Tennessee Valley Authority, 1101 Market Street, LP 5A, Chattanooga, Tennessee 37402-2801

August 5, 2008

10 CFR 52.80

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of	)	Docket Numbers	52-014 and 52-015
Tennessee Valley Authority	)		

BELLEFONTE COMBINED LICENSE APPLICATION – RESPONSE TO ENVIRONMENTAL REPORT REQUEST FOR ADDITIONAL INFORMATION – TERRESTRIAL AND AQUATIC ECOLOGY

Reference: Letter from Mallecia Hood (NRC) to Ashok S. Bhatnaker (TVA), Request for Additional Information Regarding the Environmental Review of the Combined License Application for Bellefonte Nuclear Plant, Units 3 and 4, dated July 11, 2008 [ML081840493].

This letter provides the Tennessee Valley Authority's (TVA) response to nine of the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) items included in the reference letter.

The enclosure to this letter provides a response to nine of the NRC RAIs related to Terrestrial and Aquatic Ecology, as well as identifying any associated changes that will be made in a future revision of the BLN application. The status of the terrestrial ecology and aquatic ecology RAIs is also provided in the enclosure.

If you should have any questions, please contact Thomas Spink at 1101 Market Street, LP5A, Chattanooga, Tennessee 37402-2801, by telephone at (423) 751-7062, or via email at tespink@tva.gov.

D085
NRO

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 5th day of AUG, 2008.

Jack A. Bailey
Vice President, Nuclear Generation Development
Nuclear Generation Development & Construction

Enclosure and Attachments:
See page 3.

Enclosure:

Responses to Environmental Report Information Needs – Terrestrial and Aquatic Ecology

Attachments:

2.4.1-2.	Mirarchi, R. E., ed., *Alabama Wildlife, Volume 1: A Checklist of Vertebrates and Selected Invertebrates: Aquatic Mollusks, Fishes, Amphibians, Reptiles, Birds, and Mammals*, The University of Alabama Press, 2004. (Excerpts)
2.4.1-3.	Tennessee Valley Authority, Regional Observations of Rafinesque's Big-Eared Bat in Jackson County, Alabama (including TVA Regional Natural Heritage Database Records of Observations) (Accessed in July 2008). (Entire document)
4.3.1-1.	Tennessee Valley Authority, Figure 4.3-1, Habitat Affected by Construction, Rev. 1. (Entire document)
4.3.2-1.	Tennessee Valley Authority, TVA/BLN Units 3 & 4, Barge Dock Dredge Area, July 2008. (Entire document)
5.3.1.2-1A.	Tennessee Valley Authority, Final Environmental Impact Statement, *Tennessee River and Reservoir System and Operation and Planning Review*, TVA/RDG/EQS-91/1, 1990. (Excerpts)
5.3.1.2-1B.	Tennessee Valley Authority, *Final Programmatic Environmental Impact Statement, Reservoir Operations Study*, February 2004. (Excerpts)
5.3.1.2-2A.	Tennessee Valley Authority, "Report on Larval Fish Entrainment for the Years 1975-1976, Bellefonte Nuclear Plant Units 1 and 2," 1977. (Entire document)
5.3.1.2-2B.	Tennessee Valley Authority, TVA Data Services Branch, "Summary of TVA Larval Fish Investigations," 1983. (Entire document)

cc (Enclosure and Attachments):
M. A. Hood, NRC/HQ

cc (w/o Enclosure and Attachments):
S.P. Frantz, Morgan Lewis
M.W. Gettler, FP&L
R.C. Grumbir, NuStart
P.S. Hastings, NuStart
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R.H. Kitchen, PGN
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L. Reyes, NRC/RII
R.F. Smith-Kevern, DOE/HQ
G.A. Zinke, NuStart

RESPONSE TO ENVIRONMENTAL REPORT REQUESTS FOR ADDITIONAL INFORMATION

TERRESTRIAL ECOLOGY AND AQUATIC ECOLOGY

This enclosure provides the status of the Bellefonte Nuclear Plant, Units 3 and 4 (BLN) responses to the seven requests for additional information (RAI) related to Terrestrial Ecology and the six RAIs related to Aquatic Ecology.

Status of Requests for Additional Information Related to Terrestrial Ecology

RAI Number	Date of TVA Response
• 2.4.1-1	July 25, 2008. (Reference 1)
• 2.4.1-2	This letter – see following pages.
• 2.4.1-3	This letter – see following pages.
• 2.4.1-4	This letter – see following pages.
• 2.4.1-5	This letter – see following pages.
• 2.4.1-6	Future – expected submittal by August 11, 2008.
• 4.3.1-1	This letter – see following pages.

Status of Requests for Additional Information Related to Aquatic Ecology

RAI Number	Date of TVA Response
• 2.3.1-1	August 4, 2008. (Reference 2)
• 2.4.2-1	Future – expected submittal by August 11, 2008.
• Table 2.4-7	This letter – see following pages.
• 4.3.2-1	This letter – see following pages.
• 5.3.1.2-1	This letter – see following pages.
• 5.3.1.2-2	This letter – see following pages.

References:

1. Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Bellefonte Combined License Application – Response to Environmental Report Request for Additional Information – Terrestrial Ecology," dated July 25, 2008.
2. Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Bellefonte Combined License Application – Response to Environmental Report Request for Additional Information – Hydrology," dated August 4, 2008.

NRC Review of the BLN Environmental Report

NRC Environmental Category: TERRESTRIAL ECOLOGY

NRC RAI NUMBER: 2.4.1-2

Discuss what wildlife species are likely to be found in native grass, mixed hardwood forested wetland, and emergent wetland cover types.

BLN RESPONSE:

As discussed in Environmental Report Subsection 2.4.1.3, species of fauna typical of native grass include the following:

- Eastern cottontail rabbit (*Sylvilagus floridanus*)
- Woodchuck (*Marmota monax*)
- Hispid cotton rat (*Sigmondon hispidus*)
- Least shrew (*Cryptotis parva*)
- Eastern meadow lark (*Sturnella magna*)
- Field sparrow (*Spizella pusilla*)
- Gray rat snakes (*Elaphe obsolete spiloides*)
- Eastern garter snakes (*Thamnophis sirtalis sirtalis*)
- Fowler's toad (*Bufo fowleri*)
- American toads (*Bufo americanus*)

In northeastern Alabama, mixed hardwood forested wetlands provide suitable habitat for the following fauna (Attachment 2.4.1-2):

- Swamp rabbits (*Sylvilagus aquaticus*)
- Cotton mouse (*Peromyscus gossypinus*)
- Muskrat (*Ondatra zibethicus*)
- American toad (*Bufo americanus)*
- Northern cricket frog (*Acris crepitans crepitans*)
- Cope's gray tree frog (*Hyla chryoscelis*)
- Mountain chorus frog (*Pseudacris brachyphona*)
- Northern spring peeper (*Pseudacris crucifer crucifer*)
- American bullfrog (*Rana catesbeiana*)
- Upland chorus frog (*Pseudacris feriarum feriarum*)
- Southern leopard frog (*Rana sphenocephala*)
- Mud snake (*Farancia abacura*)

- Midland water snake (*Nerodia sipendon pleuralis*)
- Eastern Ribbon snake (*Thamnphis sauritis sauritis)*
- Pond slider (*Trachemys scripta*)
- Stinkpot (*Sternotherus minor*)

Fauna typical of emergent wetland habitat in northeastern Alabama (Attachment 2.4.1-2) include the following:

- Marsh rice rat (*Oryzomys palustris*)
- Muskrat (*Ondatra zibethicus*)
- American toad (*Bufo americanus)*
- Northern cricket frog (*Acris crepitans crepitans*)
- Green tree frog (*Hyla cinerea*)
- American bullfrog (*Rana catesbeiana*)
- Upland chorus frog (*Pseudacris feriarum feriarum*)
- Southern leopard frog (*Rana sphenocephala*)
- Mud snake (*Farancia abacura*)
- Plain bellied water snake (*Nerodia erythrogaster*)
- Midland water snake (*Nerodia sipendon pleuralis*)
- Eastern Ribbon snake (*Thamnphis sauritis sauritis)*
- Pond slider (*Trachemys scripta*)
- Stinkpot (*Sternotherus minor*)
- Great blue heron (*Ardea Herodias*)
- Snowy egret (*Egretta thula*)

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

Change COLA Part 3, ER Chapter 2, Subsection 2.4.1.3, by inserting the following text as the last two paragraphs of the subsection, as follows:

The BLN site includes approximately 11 ac. of mixed hardwood forested wetlands. Mammals associated with mixed hardwood forested wetlands in Alabama include swamp rabbits (*Sylvilagus aquaticus*), cotton mice (*Peromyscus gossypinus*), and muskrats (*Ondatra zibethicus*). Forested wetlands also provide suitable habitat for a variety of reptiles and amphibians. American toad (*Bufo americanus*), northern cricket frog (*Acris crepitans crepitans*), Cope's gray tree frog (*Hyla chryoscelis*), mountain chorus frog (*Pseudacris brachyphona*), northern spring peeper (*Pseudacris crucifer crucifer*), American bullfrog (*Rana catesbeiana*), upland chorus frog (*Pseudacris feriarum feriarum*), southern leopard

frog (*Rana sphenocephala*), mud snake (*Farancia abacura*), midland water snake (*Nerodia sipendon pleuralis*), eastern ribbon snake (*Thamnphis sauritis sauritis*), pond slider (*Trachemys scripta*), and stinkpot (*Sternotherus minor*) amphibian and reptile populations are common to forested wetlands in northern Alabama. (Reference 8)

Two emergent wetlands adjacent to Town Creek have been identified on the BLN site. Marsh rice rats (*Oryzomys palustris*) and muskrats (*Ondatra zibethicus*) are common mammals identified in emergent wetlands. Amphibians and reptiles thrive in emergent wetland environments. American toad (*Bufo americanus*), northern cricket frog (*Acris crepitans crepitans*), green tree frog (*Hyla cinerea*), American bullfrog (*Rana catesbeiana*), upland chorus frog (*Pseudacris feriarum feriarum*), southern leopard frog (*Rana sphenocephala*), mud snake (*Farancia abacura*), plain bellied water snake (*Nerodia erythrogaster*), midland water snake (*Nerodia sipendon pleuralis*), eastern ribbon snake (*Thamnphis sauritis sauritis*), pond slider (*Trachemys scripta*), and stinkpot (*Sternotherus minor*) populations are associated with emergent wetlands in Alabama. Herons, including the great blue heron (*Ardea Herodias*) and snowy egrets (*Egretta thula*), often forage in emergent wetlands. (Reference 8)

ATTACHMENTS:

The following document is provided as Attachment 2.4.1-2:

2.4.1-2. Mirarchi, R. E., ed., *Alabama Wildlife, Volume 1: A Checklist of Vertebrates and Selected Invertebrates: Aquatic Mollusks, Fishes, Amphibians, Reptiles, Birds, and Mammals*, The University of Alabama Press, 2004. (Excerpts)

NRC Review of the BLN Environmental Report

NRC Environmental Category: TERRESTRIAL ECOLOGY

NRC RAI NUMBER: 2.4.1-3

Have Rafinesque's big-eared bats been observed near the BLN site? Describe where/when the nearest surveys were conducted by a qualified bat biologist.

BLN RESPONSE:

TVA's Regional Natural Heritage Database contains six records of Rafinesque's big-eared bats (*Corynorhinus rafinesquii*), also known as Eastern big-eared bats, having been observed in Jackson County, Alabama (Attachment 2.4.1-3). These six observations were made from 1953 to 1978 and are considered historical. The locality of the observations, shown in Attachment 2.4.1-3, range between 13 and 23 miles from the BLN project site. Several of these sites have been examined in the past decade, and no big-eared bats were observed at these localities.

Endangered species biologists from the Alabama Department of Conservation and Natural Resources, and from TVA, have examined many caves in Jackson County and throughout northern Alabama since 1990, and found no populations of big-eared bats in caves in this region. One big-eared bat was captured at the Walls of Jericho, northwest of Scottsboro, Alabama, during a mist nest survey in 2007. This is the only known record of this species in northern Alabama for several decades. The Walls of Jericho area is dominated by sandstone outcrops and deep gorges. This habitat does not exist at the BLN site.

Forested habitat at the BLN site was examined on June 11, 2008. No potential roost trees (mature hollow trees) suitable for use by big-eared bats were found on the site. An old water storage and pump facility was also examined (externally). Louvered ventilation openings and areas along the eaves and roof line of the facility were examined for staining that would indicate that the structure was used by bats. No evidence of bats was identified.

The closest suitable habitat for this species exists in wetlands on Bellefonte Island (mature hollow trees) in the Tennessee River and along the extensive sandstone escarpment of Sand Mountain located south and across the river from the BLN site. Given the overall lack of suitable roost trees, caves, or sandstone outcrops and no evidence of bat use at the water pump facility, the likelihood that Rafinesque's big-eared bats use the BLN site is minimal.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

None.

ATTACHMENT:

The following document (map and data) are provided as Attachment 2.4.1-3:

2.4.1-3. Tennessee Valley Authority, Regional Observations of Rafinesque's Big-Eared Bat in Jackson County, Alabama (including TVA Regional Natural Heritage Database Records of Observations) (Accessed July 2008). (Entire document)

NRC Review of the BLN Environmental Report

NRC Environmental Category: TERRESTRIAL ECOLOGY

NRC RAI NUMBER: 2.4.1-4

What keystone species are present within BLN cover types?

BLN RESPONSE:

Keystone species have a disproportional effect on an ecosystem relative to their abundance. A species that serves as the only member of a niche would be considered a keystone species. If that species were removed, substantial changes to the ecosystem would result. Species common to the BLN site occupy trophic levels that are sufficiently broad such that niche overlap is widespread. Thus, no keystone species have been identified on the BLN site. Because a single organism is not the sole constituent of a niche on the BLN site, the removal of a single species would not cause cascading effects through the ecosystem.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

Change COLA Part 3, ER Chapter 2, Section 2.4, by adding new Subsection 2.4.1.4.6, as follows:

2.4.1.4.6 Keystone Species

Keystone species have a disproportional effect on an ecosystem relative to their abundance. A species that serves as the only member of a niche would be considered a keystone species. If that species were removed, substantial changes to the ecosystem would result. Species common to the BLN site occupy trophic levels that are sufficiently broad such that niche overlap is widespread. Thus, no keystone species have been identified on the BLN site. Because a single organism is not the sole constituent of a niche on the BLN site, the removal of a single species would not cause cascading effects through the ecosystem.

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: TERRESTRIAL ECOLOGY

NRC RAI NUMBER: 2.4.1-5

What species may function as indicators of ecological health on the BLN Site?

BLN RESPONSE:

Species that may function as indicators of ecological health are groups or types of biological resources that can be used to assess environmental conditions. Such species are often, but not limited to, state or federally-listed species and other rare species. Typically, such organisms at or near a site can be selected to characterize the current ecological status of the site or to track or predict significant change in the future.

Terrestrial organisms that inhabit the BLN site are common inhabitants of the Sequatchie Valley ecoregion. There is little population information available for those organisms that are less common, which limits the ability to track possible changes to their status in the future. Therefore, no species exist at the site that might function as true ecological indicators.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

Change COLA Part 3, ER Chapter 2, Section 2.4, by inserting new Subsection 2.4.1.4.7, as follows:

2.4.1.4.7 Ecological Indicators

Species that may function as indicators of ecological health are groups or types of biological resources that can be used to assess environmental conditions. Such species are often, but not limited to, state or federally listed species and other rare species. Typically, such organisms at or near a site can be selected to characterize the current ecological status of the site or to track or predict significant change in the future.

Terrestrial organisms that inhabit the BLN site are common inhabitants of the Sequatchie Valley ecoregion. There is little population information available for those organisms that are less common, which limits the ability to track possible changes in their status in the future. Therefore, no species exist at the site that might function as true ecological indicators.

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: TERRESTRIAL ECOLOGY

NRC RAI NUMBER: 4.3.1-1

Identify how much acreage of each cover type will be permanently lost due to the construction and operation. Identify how much will be temporarily lost and what cover type the reclaimed community will resemble.

BLN RESPONSE:

Areas of previously undisturbed habitat that would be permanently lost due to construction are illustrated in the revision to ER Figure 4.3-1 provided as Attachment 4.3.1-1 to this enclosure. As indicated in Table 1 below, approximately 87 acres of various cover types would be permanently lost. The remainder of construction and operational impacts would occur on previously disturbed areas composed of existing facilities and improved yard grass areas.

Areas temporarily lost would not be restored to their preconstruction undisturbed habitat cover type, but instead would be available for reclamation. Reclaimed areas would resemble the improved yard grass areas currently maintained at the site.

In ER Subsection 4.3.1.1, approximately 147 acres are described as the area of anticipated disturbance based on previously affected areas. This area was derived from an amalgam of existing and planned buildings, as well as previously disturbed yard grass areas. Because permanent facilities and maintained yard grass provide limited habitat for wildlife, the reference to 147 acres in Subsection 4.3.1.1 is removed.

Table 1

Estimated Acreage of Permanently Lost Habitat by Cover Type

Previously Undisturbed Habitat to Be Permanently Lost (by Cover Type)	Acres	Habitat Lost (Percent of Each Cover Type Habitat on BLN Property)
Mixed Hardwood and Pine Forest	60	7
Native Grasses	13	11
Mixed Hardwood Forested Wetlands	11	100
Scrub-Shrub	3	1
Note: Previously disturbed yard grass areas are not included as a permanent habitat loss, because maintenance activities (mowing, fertilizing, etc.) limit their usefulness as wildlife habitat.		

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

Change COLA Part 3, ER Chapter 4, Section 4.3, beginning with paragraph 2, and Subsections 4.3.1 and 4.3.1.1, as follows:

Generally, potential impacts associated with construction are temporary and minor, except for the addition of permanent structures, which affect a small percentage of habitats. An estimated ~~188~~ 200 ac. of the 1600-ac. site are expected to be affected by the construction of a new facility (Figure 4.3-1). ~~(Calculation of affected acreage did not include 254 ac. of cultivated grasslands, because they are areas that have been previously altered and routinely maintained, and therefore are of poor habitat quality).~~ When BLN construction is complete, approximately 60 ac. of the affected acreage are expected to contain permanent structures including paved lots. Altered areas not containing permanent structures are revegetated with grasses and routinely maintained following construction. Figure 3.1-6 depicts a detailed construction plan.

4.3.1 TERRESTRIAL ECOSYSTEMS

A detailed and comprehensive description of the terrestrial environment at the BLN site is provided in Section 2.4.1.

4.3.1.1 Terrestrial Vegetation

Common effects of construction at the BLN site include temporary and long-term alteration and loss of vegetative cover, loss of habitat, increased erosion, and increased interaction between humans and wildlife. Approximately ~~55~~60 ac. of mixed hardwood and pine hardwood forests, 13 ac. of native grass fields, ~~and~~ 11 ac. of hardwood forested wetlands, and 3 ac. of scrub-shrub communities are located within the proposed construction area. These areas of land represent approximately 7 percent, 11 percent, ~~and~~ 100 percent, and 1 percent of the above habitat types, respectively, within the boundary of the BLN site~~,~~ ~~respectively~~. The remaining acres ~~area~~ of proposed disturbance~~, approximately 147 ac.,~~ are in areas previously disturbed by the original construction of Bellefonte Units 1 and 2. Because vegetative communities within the BLN boundary are common within the entire Sequatchie Valley, the affected area located on BLN property would be a very small percentage relative to the total areas present in the region.

ATTACHMENT:

The following figure is provided as Attachment 4.3.1-1:

4.3.1-1. Tennessee Valley Authority, Figure 4.3-1, Habitat Affected by Construction, Rev. 1. (Entire document)

NRC Review of the BLN Environmental Report

NRC Environmental Category: AQUATIC ECOLOGY

NRC RAI NUMBER: Table 2.4-7

Provide an explanation, if available, of the observed decline in fish species between the 1949 – 1984 samples and the 2002-2006 samples.

BLN RESPONSE:

At least two explanations exist to explain species discrepancies across the years. First and foremost, sampling gear is inherently biased. Sampling methods historically used to collect fish have changed substantially compared to currently permitted sampling methods. Historically, TVA assessed standing stocks of fish using the chemical rotenone to sample several 2 to 5-acre coves per reservoir in the Tennessee River Valley. This method kills the fish assemblage within the cove or embayment, and every fish can be identified and counted. Electrofishing and gill netting are techniques currently employed, but sampling biases associated with current sampling gear should be considered when comparing data collected by different methods. Due to sampling effectiveness and habitat preferences of fishes, it is impossible to identify all fish in any given area. For example, darters, chubs, shiners, and minnows typically inhabit shallow, littoral areas, which are difficult to sample by gill net and not readily accessible by boats carrying shock equipment. Electrofishing in reservoir environments also has depth limitations, because the electrical field that can be generated is usually quite small. Gill nets are usually limited by net size and positioning in the water body; however, they sit on the bottom and are exempt from depth limitations encountered by electrofishing. Utilization of two currently permitted sampling methods with different biases provides an entirely adequate basis of information to determine fish community structure and function without killing entire fish assemblages.

In addition to equipment biases, seasonal sampling bias can be introduced when comparing samples taken with differing techniques from different times of year. For example, samples collected in spring seasons are typically used to collect spawning fish species like walleye, sauger, and paddlefish. Because TVA samples in the fall of the year, these species may be overlooked.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

None.

ATTACHMENTS:

None.

NRC Review of the BLN Environmental Report

NRC Environmental Category: AQUATIC ECOLOGY

NRC RAI NUMBER: 4.3.2-1

Confirm whether restoration plans on the barge slip/dock could involve removal of existing banks and whether refurbishment includes dredging in the vicinity of the barge slip. If disturbance of the current habitat is anticipated, identify the area of disturbance.

BLN RESPONSE:

Restoration of the existing barge slip is planned during plant construction. The barge slip is located in an inlet of the Guntersville Reservoir, as shown in Attachment 4.3.2-1. This illustration is a marked-up excerpt from the TVA/BLN Drawing DWG-NUSTART-004, which was provided as Attachment C in the referenced TVA letter dated June 12, 2008. The existing barge slip and dock area consists of a three-sided structure constructed from driven pilings lined with corrugated metal sheeting on the north and south sides. The third side at the end of the inlet is sloped bank. As depicted in Attachment 4.3.2-1, the floor of the barge slip, including the area along the base of the existing dock structure, would be dredged (i.e., desilted) to a depth adequate to accommodate barge traffic. These maintenance dredging activities are expected to be similar to, but of smaller impact than, dredging that took place during initial construction of the barge dock. No previously undisturbed habitats (terrestrial or aquatic) are expected to be affected by the dredging process.

This response is PLANT-SPECIFIC.

Reference:

Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Hydrology," dated June 12, 2008 [ML081280468].

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

None.

ATTACHMENTS:

The following figure is provided as Attachment 4.3.2-1:

4.3.2-1. Tennessee Valley Authority, TVA/BLN Units 3 & 4, Barge Dock Dredge Area, July 2008. (Entire document)

NRC Review of the BLN Environmental Report

NRC Environmental Category: AQUATIC ECOLOGY

NRC RAI NUMBER: 5.3.1.2-1

Provide a current characterization of ichthyoplankton in the vicinity of the BLN site, or provide the basis for assuming the 1977-1983 data is still valid.

BLN RESPONSE:

The data collected from 1977 through 1983 are still valid, because there have not been any major changes in the reservoir fish assemblage, water quality, or habitat in Guntersville Reservoir that would indicate an alteration to spawning success of fish. This statement is based on data and information in TVA's 1985 study titled, "*Preoperational Assessment of Water Quality and Biological Resources of Guntersville Reservoir in the Vicinity of Bellefonte Nuclear Plant, 1974-1984*," provided in the TVA letter dated June 2, 2008 (Reference 1), as Attachment A to Enclosure 2, and inferred from Vital Signs reservoir sampling data presented in studies that were provided in the TVA letter dated June 11, 2008 (Reference 2) as Attachments A through H to Enclosure 1.

The 1985 preoperational assessment study concluded that the data collected from 1977 through 1983 indicated no major changes in the relative abundance or distribution of ichthyoplankton in the vicinity of BLN. In addition, changes in reservoir conditions or operations in the intervening years, based on TVA's 1990 Lake Improvement Plan (Attachment 5.3.1.2-1A) and implementation of its Reservoir Operations Study (Attachment 5.3.1.2-1B), would not likely have caused changes in temporal or spatial distribution of ichthyoplankton in the vicinity of BLN.

This response is PLANT-SPECIFIC.

References:

1. Letter from Andrea L. Sterdis (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Terrestrial and Aquatic Ecology," dated June 2, 2008 [ML081570368].
2. Letter from Jack A. Bailey (TVA) to NRC Document Control Desk, "Response to NRC Information Needs Related to Reservoir Vital Signs Monitoring Reports and Coal Gasification Project Environmental Impact Statement," dated June 11, 2008 [ML081970366].

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

None.

ATTACHMENTS:

The following documents are provided as Attachments 5.3.1.2-1A and 5.3.1.2-1B:

5.3.1.2-1A.	Tennessee Valley Authority, Final Environmental Impact Statement, *Tennessee River and Reservoir System Operation and Planning Review,* TVA/RDG/EQS-91/1, December 1990. (Excerpts)
5.3.1.2-1B.	Tennessee Valley Authority, *Final Programmatic Environmental Impact Statement, Reservoir Operations Study*, February 2004. (Excerpts)

NRC Review of the BLN Environmental Report

NRC Environmental Category: AQUATIC ECOLOGY

NRC RAI NUMBER: 5.3.1.2-2

Provide an estimate of the level of entrainment at the BLN site.

BLN RESPONSE:

Entrainment estimates presented in the report entitled, "Report on Larval Fish Entrainment for the Years 1975-1976, Bellefonte Nuclear Plant Units 1 and 2" (Attachment 5.3.1.2-2A), are based on predictions of intake design and hydraulic flow characteristics, where it is assumed that biotic entrainment is equal to hydraulic entrainment (percent of river flow withdrawn by the intake). This report concludes that this comparison is conservative and overestimates biotic entrainment, due to a variety of factors such as (1) the assumption of a temporally and spatially homogeneous distribution of ichthyoplankton, (2) the behavior of larval fish in association with shelter or substrate, and (3) the ability of larval fish to withstand and escape from low-velocity water currents. During this study, the percent entrainment of larval fish and eggs ranged from 0.47 to 1.37 and from 0.14 to 0.26, respectively. The total number of larval fish and eggs entrained during both years of monitoring ranged from 3.314×10^7 to 8.046×10^7 and from 1.068×10^7 to 6.983×10^7, respectively. These estimates were based on an intake demand of 3.675×10^5 m^3/d for the original design of Bellefonte Units 1 and 2.

The intake system description for the AP1000 reactor systems states that the daily average flow of Guntersville Reservoir past the site is 38,850 cfs or 9.50×10^7 m^3/d (Subsection 2.3.1.2.2). The intake makeup water during normal operation is reported to be 110 cfs or 2.70×10^5 m^3/d (Subsection 3.4.2.1). Therefore, the hydraulic entrainment is 0.28 percent.

Larval fish densities, expressed as numbers per 1000 m^3 of water sampled and collected in reservoir transects adjacent to the BLN site from 1975 through 1983, ranged from 19,480 to 197,402/1000 m^3 of water sampled and averaged a total of 54,783 fish larvae over the nine years of sampling (Attachment 5.3.1.2-2B). If the biotic entrainment is equal to hydraulic entrainment, albeit a conservative assumption, then 0.28 percent of the annual average larval fish density would represent the level of entrainment of fish larvae at the BLN site. This yields an estimated 15,340/1000m^3 of fish larvae entrained.

This response is PLANT-SPECIFIC.

ASSOCIATED BLN COL APPLICATION TEXT CHANGES:

1. Change COLA Part 3, ER Chapter 5, Subsection 5.3.1.2.1, by inserting three new paragraphs after the sixth paragraph, as follows:

   Entrainment of ichthyoplankton and larval fish carries a 100% mortality rate. A study of ichthyoplankton and larval fish in the Guntersville Reservoir from 1977 – 1983 did not result in the collection of any species of special interest. The overwhelming majority (95 percent) of entrained ichthyoplankton were from freshwater drum (*Aplodinotus grunniens*), which are one of the only pelagic spawning fish species (Reference 7). However, egg characteristics of many fish species are such that they would not be entrained. Some Catostomidae species lay heavy eggs in open water, which sink to the bottom leaving them less vulnerable to current patterns (Reference 18). Species from families Catostomidae, Clupeidae, Cyprinidae and Percidae lay eggs with adhesive properties that stick to substrate such as

logs or emergent vegetation and are not susceptible to directional flow (References 18 and 19). Some species of families Centrarchidae, Ictaluridae, and Cyprinidae display parental care by laying eggs in nests and guarding them until they hatch. (References 19, 20 and 21)

Entrainment estimates presented in a 1977 TVA report (Reference 23) are based on predictions of intake design and hydraulic flow characteristics, where it is assumed that biotic entrainment is equal to hydraulic entrainment (percent of river flow withdrawn by the intake). This report concludes that this comparison is conservative and overestimates biotic entrainment due to a variety of factors such as (1) the assumption of a temporally and spatially homogeneous distribution of ichthyoplankton, (2) the behavior of larval fish in association with shelter or substrate, and (3) the ability of larval fish to withstand and escape from low-velocity water currents. During this study the percent entrainment of larval fish and eggs ranged from 0.47 to 1.37 and 0.14 to 0.26, respectively. The total number of larval fish and eggs entrained during both years of monitoring ranged from 3.314×10^7 to 8.046×10^7 and 1.068×10^7 to 6.983×10^7, respectively. These estimates were based on the intake demand of 3.675×10^5 m^3/d for original design of Bellefonte Units 1 and 2.

The intake system description for the currently considered AP1000 reactor systems states that the daily average flow of Guntersville Reservoir past the site is 38,850 cfs or 9.50×10^7 m^3/d (Subsection 2.3.1.2.2). The intake makeup water during normal operation is reported to be 110 cfs or 2.70×10^5 m^3/d (Subsection 3.4.2.1). Therefore, the hydraulic entrainment is 0.28 percent.

Larval fish densities, expressed as numbers per 1000 m^3 of water sampled, collected in reservoir transects adjacent to Bellefonte Nuclear Plant site from 1975 through 1983 ranged from 19,480 to 197,402/1000m^3 and averaged a total of 54,783 fish larvae over the nine years of sampling (Reference 24). If the biotic entrainment is equal to hydraulic entrainment, albeit a conservative assumption, then 0.28 percent of the annual average larval fish density would represent the level of entrainment of fish larvae at the BLN site. This yields an estimated 15,339.2/1000m^3 of fish larvae entrained.

2. Change COLA Part 3, ER Chapter 5, Subsection 5.3.5, by adding references as follows:

23. Tennessee Valley Authority, "Report on Larval Fish Entrainment for the Years 1975 - 1976, Bellefonte Nuclear Plant Units 1 and 2," 1977.

24. Tennessee Valley Authority, TVA Data Services Branch, "Summary of TVA Larval Fish Investigations," 1983.

ATTACHMENTS:

The following documents are provided as Attachments 5.3.1.2-2A and 5.3.1.2-2B to this enclosure:

5.3.1.2-2A. Tennessee Valley Authority, "Report on Larval Fish Entrainment for the Years 1975 – 1976, Bellefonte Nuclear Plant Units 1 and 2," 1977. (Entire document)

5.3.1.2-2B. Tennessee Valley Authority, TVA Data Services Branch, "Summary of TVA Larval Fish Investigations," 1983. (Entire document)

ATTACHMENT 2.4.1-2
MIRARCHI, R.E., ED.
ALABAMA WILDLIFE, VOLUME 1
A CHECKLIST OF VERTEBRATES AND SELECTED INVERTEBRATES:
AQUATIC MOLLUSKS, FISHES, AMPHIBIANS, REPTILES, BIRDS, AND MAMMALS
2004

Mirarchi, R.E., ed.

Alabama Wildlife, Volume 1: A Checklist of Vertebrates and Selected Invertebrates: Aquatic Mollusks, Fishes, Amphibians, Reptiles, Birds, and Mammals

(13 pages: Title page, copyright page, pages 104 - 109, 122 – 132, and 192 – 195

2004

ALABAMA WILDLIFE

~VOLUME I~

A Checklist of Vertebrates and Selected Invertebrates: Aquatic Mollusks, Fishes, Amphibians, Reptiles, Birds, and Mammals

RALPH E. MIRARCHI

Published for, and in cooperation with,

The Division of Wildlife and Freshwater Fisheries
Alabama Department of Conservation and Natural Resources

and

The School of Forestry and Wildlife Sciences and
The Alabama Agricultural Experiment Station, Auburn University

by

The University of Alabama Press
Tuscaloosa and London

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The paper on which this book is printed meets the minimum requirements of American National Standard for Information Science–Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.

Library of Congress Cataloging-in-Publication Data

Alabama wildlife / [edited by] Ralph E. Mirarchi ... [et al.].
p. cm.
Updates and expands: Vertebrate wildlife of Alabama. 1984 andVertebrate animals of Alabama in need of special attention. 1986.
"Published for, and in cooperation with, the Division of Wildlife and Freshwater Fisheries, Department of Conservation and Natural Resources and the School of Forestry and Wildlife Sciences and the Alabama Experiment Station, Auburn University."
Includes bibliographical references.
Contents:
— v.1. A checklist of vertebrates and selected invertebrates: Aquatic mollusks, fishes, amphibians, reptiles, birds, and mammals. ISBN 0-8173-5130-2 (pbk. : alk paper)
— v.2. Imperiled aquatic mollusks and fishes ISBN 0-8173-5131-0
— v.3. Imperiled amphibians, reptiles, birds, and mammals. ISBN 0-8173-5132-9 (pbk. : alk paper)
— v.4.Conservation and management recommendations for imperiled wildlife. ISBN 0-8173-5133-7 (pbk. : alk paper)
1. Vertebrates—Alabama. 2. Endangered species—Alabama. I. Mirarchi, R. E. (Ralph Edward), 1950– II. Alabama. Division of Wildlife and Freshwater Fisheries. III. Auburn University. School of Forestry and Wildlife Sciences. IV. Alabama Agricultural Experiment Station. V. Vertebrate wildlife of Alabama. VI. Vertebrate animals of Alabama in need of special attention.

AL606.52.U6A58 2004
596'.09761—dc22

2003064557

The University of Alabama Press
Tuscaloosa, Alabama 35487-0380

tiles) that the committee felt merited separate treatment. Five established exotic species, one frog and four lizards, also are documented within the state.

Priority designations were based on each species' population in Alabama, without regard to status elsewhere. Thus, a species whose distribution barely reaches the state may be classified as Priority 1, 2, or 3, even though it may be secure in adjacent states. The committee followed the scientific nomenclature of Crother (2000). However, the selection of common names was guided by traditional usage, and frequently differed from those proposed in that document.

I thank the other 16 committee members for the dedicated effort each put into this project. I am most indebted and grateful to Robert H. Mount, previous chair of this committee, editor of the 1984 and 1986 publications, and author of *The Repiles and Amphibians of Alabama*. His long-term naturalist's perspective has been invaluable, and much of what follows in this section is derived extensively from his work.

Mark A. Bailey

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AMPHIBIANS
CLASS AMPHIBIA

FROGS AND TOADS
ORDER ANURA

"TRUE" TOADS - FAMILY BUFONIDAE

American Toad *Bufo americanus*. Fairly common in northeastern Alabama above Fall Line Hills. Breeds in temporary woodland pools January to May. Encountered most frequently late winter to early spring near deciduous forest. Lowest Conservation Concern.

Fowler's Toad *Bufo fowleri*. Common statewide in a variety of habitats, including disturbed areas. Breeds March to August, often in more permanent aquatic sites than other toads. Alabama's most commonly encountered and widely distributed toad; often seen on roads. Lowest Conservation Concern.

Oak Toad *Bufo quercicus*. Uncommon to fairly common south of Blackland Prairie. Found locally in Coosa River Valley of Ridge and Valley, where it has not been verified for many years. Breeds April to July in temporary pools. Inhabits areas of sandy soils, especially fire-maintained pine flatwoods, where it may be absent from some areas of seemingly suitable habitat. MODERATE CONSERVATION CONCERN. **(Fig. 80, p. 113)**

Southern Toad *Bufo terrestris*. Common in southern and western portions of Alabama, occupying all of Coastal Plain and western portions of Southwestern Appalachians. Breeds March to June in small ponds and woodland pools. Exploits a variety of habitats. Often seen on roads. Lowest Conservation Concern. **(Fig. 81, p. 113)**

TREEFROGS AND ALLIES - FAMILY HYLIDAE

Northern Cricket Frog *Acris crepitans crepitans*. Common above Fall Line Hills and locally common in Coastal Plain. Occurs essentially statewide. Breeds March through August in a wide variety of aquatic habitats, especially margins of permanent water bodies with sparse vegetation. Low Conservation Concern. **(Fig. 82, p. 113)**

Southern Cricket Frog *Acris gryllus gryllus*. Common in Coastal Plain, locally common above Fall Line Hills, absent from northeastern and extreme northern Alabama. Breeds March through August in, and near, temporary water bodies, preferring weedy shorelines, wet meadows, and similar habitats. Lowest Conservation Concern.

Pine Barrens Treefrog *Hyla andersonii*. Threatened. Known from fewer than 20 isolated locations in southern Escambia, Covington, and Geneva Counties as part of a disjunct population shared with the Florida Panhandle. Breeds March to August in fire-maintained shrub bogs. Habitat quality and quantity declining, especially on private lands. HIGH CONSERVATION CONCERN.

Bird-voiced Treefrog *Hyla avivoca*. Common in Coastal Plain to which it is apparently restricted. If valid, one unverified record from St. Clair County in Ridge and Valley ecoregion would represent a northern disjunct population. Breeds April through July in forested swamps, beaver ponds, and floodplains. Lowest Conservation Concern.

Cope's Gray Treefrog *Hyla chrysoscelis*. Common statewide. Breeds April through August in temporary to semi-permanent pools. Found in a variety of habitats, most frequently in association with deciduous forest. Lowest Conservation Concern.

Green Treefrog *Hyla cinerea*. Common nearly statewide, but rare or absent from portions of Interior Plateau and northern portions of Southwestern Appalachians, Ridge and Valley, and Piedmont. Breeds April to August in permanent aquatic habitats with emergent vegetation. Lowest Conservation Concern.

Pine Woods Treefrog *Hyla femoralis*. Locally common in Coastal Plain, where most frequently encountered in Dougherty Plain and Southern Pine Plains and Hills. Disjunct populations in Ridge and Valley have not been verified in many years. Breeds April to August in temporary pools and ponds. Typically inhabits pine-dominated forests in areas of sandy soils. Lowest Conservation Concern.

Barking Treefrog *Hyla gratiosa*. Fairly common in Coastal Plain, scarcer in other regions, where suitable habitats often are limited and distribution more localized. Occurs essentially statewide. Breeds March through July, usually in temporary ponds or fishless semi-permanent ponds. Low Conservation Concern. **(Fig. 83, p. 113)**

Squirrel Treefrog *Hyla squirella*. Common in Coastal Plain, less common and local in Ridge and Valley and extreme southern Piedmont. Breeds April to August in temporary pools and ponds, exploits a variety of habitats, and often encountered around buildings. Lowest Conservation Concern.

Mountain Chorus Frog *Pseudacris brachyphona*. Fairly common from Fall Line Hills northward, absent from most of Coastal Plain. Breeds December to April in shallow temporary pools in wooded areas, most often in hilly terrain. Lowest Conservation Concern.

Northern Spring Peeper *Pseudacris crucifer crucifer*. Common statewide. Breeds January to April in ponds, pools, and swamps in, or near, wooded areas. Rarely encountered during warmer months. Lowest Conservation Concern. **(Fig. 84, p. 113)**

Upland Chorus Frog *Pseudacris feriarum feriarum*. Common nearly statewide; absent from extreme southern Alabama except along Conecuh and Chattahoochee Rivers, where its distribution barely extends into Florida. Breeds December to April in temporary pools in woods and fields. Lowest Conservation Concern.

Southern Chorus Frog *Pseudacris nigrita nigrita*. Locally common in Dougherty Plain and Southern Pine Plains and Hills. Also occurs in eastern portion of Southern Hilly Gulf Coastal Plain. Breeds February to May, usually in grassy temporary wetlands in, or near, areas of sandy soils. Lowest Conservation Concern.

Little Grass Frog *Pseudacris ocularis*. Rare and peripheral in Dougherty Plain. This tiniest of North American frogs, found from Florida to Virginia, barely reaches extreme southeastern Alabama. Known from only four localities in southeastern Houston County. Breeds late winter to late summer in shallow, grassy cypress ponds and roadside ditches. HIGH CONSERVATION CONCERN.

Ornate Chorus Frog *Pseudacris ornata*. Uncommon to locally common in Coastal Plain east of Cahaba and Alabama Rivers. Occurs west of Mobile Bay in southern Mississippi. Expected in Mobile and Washington Counties of Alabama. Breeds from December to March in shallow, temporary pools. Choruses indicate possible presence of other winter-breeding amphibians of conservation concern, such as gopher frogs and flatwoods salamanders. MODERATE CONSERVATION CONCERN. **(Fig. 85, p. 113)**

LEPTODACTYLID FROGS - FAMILY LEPTODACTYLIDAE

Greenhouse Frog *Eleutherodactylus planirostris*. ***Exotic***. Apparently confined to coastal areas of Baldwin and Mobile Counties, where it prefers lawn edges, gardens, and greenhouses to "natural" habitats.

NARROW-MOUTHED TOADS AND ALLIES - FAMILY MICROHYLIDAE

Eastern Narrow-mouthed Toad *Gastrophryne carolinensis*. Common statewide. A secretive burrowing frog that breeds April to September in vegetated margins of lakes, ponds, and ditches. Lowest Conservation Concern.

SPADEFOOT TOADS AND ALLIES - FAMILY PELOBATIDAE

Eastern Spadefoot *Scaphiopus holbrookii*. Locally common statewide. A secretive burrowing frog that may breed at any season following heavy rains. Capable of reproducing in pools that hold water only two to three weeks. Susceptible to destruction of breeding habitat, which may not be readily recognized as wetland. Low Conservation Concern.

"TRUE" FROGS - FAMILY RANIDAE

Gopher Frog *Rana capito*. Endangered. Principally a Coastal Plain longleaf pine forest inhabitant, where 10 historic records exist. Subspecific allocation of Alabama populations is problematic; formerly considered *R. c. sevosa*, dusky gopher frog (see Mississippi gopher frog). Highly terrestrial, but breeds late January to March in open temporary ponds. Alabama's five extant breeding sites are in Escambia and Covington Counties. The only Ridge and Valley breeding pond (Shelby County) was drained for a subdivision in 1997, and a Barbour County breeding pond was destroyed by road construction. HIGHEST CONSERVATION CONCERN.

American Bullfrog *Rana catesbeiana*. Common statewide. A large, familiar, highly aquatic frog. Breeds March to August in lakes, ponds, and many streams. Lowest Conservation Concern. **(Fig. 86, p.113)**

Bronze Frog/Green Frog *Rana clamitans* ssp. Common statewide, this highly aquatic and familiar frog is bronze (*R. c. clamitans*) in southern and green (*R. c. melanota*) in northern Alabama. Breeds April to August. Prefers swamps, small streams, and other aquatic habitats. Lowest Conservation Concern.

Pig Frog *Rana grylio*. Locally common in Lower Coastal Plain and southernmost tier of counties of Dougherty Plain and Southern Pine Plains and Hills. A large, highly aquatic frog of permanent, open water bodies with emergent vegetation. Breeds April to August. Lowest Conservation Concern.

Mississippi Gopher Frog *Rana sevosa*. Endangered/***Possibly extirpated***. Recently described (2001) as western component of what had been considered *R. capito sevosa* (dusky gopher frog) from Mobile Bay to Louisiana. Currently known from a single population in Mississippi, but also recorded from Gulf Coast Flatwoods of Alabama (mouth of Dog River). Similar in appearance and habitat requirements to gopher frog. Secretive and difficult to survey. Listed as ***endangered*** by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.

River Frog *Rana heckscheri*. Peripheral and rare in southern portion of Southern Pine Plains and Hills, and potentially in Dougherty Plain of southernmost tier of counties. Common in Florida and Georgia. Documented in Alabama from four old records. HIGHEST CONSERVATION CONCERN.

Pickerel Frog *Rana palustris*. Fairly common to uncommon and locally distributed in all regions above Fall Line, with disjunct populations in Lime Hills and Southern Pine Plains and Hills of Coastal Plain (Monroe and Conecuh Counties). Frequently encountered in, and near, cave entrances, but exploits other cool-water habitats. Breeds in winter and early spring. A Conecuh County population, associated with a limestone cave, has not been confirmed in over two decades. Low Conservation Concern. (Fig. 87, p. 114)

Southern Leopard Frog *Rana sphenocephala*. Common statewide. Fairly aquatic but ranges away from water when foraging. Often seen on roads. Breeds mostly December through March in woodland pools, swamps, ponds, and other wetlands. Lowest Conservation Concern.

Wood Frog *Rana sylvatica*. Rare and local in distribution. Documented from twelve locations in eastern Ridge and Valley and upper Piedmont from Mount Cheaha, in Talledega County, south to Horseshoe Bend in Tallapoosa County. A highly terrestrial frog of deciduous forests. Breeds January to February in woodland pools. Thought to be declining, but status not investigated in over two decades. MODERATE CONSERVATION CONCERN. (Fig. 88, p. 114)

SALAMANDERS
ORDER CAUDATA

MOLE SALAMANDERS - FAMILY AMBYSTOMATIDAE

Flatwoods Salamander *Ambystoma cingulatum*. Endangered. Historically known from five sites in low pine flatwoods of Southern Coastal Plain, Dougherty Plain, and Southern Pine Plains and Hills. Highly secretive and burrowing. Not documented in Alabama in over two decades despite surveys from 1992 to 1995. May persist in scattered remnants of intact habitat, which continue to decline through fire suppression, development, and conversion of forest type. HIGHEST CONSERVATION CONCERN.

Spotted Salamander *Ambystoma maculatum*. Uncommon to fairly common statewide except southern Coastal Plain and much of southern portions of Dougherty Plain and southern Pine Plains and Hills. Believed to be declining. Found predominantly in low hardwood forest where it breeds in woodland pools in winter. Low Conservation Concern. **(Fig. 89, p. 114)**

Marbled Salamander *Ambystoma opacum*. Fairly common and similar to spotted salamander in distribution, habits, and habitat requirements. Low Conservation Concern.

Mole Salamander *Ambystoma talpoideum*. Locally common to uncommon in Coastal Plain, with scattered populations known from Interior Plateau. Populations also known from southwestern Appalachians a few miles east of Georgia border, and expected in adjacent portions of northeastern Alabama. A burrowing salamander that breeds in winter in woodland pools. Low Conservation Concern.

Small-mouthed Salamander *Ambystoma texanum*. Poorly known in Interior Plateau and western two-thirds of Coastal Plain, where it may be largely confined to floodplains of rivers and larger streams. Extends eastward along Alabama River to Montgomery County. A winter-breeding, burrowing salamander; uses floodplain pools

Eastern Indigo Snake *Drymarchon couperi*. Endangered/***Possibly extirpated***. Historically reported from Southern Pine Plains and Hills in Mobile, Baldwin, and Covington Counties in extreme southern Alabama, but not documented from natural populations in state since 1954. Recent reports *may* be from several experimental introductions in late 1970s and 1980s. Further investigation into possibly extant natural populations is needed, especially in Mobile County. **Listed as *threatened* by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.**

Corn Snake *Elaphe guttata guttata*. Uncommon to locally fairly common statewide. While still fairly common in northern Alabama, Coastal Plain populations have declined precipitously. Somewhat arboreal, but less so than related rat snakes. Corn snakes nest in loose soil or organic debris, are mainly nocturnal, and are found in a variety of terrestrial habitats that support sizeable small rodent populations. MODERATE CONSERVATION CONCERN.

Rat Snake *Elaphe obsoleta* ssp. Fairly common statewide. This large arboreal snake, known to many as "chicken snake," has not declined like corn snakes. Rat snakes may nest high in tree cavities, a position that may reduce mortality from fire ants and other ground-foraging predators. Occurs in most terrestrial habitats, and occasionally may be found in, or near, forested suburbs. Populations in extreme northeastern Alabama are *E. o. obsoleta* (black rat snake), while others, except intergrades, are *E. o. spiloides* (gray rat snake). Lowest Conservation Concern.

Mud Snake *Farancia abacura* ssp. Uncommon to fairly common throughout Coastal Plain, wherever suitable habitat is found. Also known from Interior Plateau near Tennessee River. A large and secretive semi-aquatic snake of beaver swamps, ponds, floodplains, and sluggish streams. Includes two intergrading subspecies, *F. a. abacura* (eastern mud snake) and *F. a. reinwardti* (western mud snake). Low Conservation Concern. **(Fig. 100, p. 115)**

Rainbow Snake *Farancia erytrogramma erytrogramma*. Rare and possibly threatened. Seldom encountered in known distribution, which includes Coastal Plain and possibly adjacent regions above Fall Line Hills. Recorded from fewer than 10 locations in Alabama. A large semi-aquatic burrowing snake of rivers, large creeks, and occasionally ponds. **HIGH CONSERVATION CONCERN.**

Eastern Hog-nosed Snake *Heterodon platirhinos*. Uncommon to rare in many places where formerly common. Statewide in distribution. Often called "spreading adder," this familiar snake is apparently declining for unknown reasons. Typically inhabits fields, open woods, and disturbed areas. MODERATE CONSERVATION CONCERN.

Southern Hog-nosed Snake *Heterodon simus*. Endangered/***Possibly extirpated***. Known from portions of Coastal Plain and Ridge and Valley. A small secretive snake of sandy woods, fields, and other upland habitats. Although at least 10 records exist, none are known since 1975. Reasons for apparent decline unknown. Southern hognose snakes are declining throughout their distribution, but still occur in parts of southern Georgia, South Carolina, and Florida, and may persist in very low numbers in Alabama. **HIGHEST CONSERVATION CONCERN.**

Prairie Kingsnake *Lampropeltis calligaster calligaster*. Peripheral and uncommon in Interior Plateau, and possibly Appalachian Plateau north of Tennessee River. Known from Madison County, and may occur in Limestone and Jackson Counties. A secretive and poorly known burrowing snake of open woodlands and grassy areas. **HIGH CONSERVATION CONCERN.**

Mole Kingsnake *Lampropeltis calligaster rhombomaculata*. Uncommon to rare in Coastal Plain, uncommon elsewhere. Thought to occur statewide, but records are lacking from substantial areas. A secretive burrowing snake of woods and fields. Occasionally found above ground after dark, especially after rains. MODERATE CONSERVATION CONCERN.

Eastern Kingsnake *Lampropeltis getula getula*. Rare to uncommon, and possibly threatened. Found in south-central and eastern portion of Coastal Plain and adjacent Piedmont. Also known from Dauphin Island. A large, diurnal, conspicuous ground-dwelling snake of most terrestrial habitats. Formerly one of Alabama's most commonly encountered snakes, it and speckled kingsnake have declined markedly for reasons not well understood. **HIGH CONSERVATION CONCERN.**

Speckled Kingsnake *Lampropeltis getula holbrooki*. Rare to uncommon, and possibly threatened. Coastal Plain inhabitant, except for those portions occupied by eastern and black kingsnakes. Attains its greatest population densities in Blackland Prairie. This subspecies is similar in both habits and conservation status to eastern kingsnake. **HIGH CONSERVATION CONCERN.**

Black Kingsnake *Lampropeltis getula nigra*. Fairly common above Fall Line Hills in northern Alabama. Similar in habits to eastern and speckled kingsnakes, but apparently has not declined to extent of Coastal Plain forms of *L. getula*. Low Conservation Concern.

Scarlet Kingsnake *Lampropeltis triangulum elapsoides*. Uncommon to fairly common. Presumed statewide in distribution, but many areas lack records. Secretive and rarely seen except in spring. Along with scarlet snake, sometimes confused with the coral snake due to its similar colorful banded pattern. Low Conservation Concern.

Red Milk Snake *Lampropeltis triangulum syspila*. Uncommon and infrequently encountered in northwestern portion of Appalachian Plateau. Inhabits woodland, often near

rocky areas. A secretive snake usually found in, and under, rotting logs, and occasionally seen on roads at night. Intergrades eastward with eastern milk snake. MODERATE CONSERVATION CONCERN.

Eastern Milk Snake *Lampropeltis triangulum triangulum*. Uncommon and infrequently encountered in eastern portions of Appalachian Plateau, including Lookout Mountain. Similar in habits and habitat preference to red milk snake, with which it intergrades westward in DeKalb and Jackson Counties. MODERATE CONSERVATION CONCERN.

Eastern Coachwhip *Masticophis flagellum flagellum*. Formerly common, now declining and generally rare to uncommon, especially in northern Alabama. A large conspicuous snake of sparse grassy woods and fields from Tennessee River to coastal dunes. While some northern populations are feared extirpated, a few areas of scrubby or frequently burned Coastal Plain habitats still support fair numbers. MODERATE CONSERVATION CONCERN. **(Fig. 101, p. 115)**

Gulf Saltmarsh Snake *Nerodia clarkii clarkii*. Uncommon to fairly common in suitable habitat, which is limited. This coastal water snake has specialized habitat requirements and has declined due to destruction and degradation of salt marshes in both Baldwin and Mobile Counties. Formerly considered a subspecies of *N. fasciata*. MODERATE CONSERVATION CONCERN.

Mississippi Green Water Snake *Nerodia cyclopion*. Peripheral and fairly common in Southern Coastal Plain from Tensaw Delta westward. A large snake of forested swamps, oxbows, and sluggish, tree-lined streams, where it may be found as far as 97 kilometers (60 miles) inland from coastal areas. Less frequently encountered in lower Mobile Bay area, where forest gives way to marsh and grass flats. MODERATE CONSERVATION CONCERN.

Plain-bellied Water Snake *Nerodia erythrogaster* ssp. Common statewide. A large snake of most permanently aquatic habitats, especially swamps, sluggish streams, and weedy lakes and ponds. Chiefly nocturnal. Includes two intergrading subspecies, *N. e. erythrogaster* (red-bellied water snake) and *N. e. flavigaster* (yellow-bellied water snake). Lowest Conservation Concern.

Southern Water Snake *Nerodia fasciata* ssp. Common across southern portions of Coastal Plain. Inhabits most permanently aquatic habitats, especially sinkhole ponds and streams with abundant vegetation. Includes subspecies *N. f. fasciata* (banded water snake), *N. f. confluens* (broad-banded water snake), and *N. f. pictiventris* (Florida water snake) and intergrades. Lowest Conservation Concern.

Florida Green Water Snake *Nerodia floridana*. Peripheral and locally common in Southern Coastal Plain from Mobile Bay eastward in Baldwin County. Similar in appearance to Mississippi green water snake, but inhabits marshes and wet prairie habitats instead of forested wetlands. Not known more than 48 kilometers (30 miles) inland from coastal areas, and susceptible to local extirpations from hurricanes. MODERATE CONSERVATION CONCERN.

Diamond-backed Water Snake *Nerodia rhombifer*. Fairly common to common in western portions of Coastal Plain, extending eastward along Tennessee and Tallapoosa drainages to Macon County. A heavy-bodied large snake of river sloughs, lakes, and swamps. Low Conservation Concern.

Midland Water Snake *Nerodia sipedon pleuralis*. Common statewide, except southernmost portions of Coastal Plain, where apparently confined to immediate vicinity of Conecuh, Yellow, and Choctawhatchee Rivers. A conspicuous inhabitant of ponds, lakes, and streams, and the most frequently encountered water snake in the northern two-thirds of Alabama. Lowest Conservation Concern.

Brown Water Snake *Nerodia taxispilota*. Fairly common in southeastern portion of Coastal Plain. Most frequently encountered in streams and stream impoundments. Large and active by day, it basks conspicuously and is frequently subject to human persecution. Low Conservation Concern.

Rough Green Snake *Opheodrys aestivus*. Uncommon to fairly common statewide. Formerly more common, this familiar slender and docile snake is found in a variety of heavily vegetated terrestrial habitats, including overhanging branches around lakes and streams. Reasons for apparent decline unknown. Low Conservation Concern.

Black Pine Snake *Pituophis melanoleucus lodingi*. Rare and possibly endangered in southern Pine Plains and Hills region west of Mobile Bay. Also known from Buhrstone/Lime Hills of Clarke County. Apparently extirpated from large area around Mobile. Intergrades east of Mobile Bay with Florida pine snake. A large snake of dry, periodically burned open pine or mixed pine-scrub oak forest with abundant groundcover vegetation. **Currently a candidate for federal listing. HIGHEST CONSERVATION CONCERN.**

Northern Pine Snake *Pituophis melanoleucus melanoleucus*. Rare and possibly threatened. Populations may be disjunct and very localized in Ridge and Valley, Appalachian Plateau, and Interior Plateau. A large upland snake of relatively open, periodically burned pine or mixed pine-hardwood forest and adjacent clearings in sandy or gravelly uplands. **HIGH CONSERVATION CONCERN.**

Florida Pine Snake *Pituophis melanoleucus mugitus*. Threatened in southern portion of Coastal Plain east of Mobile Bay. Also known from Southern Hilly Gulf Coastal Plain region of Russell County in extreme eastern Alabama. Individuals from Escambia and Baldwin Counties are intergradient with black pine snake, and a Fall Line Hills population in Elmore County appears to be intergradient with northern pine snake. A large snake of open, periodically burned pine forest with abundant groundcover. Frequently associated with burrows of gopher tortoise and southeastern pocket gopher. HIGH CONSERVATION CONCERN.

Glossy Crayfish Snake *Regina rigida sinicola*. Fairly common in Coastal Plain, except extreme northwestern portions. A small secretive snake of ponds and swamps. Believed to be stable throughout most of its distribution. Lowest Conservation Concern.

Queen Snake *Regina septemvittata*. Fairly common to uncommon. Nearly statewide, but apparently absent from Coastal Plain west of Tombigbee River, and from southern portions of Baldwin County. Believed to be declining, especially in southern Alabama. A small slender water snake of streams and stream impoundments, often seen basking on limbs overhanging water. MODERATE CONSERVATION CONCERN. **(Fig. 102, p. 116)**

Pine Woods Snake *Rhadinaea flavilata*. Peripheral and rare in southern Coastal Plain and southern Pine Plains and Hills of southwestern Alabama, where known from only a few localities in Mobile, Washington, and Baldwin Counties. A small secretive snake of damp pine flatwoods; occasionally appears in residential areas. MODERATE CONSERVATION CONCERN.

North Florida Swamp Snake *Seminatrix pygaea pygaea*. Peripheral and rare in extreme southern Coastal Plain. Known from three Covington County localities and one locality west of Conecuh River in Escambia County that represents the northwestern limit of the known United States' distribution. A small secretive snake of swamps and weedy ponds. HIGH CONSERVATION CONCERN.

DeKay's Brown Snake *Storeria dekayi* ssp. Common essentially statewide, but lack of records from much of southeastern Coastal Plain may reflect actual scarcity or absence there. One of Alabama's most common snakes north of Buhrstone/Lime Hills. Often encountered around human dwellings and erroneously called "ground rattler." Includes three intergrading subspecies, *S. d. dekayi* (northern brown snake), *S. d. limnetes* (marsh brown snake), and *S. d. wrightorum* (midland brown snake). Lowest Conservation Concern. **(Fig. 103, p. 116)**

Northern Red-bellied Snake *Storeria occipitomaculata occipitomaculata*. Fairly common statewide. A small, secretive ground-dwelling snake of mesic forested habitats where soils are moderately heavy. Often found under logs, rocks, and other objects. Believed to be declining in many areas. Lowest Conservation Concern.

Southeastern Crowned Snake *Tantilla coronata*. Fairly common statewide, but thought to be declining. A small, secretive ground-dwelling snake of dry woodland ridges and hillsides. Often found under rocks, logs, and in rotting stumps. Low Conservation Concern.

Eastern Ribbon Snake *Thamnophis sauritus sauritus*. Fairly common statewide, but not as frequently encountered as in the past. A semi-aquatic snake of marshes, beaver swamps, lake and stream margins, and wet meadows. Low Conservation Concern.

Eastern Garter Snake *Thamnophis sirtalis sirtalis*. Fairly common statewide. Very generalized in habitat preferences, and found in most terrestrial habitat types. Frequently encountered, especially in northern Alabama. Low Conservation Concern. **(Fig. 104, p. 116)**

Rough Earth Snake *Virginia striatula*. Fairly common across most of Alabama, and present in all regions except Interior Plateau. Absent from northeastern portions of Appalachian Plateau and Ridge and Valley. Inhabits relatively drier woodlands than smooth earth snake. More commonly encountered in Coastal Plain, and believed to have declined in recent decades. Lowest Conservation Concern.

Smooth Earth Snake *Virginia valeriae* ssp. Common statewide. Usually inhabits more mesic woodlands than rough earth snake, but both may occur together, and are very similar in appearance. Most Alabama populations are *V. v. valeriae* (eastern smooth earth snake), but western populations may show influence of intergradation with *V. v. elegans* (western smooth earth snake). Lowest Conservation Concern.

CORAL SNAKES - FAMILY ELAPIDAE

Eastern Coral Snake *Micrurus fulvius*. Rare and possibly threatened. A colorful, venomous snake principally occurring in Coastal Plain from Buhrstone/Lime Hills southward, but also known from disjunct localities in southern Ridge and Valley (Bibb and St. Clair Counties) and Piedmont (Coosa County). Spends much time underground, emerging to forage in early morning and late afternoon. Inhabits a variety of terrestrial habitats having loose, friable soils. Few recent observations may indicate that this secretive species has declined in Alabama. Two more common and similarly patterned nonvenomous snakes, scarlet kingsnakes and scarlet snakes, are frequently mistaken for eastern coral snakes. HIGH CONSERVATION CONCERN.

PIT VIPERS - FAMILY VIPERIDAE

Copperhead *Agkistrodon contortrix* ssp. Common statewide. Most frequently encountered venomous snake in Alabama. Inhabits a wide variety of upland habitats. May be increasing in parts of Coastal Plain, especially where fire is suppressed. Includes subspecies *A. c. contortrix* (southern copperhead) and *A. c. mokeson* (northern copperhead). Lowest Conservation Concern. **(Fig. 105, p. 116)**

Cottonmouth *Agkistrodon piscivorus* ssp. Common statewide. Occurs in most aquatic habitats, but reaches greatest abundance in Coastal Plain swamps. The only venomous aquatic snake in North America. Includes subspecies *A. p. piscivorus* (eastern cottonmouth), *A. p. conanti* (Florida cottonmouth), and *A. p. leucostoma* (western cottonmouth). Lowest Conservation Concern.

Eastern Diamondback Rattlesnake *Crotalus adamanteus*. Uncommon to rare and possibly threatened. Alabama's largest venomous snake. Exploits a variety of upland habitats from extreme southern portion of Southern Hilly Gulf Coastal Plain to Gulf Coast, favoring relatively dry pine flatwoods and longleaf pine-turkey oak sandhills. Overwinters in stump holes and gopher tortoise burrows, where it is vulnerable to "gassing" by snake hunters. Infrequently encountered where formerly common, and now absent from many areas of historic occurrence. **HIGH CONSERVATION CONCERN.**

Timber Rattlesnake *Crotalus horridus*. Fairly common to uncommon statewide, except for extreme southern Alabama. Commonly called canebrake or velvet-tail rattlesnake. A large venomous snake of upland and lowland forested habitats, especially in sparsely settled areas. Declining or absent from many formerly inhabited areas because of direct persecution, habitat fragmentation, and gradual loss of deciduous and mixed forest types, but still apparently secure in some areas. Low Conservation Concern.

Pigmy Rattlesnake *Sistrurus miliarius* ssp. Uncommon to rare. Statewide in distribution, but rarely encountered in recent years except in extreme southern Alabama. Believed to be declining. Inhabits a variety of upland habitats. Often called "ground rattler" by those who recognize it. Includes subspecies *S. m. miliarius* (Carolina pigmy rattlesnake), *S. m. barbouri* (dusky pigmy rattlesnake), and *S. m. streckeri* (western pigmy rattlesnake). MODERATE CONSERVATION CONCERN.

TURTLES
ORDER TESTUDINES

SEA TURTLES - FAMILY CHELONIIDAE

Loggerhead Sea Turtle *Caretta caretta*. Rare and endangered along Gulf Coast. Most frequently encountered sea turtle in Alabama's waters, and only one that regularly nests on Alabama beaches. Mainly carnivorous, but some vegetation is consumed. **Listed as *threatened* by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.**

Green Sea Turtle *Chelonia mydas*. Rare and endangered along Gulf Coast. Nesting in Alabama is rare. Small numbers of this herbivorous species, most often subadults, occur in state waters, but feeding areas of submerged grass beds are limited in Alabama. **Listed as *threatened* by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.**

Kemp's Ridley Sea Turtle *Lepidochelys kempii*. Rare and endangered along Gulf Coast. Although virtually entire population nests in Mexico and southern Texas, at least two nests have been documented in Alabama. An occasional visitor to Alabama waters, where it is sometimes caught in shrimp nets. Mostly carnivorous. **Listed as *endangered* by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.**

SNAPPING TURTLES - FAMILY CHELYDRIDAE

Common Snapping Turtle *Chelydra serpentina serpentina*. Common statewide. A large aquatic turtle of a wide variety of permanently aquatic habitats. Lowest Conservation Concern.

Alligator Snapping Turtle *Macrochelys temminckii*. Uncommon to rare in streams south of Tennessee River, and very rare in Tennessee River system. Most numerous in Coastal Plain. Inhabits rivers, oxbows, and sloughs, and occasionally occurs in medium-sized creeks. A very large turtle that is recovering from historic commercial harvest for food. **HIGH CONSERVATION CONCERN.**

LEATHERBACK SEA TURTLES - FAMILY DERMOCHELYIDAE

Leatherback Sea Turtle *Dermochelys coriacea*. Rare and endangered along Gulf Coast. An occasional visitor to Alabama waters, but not known to nest in state. Largest of sea turtles, feeding primarily on jellyfish. **Listed as *endangered* by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.**

EMYDID TURTLES - FAMILY EMYDIDAE

Painted Turtle *Chrysemys picta* ssp. Common to fairly common in Tennessee, Chattahoochee, and Mobile Bay drainages except portions of Black Warrior and Cahaba Rivers. Includes three intergrading subspecies, *C. p. picta* (eastern painted turtle), *C. p. dorsalis* (southern painted turtle), and *C. p. marginata* (midland painted turtle). Lowest Conservation Concern.

Eastern Chicken Turtle *Deirochelys reticularia reticularia*. Uncommon to locally common. Occurs throughout Coastal Plain and a portion of Ridge and Valley, where it is less frequently encountered. A turtle of semi-permanent shallow ponds, swamps, and borrow pits. Often moves on land, where it aestivates and sometimes overwinters under leaves. Low Conservation Concern. **(Fig. 106, p. 116)**

Barbour's Map Turtle *Graptemys barbouri*. Uncommon to fairly common in large streams of southeastern Alabama, where restricted to Chattahoochee and Choctawhatchee River systems. The Choctawhatchee River population only recently

was discovered (1997). Greatest numbers occur along stream stretches with exposed limestone and abundant snags for basking. **HIGH CONSERVATION CONCERN.**

Escambia Map Turtle *Graptemys ernsti*. Fairly common to common, but limited to Escambia (Conecuh), Yellow, and Choctawhatchee River drainages. Relatively recently (1992) separated as species distinct from similar Alabama map turtle, *G. pulchra*. Occurs both in main channels of larger streams and in smaller tributaries. MODERATE CONSERVATION CONCERN. **(Fig. 107, p. 116)**

Northern Map Turtle *Graptemys geographica*. Uncommon to locally common in Interior Plateau, Appalachian Plateau, and Ridge and Valley. Absent from Coastal Plain, but occurs in Tennessee River system as well as upper Mobile Bay drainage (Black Warrior, Cahaba, and Coosa River systems). Inhabits rivers as well as smaller creeks. Low Conservation Concern.

Black-knobbed Sawback *Graptemys nigrinoda* ssp. Fairly common in Coastal Plain reaches of Alabama, Tombigbee, Black Warrior, Cahaba, Coosa, and Tallapoosa Rivers, but not as common as in past. Endemic to Alabama, except for a small portion of distribution in Mississippi. Includes subspecies *G. n. nigrinoda* (northern black-knobbed sawback) and *G. n. deltícola* (southern black-knobbed sawback). MODERATE CONSERVATION CONCERN.

Ouachita Map Turtle *Graptemys ouachitensis*. Fairly common in Tennessee River reservoirs of northern Alabama. A large turtle of low-gradient streams and impoundments. Often seen basking in large numbers during spring. Lowest Conservation Concern.

Alabama Map Turtle *Graptemys pulchra*. Fairly common throughout Mobile Bay drainage. Mostly confined to Alabama, but ranges into Mississippi along Tombigbee River and into Georgia along Coosa River. Occurs both in main channels of larger streams and smaller tributaries. Low Conservation Concern.

Mississippi Diamondback Terrapin *Malaclemys terrapin pileata*. Rare and possibly endangered in coastal marshes of Mobile and Baldwin Counties. Formerly much more common, but declining due to variety of factors, including habitat degradation and mortality in crab traps. **HIGHEST CONSERVATION CONCERN.**

Alabama Red-bellied Turtle *Pseudemys alabamensis*. Endangered. Restricted to extreme lower portion of Mobile Bay drainage in Mobile and Baldwin Counties. Primarily a freshwater species, but may occur in moderately brackish water with abundant vegetation. **Designated the official state reptile by the Alabama Legislature. Listed as *endangered* by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.**

River Cooter *Pseudemys concinna concinna*. Common and statewide in rivers, lakes, and larger streams. Subspecific allocation of Alabama's populations is problematic. Lowest Conservation Concern.

Florida Cooter *Pseudemys concinna floridana*. Somewhat peripheral, and fairly common in southern portion of Coastal Plain. Taxonomic status questionable; many authorities consider it a full species, *P. floridana*. Occurs in vegetated lakes and ponds, as well as oxbows and vegetated margins of large sluggish streams. Lowest Conservation Concern.

Eastern Box Turtle *Terrapene carolina* ssp. Common to locally uncommon or rare statewide. While they have declined over past two decades, box turtles still are frequently encountered (especially after rains) in, or near, forested areas. Often seen on roads. Includes subspecies *T. c. carolina* (eastern box turtle) with influence of *T. c. major* (Gulf Coast box turtle) and *T. c. triunguis* (three-toed box turtle). Low Conservation Concern. **(Fig. 108, p. 116)**

Pond Slider *Trachemys scripta* ssp. Common statewide. Inhabits ponds, lakes, rivers, creeks, and swamps. Shows high tolerance to pollution. Includes two intergrading subspecies, *T. s. scripta* (yellow-bellied pond slider), *T. s. elegans* (red-eared pond slider), and possibly a third, *T. s. troosti* (Cumberland pond slider). Lowest Conservation Concern.

MUD AND MUSK TURTLES - FAMILY KINOSTERNIDAE

Eastern Mud Turtle *Kinosternon subrubrum* ssp. Common statewide in virtually all aquatic habitats except free-flowing creeks and rivers. Often wanders on land and is frequently seen crossing roads. Includes *K. s. subrubrum* (eastern mud turtle) and *K. s. hippocrepis* (Mississippi mud turtle), and intergrades between the two. Lowest Conservation Concern.

Razor-backed Musk Turtle *Sternotherus carinatus*. Peripheral in Escatawpa River and its tributaries in Mobile County. Possibly occurs in Red Creek in Washington County. Long known from Mississippi, it was first documented from Alabama in 1994. **HIGH CONSERVATION CONCERN.**

Flattened Musk Turtle *Sternotherus depressus*. Threatened. Restricted to upper Black Warrior River Basin in Southwestern Appalachians. Occurs only in Alabama. A small bottom-dwelling turtle of rocky rivers and large creeks. Extirpated from many formerly occupied streams. Although most habitat is degraded, a few sizeable populations remain in certain free-flowing streams with good water quality. Some reservoir habitats also are inhabited. **Listed as *threatened* by the U.S. Fish and Wildlife Service. HIGH CONSERVATION CONCERN.**

Loggerhead Musk Turtle *Sternotherus minor ssp.* Common essentially statewide, except for upper Black Warrior River system. A bottom-dwelling small turtle of creeks and rivers. Includes subspecies *S. m. minor* (loggerhead musk turtle) and *S. m. peltifer* (stripe-necked musk turtle) and intergrades. Low Conservation Concern.

Stinkpot *Sternotherus odoratus*. Common statewide in a variety of sluggish-water environments. More tolerant of habitat degradation than other members of its genus. Lowest Conservation Concern.

TORTOISES - FAMILY TESTUDINIDAE

Gopher Tortoise *Gopherus polyphemus*. Threatened. Greatly reduced from historic abundance; locally common in only a few protected areas. A large burrowing land turtle of open sandy areas in Coastal Plain south of Blackland Prairie, and extreme eastern Fall Line Hills. **Western population (Louisiana; Mississippi; and Mobile, Washington, and Choctaw Counties in Alabama) listed as *threatened* by the U.S. Fish and Wildlife Service. HIGH CONSERVATION CONCERN.**

SOFTSHELL TURTLES - FAMILY TRIONYCHIDAE

Florida Softshell *Apalone ferox*. Peripheral. Known from only a few localities in southern Baldwin County and extreme southern Coastal Plain in the Yellow and Choctawhatchee River systems. Inhabits sluggish streams, lakes, and ponds. MODERATE CONSERVATION CONCERN.

Midland Smooth Softshell *Apalone mutica mutica*. Common. Inhabits Tennessee Valley creeks, rivers, and impoundments. Low Conservation Concern.

Gulf Coast Smooth Softshell *Apalone mutica calvata*. Common. Coastal Plain portions of Mobile Bay drainage. Inhabits creeks, rivers, and impoundments in western portion of Coastal Plain. Low Conservation Concern.

Eastern Spiny Softshell *Apalone spinifera aspera*. Fairly common. Inhabits streams and lakes of Tennessee River drainage. Low Conservation Concern. **(Fig. 109, p. 116)**

Gulf Coast Spiny Softshell *Apalone spinifera spinifera*. Fairly common. Inhabits streams and lakes south of Tennessee River. Low Conservation Concern.

ARMADILLOS, SLOTHS, AND ANTEATERS
ORDER XENARTHRA

ARMADILLOS - FAMILY DASYPODIDAE

Nine-banded Armadillo *Dasypus novemcinctus*. Found statewide and common in woodlands, forest edges, savannas, and brushy areas. Breeding occurs in summer, implantation is delayed about 14 weeks, and four quadruplets are born in late winter or early spring after a gestation of 120 days. Diet consists primarily of insects, their larvae, and invertebrates, but fruits, mushrooms, eggs, and small vertebrates also consumed. Lowest Conservation concern. (Fig. 153, p. 201)

RABBITS, HARES, AND PICAS
ORDER LAGOMORPHA

RABBITS AND HARES - FAMILY LEPORIDAE

Marsh Rabbit *Sylvilagus palustris*. Poorly known. Restricted to southernmost counties. Primarily occurs in and around marshes and swamps. Sexually active year-round, gestation period 30-37 days, several litters averaging three to five young born annually. Feeds on variety of lowland plants, including cattails, rushes, and cane, and also consumes twigs and leaves of trees, shrubs, and woody vines. **HIGH CONSERVATION CONCERN.**

Swamp Rabbit *Sylvilagus aquaticus*. Poorly known. Distributed statewide, except for southern tier of counties along Florida Panhandle. Found in floodplain forests, wooded bottomlands, briar and honeysuckle patches, and canebrakes. Produces up to eight litters averaging three to six young annually. Diet includes a variety of plant material, such as grasses, sedges, shrubs, twigs, and bark. Low Conservation Concern.

Eastern Cottontail *Sylvilagus floridanus*. Common and found statewide. Primarily occurs in deciduous forests and forest edges, but also in grasslands, along fencerows, and in urban areas. Produces up to seven litters averaging three to five young annually; gestation about 30 days. Forbs and grasses comprise most of diet in summer, but consumption of twigs and tree bark increases in winter. Lowest Conservation Concern. (Fig. 154, p. 201)

Appalachian Cottontail *Sylvilagus obscurus*. Poorly known. Records only from northern third of Alabama. Inhabits dense woodlands and mountainous areas. Gestation 28 days; average litter size is five with two to three young produced annually. Diet mostly grass and clover; other foods include herbaceous plants and shrubs, twigs, buds, seeds, and fruit. **HIGH CONSERVATION CONCERN.**

RODENTS
ORDER RODENTIA

SQUIRRELS - FAMILY SCIURIDAE

Eastern Chipmunk *Tamias striatus*. Common. Found statewide, except for extreme southwestern and southeastern regions. Occupies wooded areas with dense canopy and sparsely covered forest floor, open brushy habitats, ravines, deciduous growth along streams, and urban areas. Gestation 31-32 days; two litters averaging four to five young produced each year. Seeds, nuts, insects, other invertebrates, and fungi are important foods. Lowest Conservation Concern.

Woodchuck *Marmota monax*. Poorly known. Distribution includes northern two-thirds of state. Occupies forest edges and open fields and pastures near brushy fencerows or other cover Breeding occurs upon emergence from hibernation in spring. Gestation 31-33 days; one litter averaging four to five young produced annually. Diet includes various weedy plants, but clover and alfalfa favored. Fruits and agricultural crops also consumed. Lowest Conservation Concern. (Fig. 155, p. 201)

Gray Squirrel *Sciurus carolinensis*. Common. Found statewide in hardwood forests, mixed forests, and urban areas. An important game species, active throughout year. Two litters of two to four young born annually, one in late winter and another in summer; gestation about 44 days. Diet includes seeds, fruits, flowers, leaves, bark, and some insects, eggs, and young birds. Lowest Conservation Concern. (Fig. 156, p. 201)

Fox Squirrel *Sciurus niger*. Found statewide, this large tree squirrel favors mature deciduous and pine-oak woodlands, but also occurs at forest edges and in riparian woodlands. Two reproductive peaks occur in late winter and mid-late summer. Gestation about 45 days, with an average of three young born. Diet is acorns, pine seeds, other nuts, and a wide variety of plant and animal material, including fruits, corn, and other grains. Low Conservation Concern. (Fig. 157, p. 201)

Southern Flying Squirrel *Glaucomys volans*. Found statewide. Most common in mature, broad-leaved forests, but also found in coniferous-deciduous woodlands, and urban areas. Nocturnal existence belies its common occurrence. Breeds in mid-summer to early winter. Gestation about 40 days, with an average litter size of two to three. Foods are nuts of deciduous trees, such as oaks and hickories, but also consumes seeds, fruits, buds, bark, fungi, insects, eggs, and small vertebrates. Lowest Conservation Concern. (Fig. 158, p. 201)

POCKET GOPHERS - FAMILY GEOMYIDAE

Southeastern Pocket Gopher *Geomys pinetis*. Poorly known. Seemingly less common now than previously; once occupied southern half of Alabama. Usually occurs in dry,

sandy soils, but may inhabit well-drained, gravelly, upland sites. Peaks of reproductive activity occur February-March and June-August. Females produce two litters of about two young annually. **HIGH CONSERVATION CONCERN.**

BEAVERS - FAMILY CASTORIDAE

Beaver *Castor canadensis*. Once extirpated, or nearly so, now common. Found statewide in all habitats with open water. Considered a pest in some areas, because of flooding caused by construction of dams. In April-June, three to five young born after a gestation of about 107 days. Sexual maturity reached at two years. Diet includes leaves, branches, and bark of most kinds of woody plants that grow near water. Lowest Conservation Concern. **(Fig. 159, p. 202)**

RATS AND MICE - FAMILY MURIDAE

Marsh Rice Rat *Oryzomys palustris*. Common and found statewide in wet meadows and dense vegetation near marshes, swamps, streams, ponds, and ditches. Probably breeds throughout year. Gestation 21-28 days, average litter size four to five, and sexual maturity attained at six to eight weeks. Diet includes seeds and green plants, but insects, snails, and other animal materials are consumed. Lowest Conservation concern.

Eastern Harvest Mouse *Reithrodontomys humulis*. Poorly known. Once common in old fields containing dense stands of weeds and grasses, but may be declining in Alabama. Breeds throughout year, gestation 21-22 days, and litter of two to three. Seeds comprise most of diet, but insects and green vegetation also eaten. MODERATE CONSERVATION CONCERN.

Oldfield Mouse *Peromyscus polionotus*. Poorly known. Primarily distributed in sandy-soiled habitats in eastern and southern Alabama, but also occurs in west-central and northwestern parts of state. Occurs in fallow fields with herbaceous vegetation, and along roadsides in agricultural areas. Breeds throughout year. Gestation about 22 days with an average of four young born. Diet mostly consists of seeds of grasses and herbs, but green plants and insects also consumed. MODERATE CONSERVATION CONCERN. **(Fig. 160, p. 202)**

Alabama Beach Mouse *P. polionotus ammobates*. Known only from coastal dune areas of Baldwin County, Alabama. Distribution continues to shrink due to construction of beach-front buildings and associated destruction of habitat. Monogamous, with strong pair bonds; reproduction peaks in late autumn and early winter. Gestation about 28 days; litter size varies from two to eight. Diet includes sea oats, bluestems, and a variety of insects. **Listed as *endangered* by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.**

Perdido Key Beach Mouse *P. polionotus trissylepsis*. Known only from Perdido Key, Baldwin County, Alabama. Storms and habitat destruction have reduced distribution from entire length of Perdido Key to a few remnant and reintroduced populations.

Although there are distinct morphological and genetic differences, ecology and reproduction similar to the Alabama beach mouse. **Listed as *endangered* by the U.S. Fish and Wildlife Service. HIGHEST CONSERVATION CONCERN.**

Cotton Mouse *Peromyscus gossypinus*. Common. Found statewide in dense underbrush, bottomland hardwood forests, and a variety of other habitats, including old fields, upland forests, hammocks, and swamps. Except for summer, breeds year-round. Gestation about 23 days; litter size averages four. This opportunistic omnivore consumes insects, spiders, slugs, and snails, but also eats seeds and fungi. Lowest Conservation concern.

White-footed Mouse *Peromyscus leucopus*. Poorly known. Occurs in northern two-thirds of state. Common in woodlands with fallen logs, brush piles, and rocks, and in shrubs along fencerows and streams. Breeds year-round, with reduced activity in summer. Several litters of three to four produced annually; gestation 22-23 days. Females may be pregnant and lactating simultaneously. Diet includes seeds, nuts, fruits, other plant materials, and small invertebrates. Lowest Conservation concern.

Golden Mouse *Ochrotomys nuttalli*. Common in a variety of habitats, including woodlands, floodplains, borders of fields, and thickets bordering swamps and dense woods. Highly social; up to eight have been found in same nest. Breeding occurs all year. Gestation 25-30 days; litter size usually two to three. Seeds and invertebrates form majority of diet. Lowest Conservation concern.

Hispid Cotton Rat *Sigmodon hispidus*. Found statewide, especially in grassy areas of fields and along roadways. Populations fluctuate greatly among years, but usually abundant in densely vegetated habitats. Active day and night. Prolific breeder; gestation about 27 days; one to 15 young per litter; and young mature in about eight weeks. Primarily herbivorous, but will consume invertebrates, small vertebrates, and bird eggs. Lowest Conservation Concern. **(Fig. 161, p. 202)**

Eastern Woodrat *Neotoma floridana*. Poorly known. No recent surveys; populations may be declining. Occupies woodland and brushy habitats south of Tennessee River. Usually found associated with rocky outcrops, but also in areas with dense vegetation. Mating occurs throughout year with an average of two to three young born after a gestation of about 35 days. MODERATE CONSERVATION CONCERN.

Allegheny Woodrat *Neotoma magister*. Probably restricted to region north of Tennessee River. Possibly confined to areas with rocky outcrops, crevices, caves, and boulder fields, but also may occupy woodlands and brushy areas. Breeds throughout year; litter size of two to three; gestation about 35 days. Diet consists of plant materials. **HIGH CONSERVATION CONCERN.**

Prairie Vole *Microtus ochrogaster*. Poorly known. Occupies areas with dense grasses, such as pastures, roadsides, and edges of fields in north-central Alabama. Breeds throughout

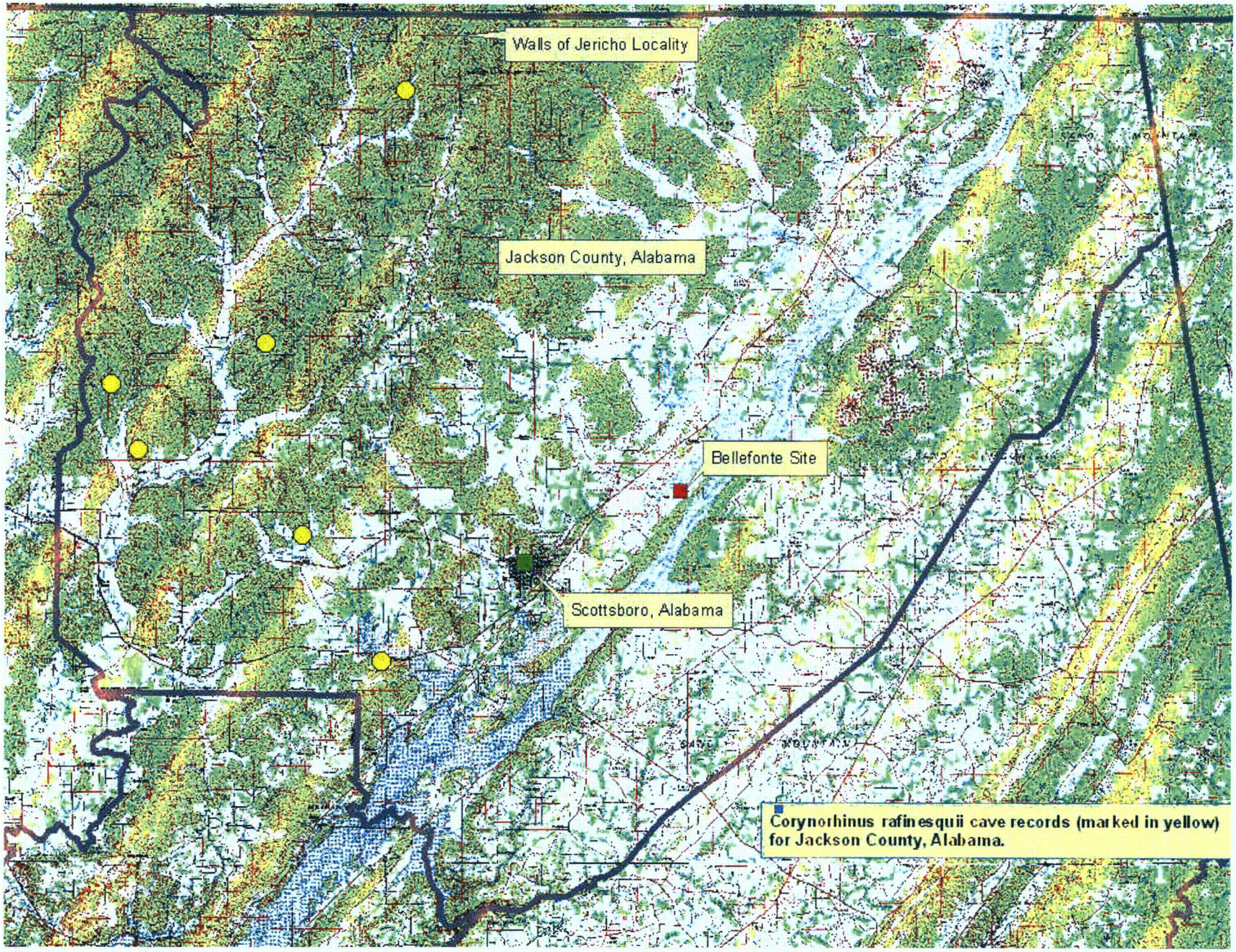
ATTACHMENT 2.4.1-3
TENNESSEE VALLEY AUTHORITY
REPORTED OBSERVATIONS OF RAFINESQUE'S BIG-EARED BAT IN JACKSON COUNTY, ALABAMA (INCLUDING TVA REGIONAL NATURAL HERITAGE DATABASE RECORDS OF OBSERVATION)
ACCESSED JULY 2008

Tennessee Valley Authority

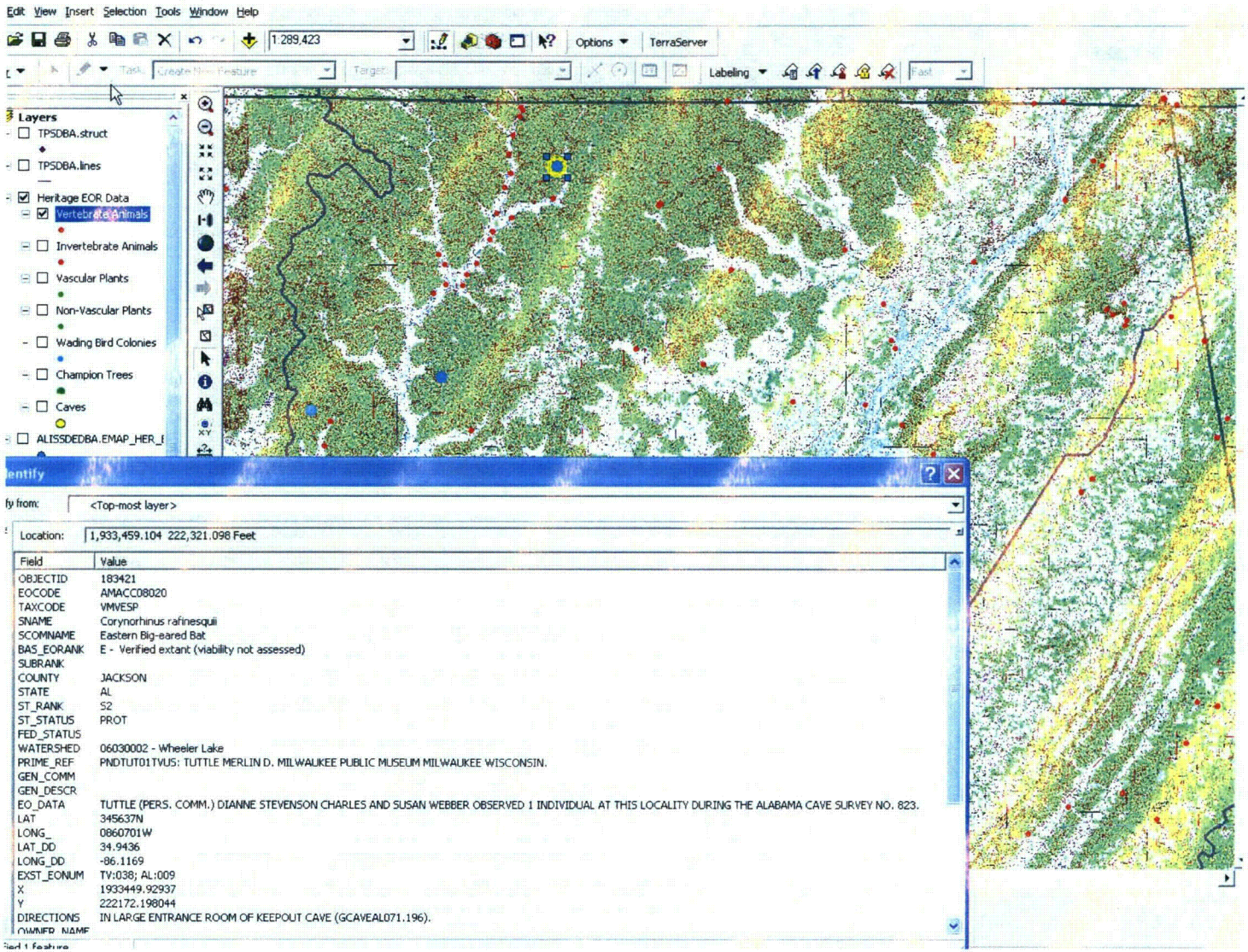
Reported Observations of Rafinesque's Big-Eared Bat in Jackson County, Alabama (including TVA Regional Natural Heritage Database Records of Observations)

(7 pages: Map and 6 database records)

Accessed July 2008

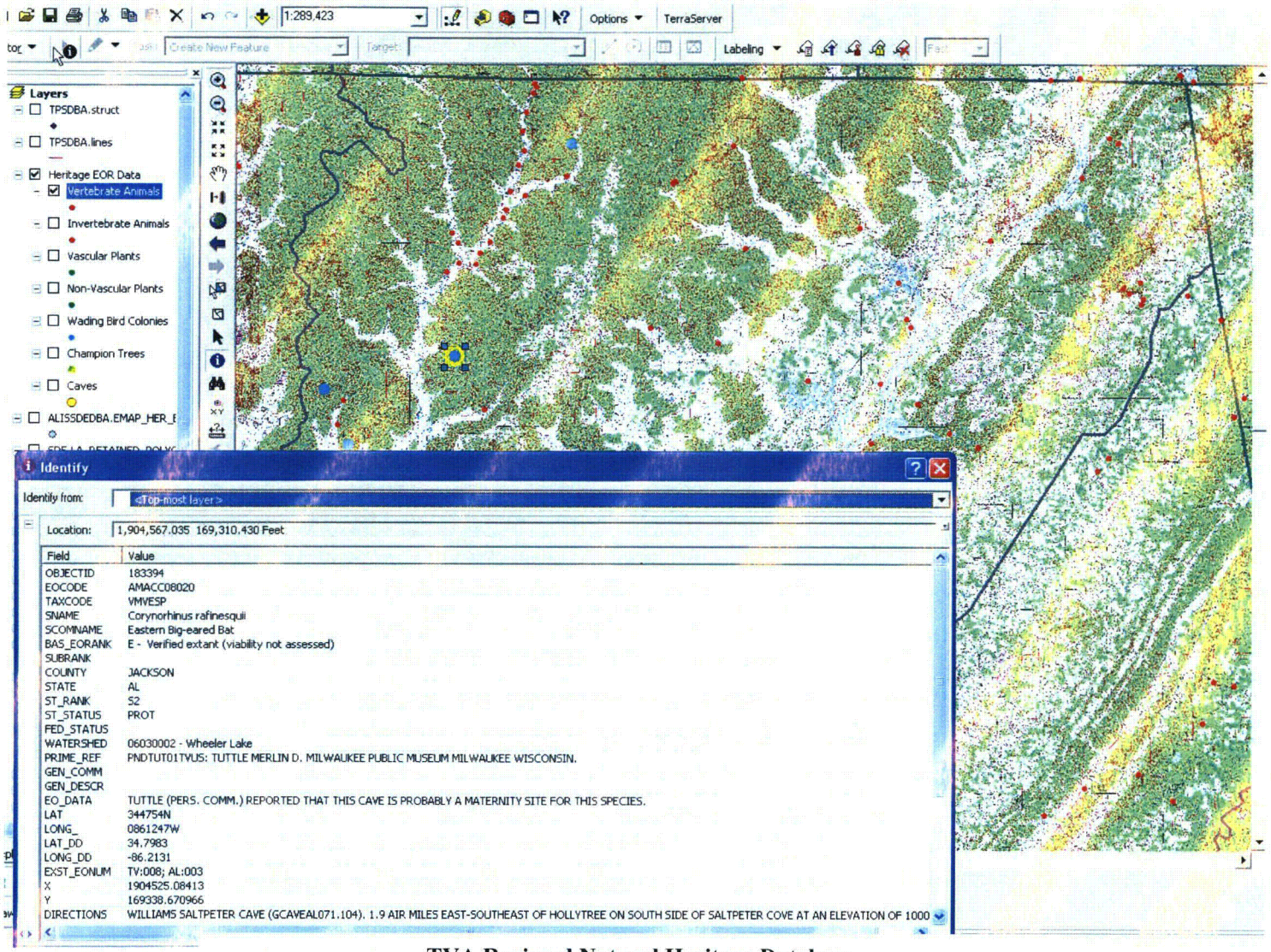


Att. 2.4.1-3 Reported Observations of Rafinesque's Big-Eared Bat in Jackson County, Alabama
(All are historical, reported between 1953 and 1978)



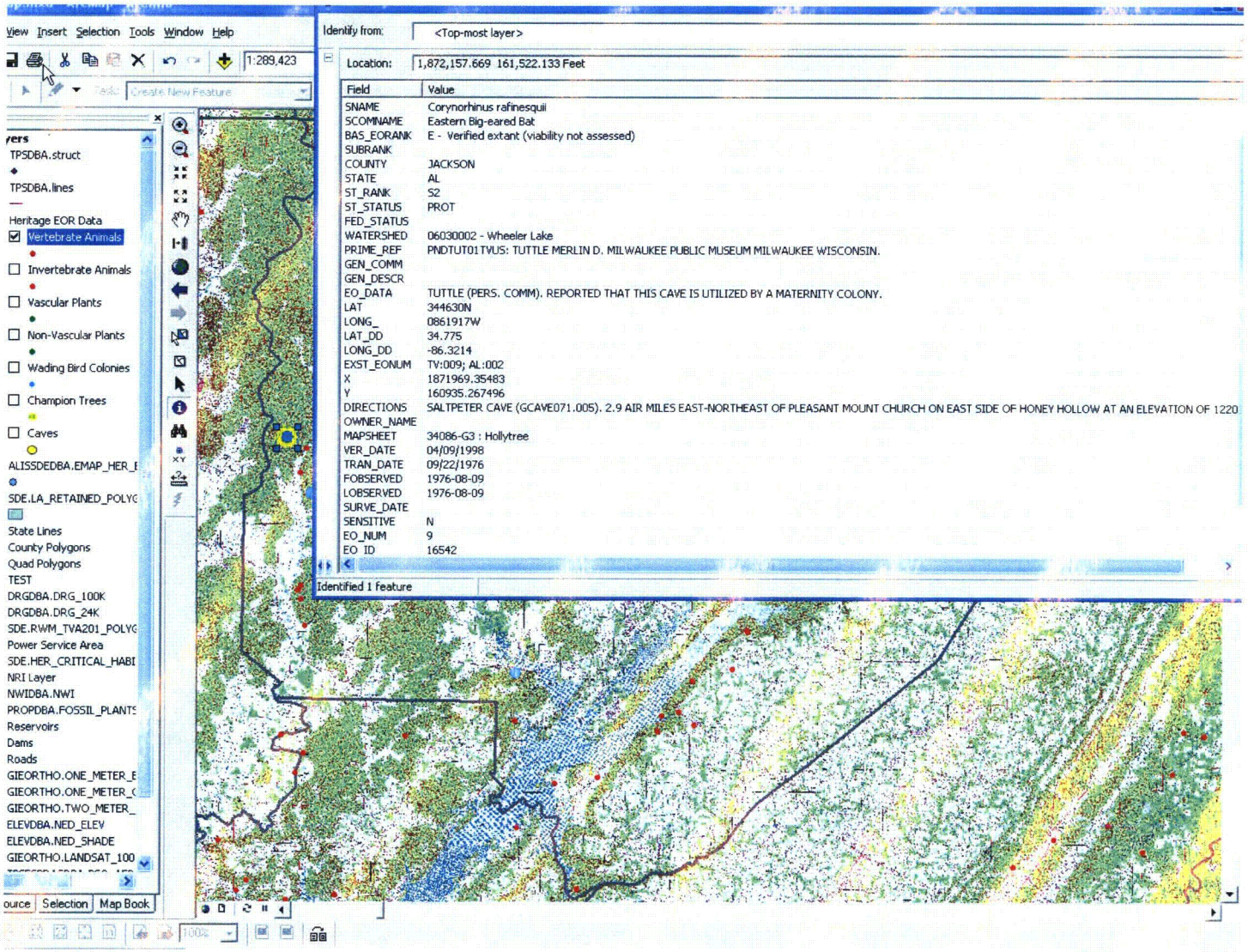
TVA Regional Natural Heritage Database

Record of observation – Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)



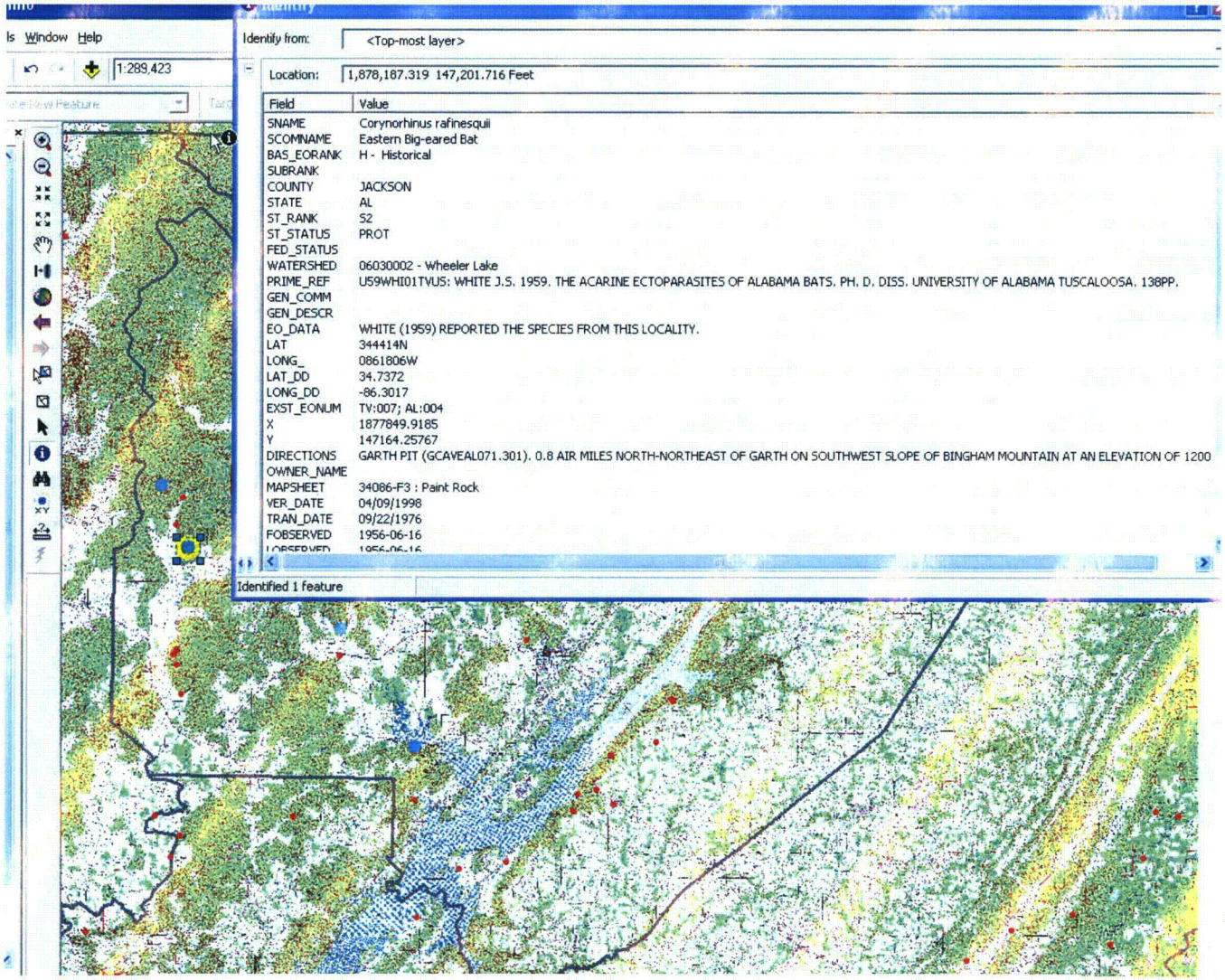
TVA Regional Natural Heritage Database

Record of observation – Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)



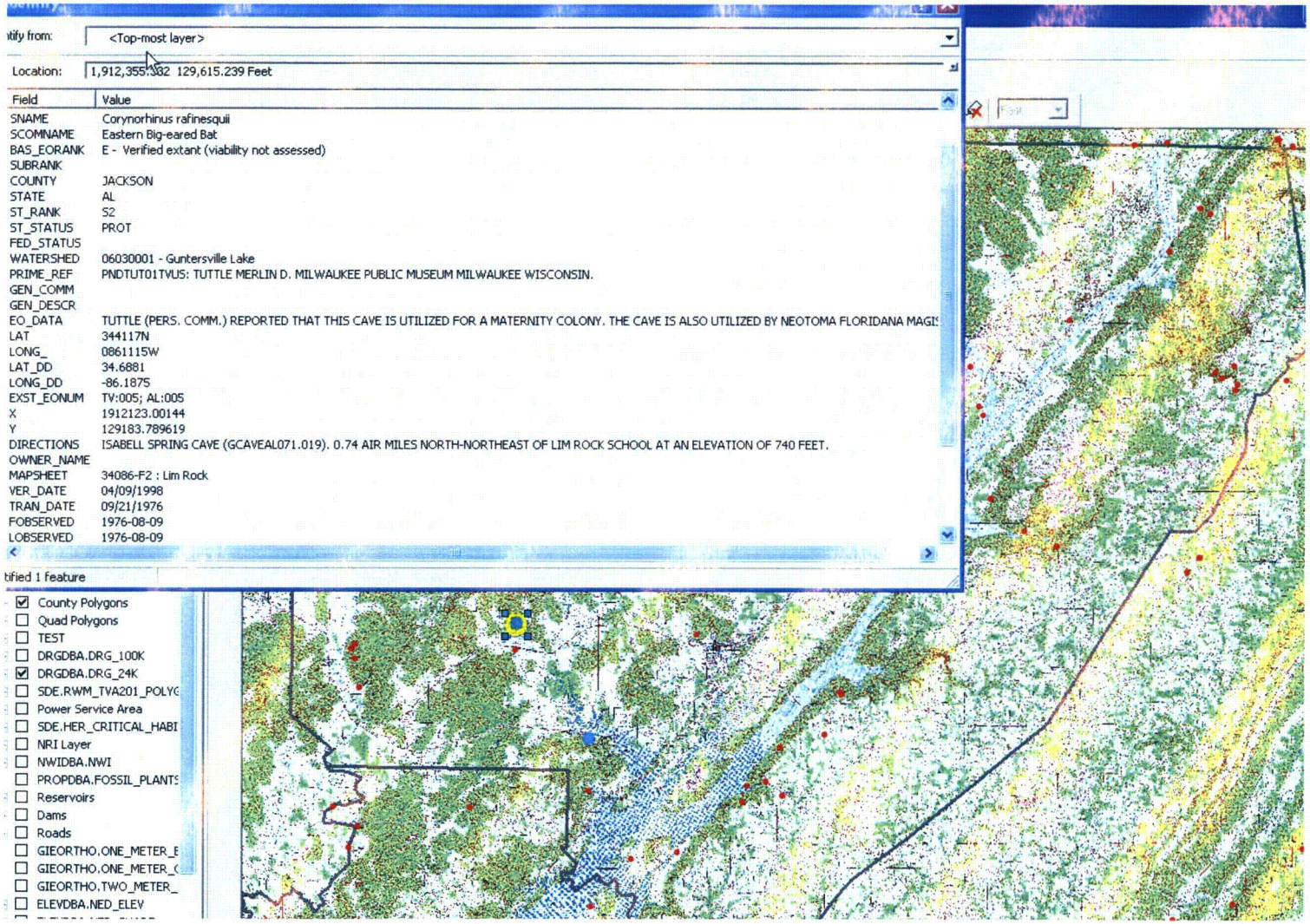
TVA Regional Natural Heritage Database

Record of observation – Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)



TVA Regional Natural Heritage Database

Record of observation – Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)



TVA Regional Natural Heritage Database

Record of observation – Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)

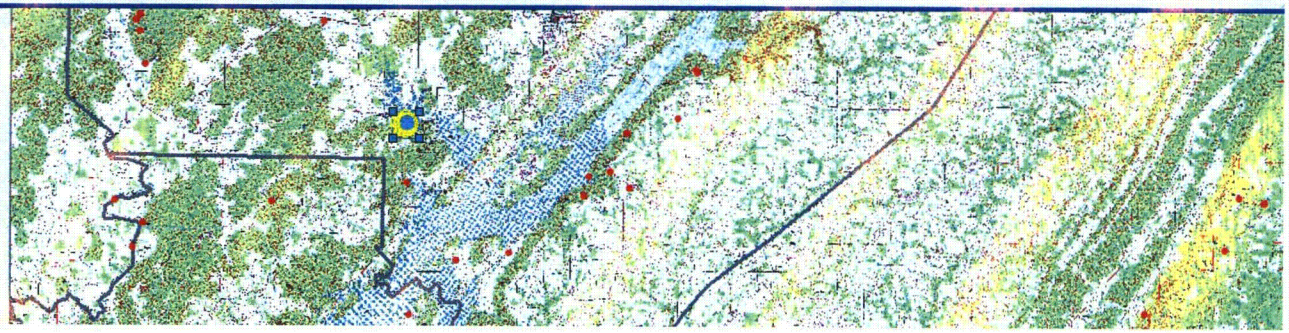
Identify from: <Top-most layer>

Location: 1,928,793.176 102,863.769 Feet

Field	Value
OBJECTID	183383
EOCODE	AMACC08020
TAXCODE	VMVESP
SNAME	Corynorhinus rafinesquii
SCOMNAME	Eastern Big-eared Bat
BAS_EORANK	H - Historical
SUBRANK	
COUNTY	JACKSON
STATE	AL
ST_RANK	S2
ST_STATUS	PROT
FED_STATUS	
WATERSHED	06030001 - Guntersville Lake
PRIME_REF	U59WHI01TVUS: WHITE J.S. 1959. THE ACARINE ECTOPARASITES OF ALABAMA BATS. PH. D. DISS. UNIVERSITY OF ALABAMA TUSCALOOSA. 138PP.
GEN_COMM	CAVE HAS 2 ENTRANCES LOWER (BLOWING CAVE) AND UPPER (SALTPETER CAVE)
GEN_DESCR	
EO_DATA	WHITE (1959) REPORTED THE SPECIES AT THIS LOCALITY AND ALSO THAT THIS CAVE SUPPORTS A LARGE SUMMER COLONY OF MYOTIS GRISESCENS (TV*006) A COLONY OF MYOTIS SODALIS (TV*020) DURING WINTER MONTHS
LAT	343657N
LONG_	0860755W
LAT_DD	34.6158
LONG_DD	-86.1319
EXST_EONUM	TV:001; AL:001
X	1928793.17492
Y	102863.770915
DIRECTIONS	SAUTA CAVE (GCAVEAL071*489). 1.94 AIR MILES EAST OF ASPEL.
OWNER_NAME	USAFWS
MAPSHEET	34086-E2 : Swearengin
VER_DATE	03/19/2001
TRAN_DATE	09/14/1976
FOBSERVED	1953-02-28
LOBSERVED	1953-02-28

Identified 4 features

- DRGDBA.DRG_100K
- DRGDBA.DRG_24K
- SDE.RWM_TVA201_POLYG
- Power Service Area
- SDE.HER_CRITICAL_HABI
- NRI Layer
- NWIDBA.NWI
- PROPDBA.FOSSIL_PLANTS
- Reservoirs
- Dams
- Roads
- GIEORTHO.ONE_METER_E
- GIEORTHO.ONE_METER_(
- GIEORTHO.TWO_METER_
- ELEVDBA.NED_ELEV



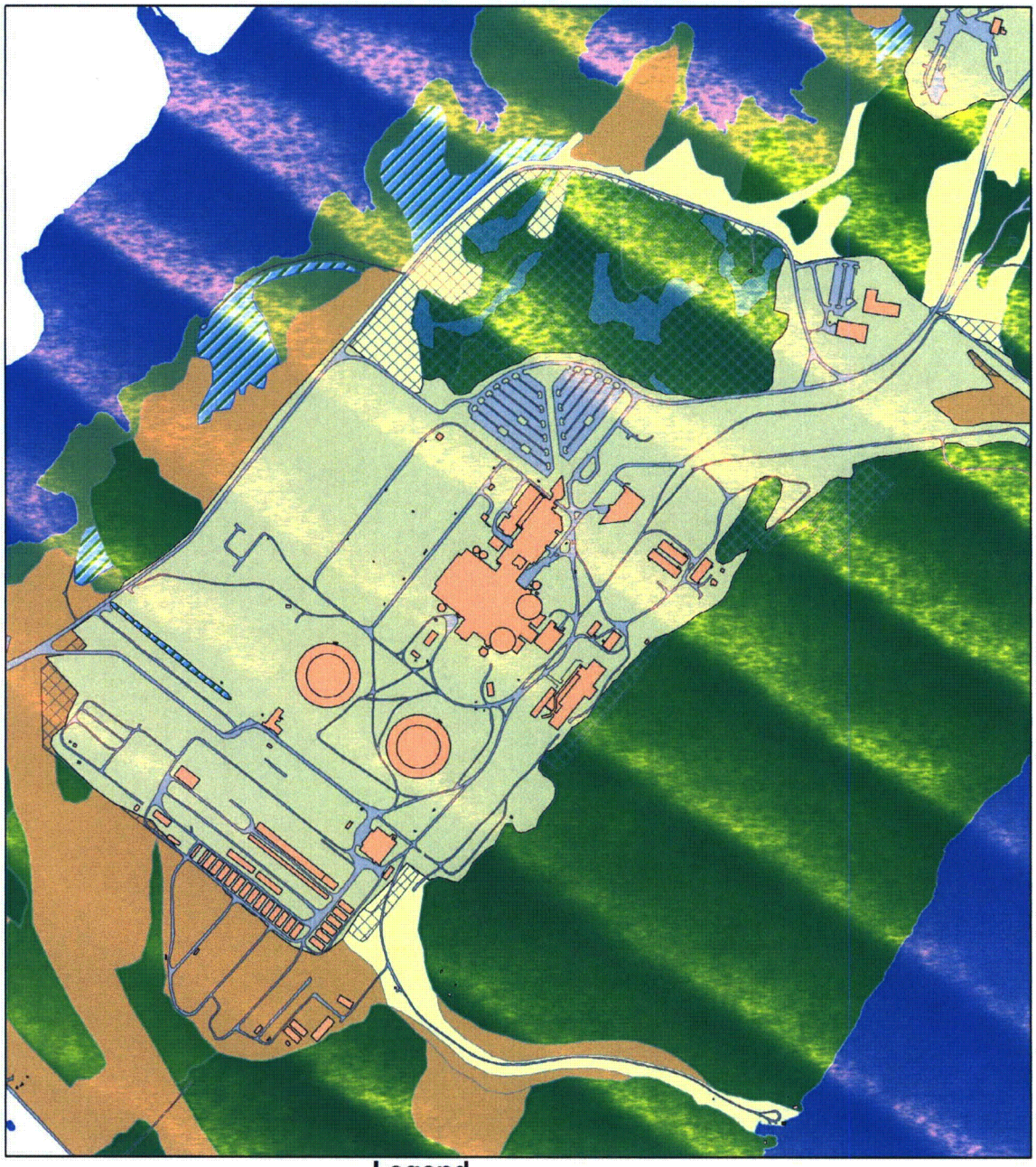
TVA Regional Natural Heritage Database

Record of observation – Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)

Tennessee Valley Authority

ER Figure 4.3-1
Habitat Affected by Construction
(1 page)

Revision 1



Legend

- Current Structures
- Affected Areas

Affected Areas by Vegetation Type

- Mixed Hardwood Forest
- Pine - Hardwood Forest
- Bottomland / Riparian Forest
- Scrub Shrub Community
- Native Grass Field
- Improved / Cultivated Grass Field
- Emergent Wetland
- Mixed Hardwood Forested Wetland
- Water

N
W E
S

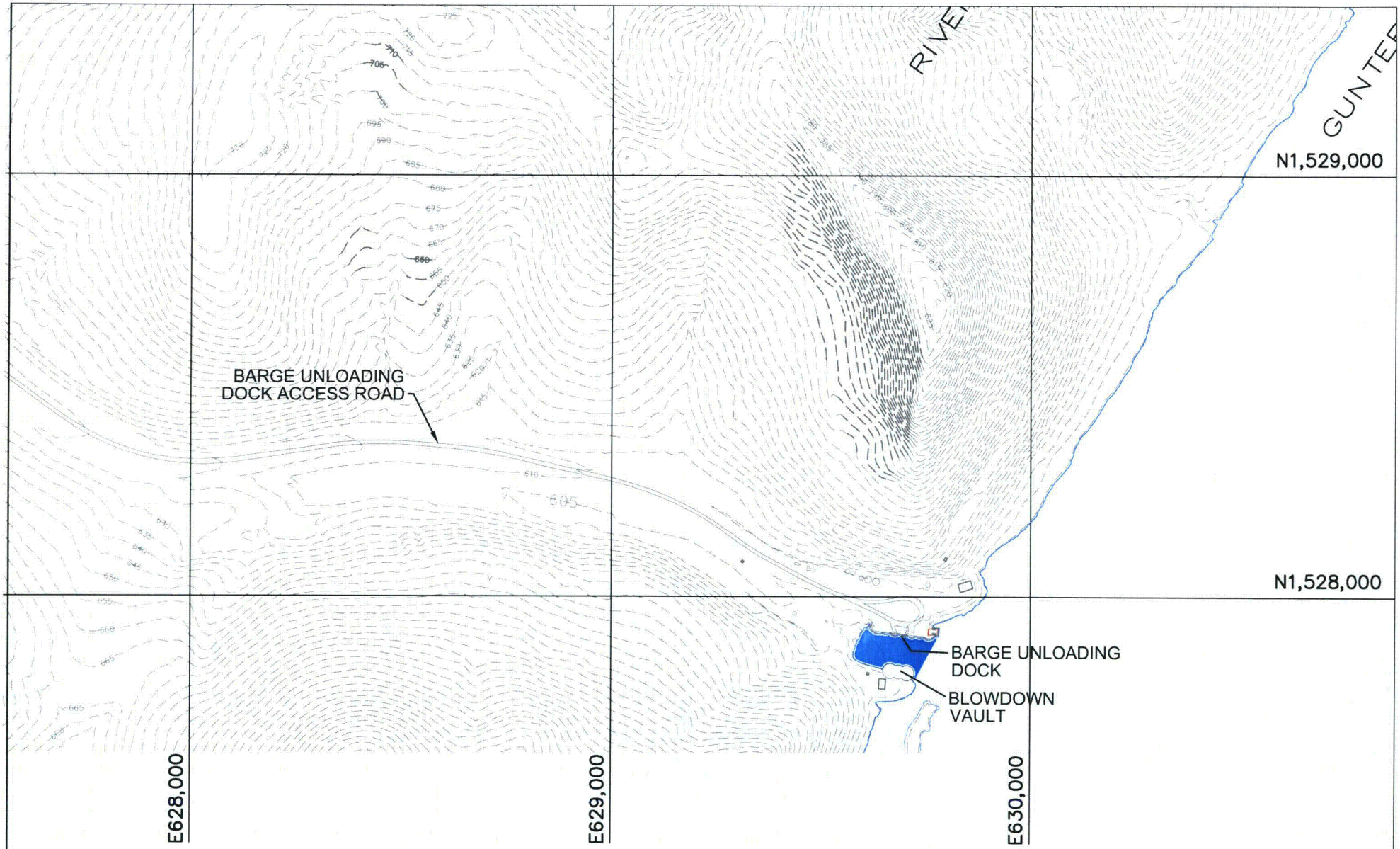
0 0.05 0.1 0.2
Miles

FIGURE 4.3-1
Habitat Affected by Construction

Tennessee Valley Authority

Illustration
TVA/BLN Units 3 & 4
Barge Dock Dredge Area
(1 page)

July 2008



0 300 600 900

GRAPHIC SCALE (FEET)

WATER LINE

DREDGE AREA

TVA / BLN
UNITS 3 & 4

ATTACHMENT 4.3.2-1
BARGE DOCK DREDGE AREA
JULY 2008

ATTACHMENT 5.3.1.2-1A
TENNESSEE VALLEY AUTHORITY
FINAL ENVIRONMENTAL IMPACT STATEMENT
TENNESSEE RIVER AND RESERVOIR SYSTEM OPERATION AND PLANNING REVIEW
TVA/TDG/EQS-91/1
DECEMBER 1990

Tennessee Valley Authority

Final Environmental Impact Statement

Tennessee River and Reservoir System Operation and Planning Review

TVA/RDG/EQS-91/1

(2 pages: Cover page and page 125)

December 1990

TVA/RDG/EQS-91/1

Final Environmental Impact Statement

Tennessee River and Reservoir System Operation and Planning Review

Tennessee Valley Authority

December 1990

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76

SECTION THREE: RECOMMENDED PLAN OF ACTION

Chapter 6

Preferred Alternatives and Supporting Recommendations

This study proposes that TVA reservoir operations be modified to delay summer drawdown in tributary lakes, maintain increased minimum flows below tributary dams and in main Tennessee River reservoirs, and, where necessary, increase dissolved oxygen in releases from TVA dams to improve water quality and protect aquatic life.

The preferred release alternative is to provide minimum flows affecting all dams, plus increase dissolved oxygen in tailwaters to a level of 5 or 6 milligrams per liter through aeration of releases from 14 tributary dams and two mainstream dams and state action to control upstream pollution (alternative B).

Implementation of this alternative should improve water quality and aquatic life throughout the Tennessee River system. No adverse impacts are expected. However, to respond to public concerns expressed during review of the Draft Environmental Impact Statement (EIS), two commitments are recommended in conjunction with release improvements. First, TVA should take steps to inform the public of the hazards associated with providing minimum flows by turbine pulsing. Second, TVA should monitor the effects of the proposed biweekly average summer flow requirements at mainstream dams on water quality and aquatic life.

In support of the proposed release improvements, the study further recommends that TVA:

- o work with the states to implement release improvements within a five-year period, tailoring actions to the specific needs at each dam,
- o focus its aeration research on autoventing turbine technology, and
- o work with interested local areas to find ways to finance releases for recreational floating.

The preferred lake level alternative is to fill 10 tributary lakes more aggressively and maintain recreational pools levels until August 1 (alternative 1).

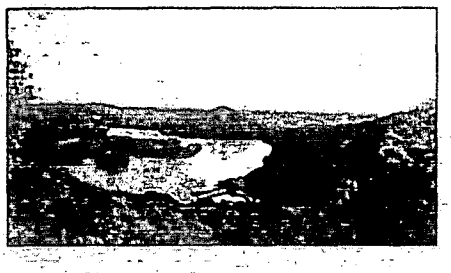
Implementation of this alternative would enhance recreation on tributary lakes and provide economic development benefits. No significant adverse impacts have been identified. However, to respond to public comments received on the Draft EIS, TVA should commit to monitoring shoreline development trends if lake level improvements are made.

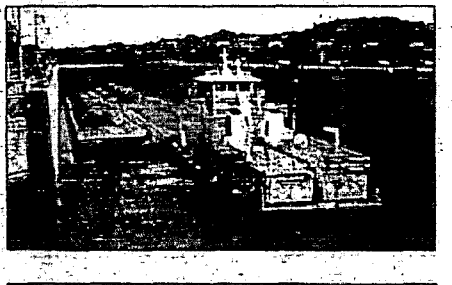
Tennessee Valley Authority

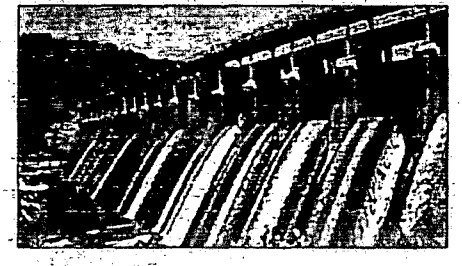
Final Programmatic Environmental Impact Statement, Reservoir Operations Study

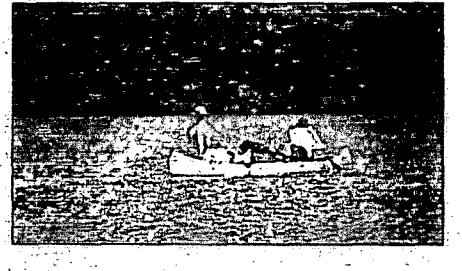
(2 pages: Cover page and page 2-15)

February 2004









FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Tennessee Valley Authority Reservoir Operations Study

Volume I – Environmental Impact Statement

February 2004

Lead Agency: Tennessee Valley Authority

In cooperation with U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service.

TVA

- **Fall Drawdown.** Reservoir elevations are lowered to the winter operating level beginning at various dates through summer and fall (Appendix A, Table A–08).

Water Release Guidelines

TVA manages the rate of flow and water levels through the system by selective releases from the dams. These releases affect water quality conditions in the tailwaters and reservoirs, water supply to the lower reservoirs, and the temperature of cooling water for coal and nuclear power plants located on mainstem reservoirs. TVA also manages flows in the tailwaters to maintain water quality and aquatic habitat. At times, TVA releases water to provide flows for special operations, as described in a following section.

To meet flow needs in the tailwaters and flow-through needs in the downstream reservoirs, TVA has adopted two broadly defined reservoir release policy elements: project minimum flows and system minimum flows. A minimum flow is a release from one or more dams to meet downstream water needs (e.g., navigation, water supply, aquatic habitat, and waste assimilation); a minimum flow does not represent the lowest flow rate that TVA can pass from a dam or dams.

Project Minimum Flows

Project minimum flows are flows released at a specific reservoir (Appendix A, Table A–03). TVA implements project minimum flows to achieve specific operating objectives, including water supply and water quality improvements, and benefits for aquatic habitat and fisheries. Project minimum flows are provided below seven mainstem (these are also the system minimum flows discussed below) and 20 tributary reservoirs in a variety of ways, including instantaneous flows (continuous via small turbine operation or sluice outlet setting), pulsing flows (use of a generating unit at various hourly intervals), and daily average releases.

Minimum flows at 10 tributary projects were developed on the basis of techniques used by the USFWS to enhance aquatic life in streams in other regions of the country (see discussion of the Lake Improvement Plan in Chapter 1). These minimum flows are intended to afford greater protection for aquatic life from environmental stresses than would occur under average dry conditions.

System Minimum Flows

System minimum flows are indicators of total flow to meet requirements for navigation, water supply, cooling water for coal and nuclear plants, water quality, and aquatic habitat. System minimum flows are measured at the Chickamauga, Kentucky, and Pickwick Dams and other locations (Appendix A, Table A–03). These flows include a bi-weekly average minimum flow in summer and a daily average minimum flow in winter. If the total of the project minimum flows discussed above plus any natural runoff from the watershed is insufficient to meet these system minimum flows, additional water must be released from upstream reservoirs to supply the difference.

Tennessee Valley Authority

Report on Larval Fish Entrainment for the Years 1975 – 1976 Bellefonte Nuclear Plant Units 1 and 2 (105 pages: Entire document)

1977

TENNESSEE VALLEY AUTHORITY

REPORT ON LARVAL FISH ENTRAINMENT FOR THE YEARS 1975 - 1976

Return to:
Water Management Files
CST 17B-C

BELLEFONTE NUCLEAR PLANT
UNITS 1 AND 2

TENNESSEE VALLEY AUTHORITY

REPORT ON

LARVAL FISH ENTRAINMENT

FOR THE YEARS 1975-1976

(BELLEFONTE NUCLEAR PLANT)

SUMMARY

The samples taken at the Bellefonte transect have similar characteristics to those taken at other transects within the reservoir. Hydrodynamic investigations performed by TVA yield the assumption that hydraulic entrainment by the intake will be from the reservoir channel rather than the Town Creek embayment via the backwater area as previously (1974) assumed. Based on experience gained through recent FWPCA Section 316(b) investigations for TVA steam plants, the assumption that hydraulic entrainment is a predictor of biotic (ichthyoplankton) entrainment is judged to be conservative.

The data shows ichthyofauna of Guntersville Reservoir, while varied, is dominated by the clupeidae (approximately 70 to 90 percent of all larvae captured); cyprinidae, catostomidae, sciaenidae, and in certain restricted habitats, centrarchidae, are important constituents but do not exceed 10 percent of the larvae captured. Weekly estimates of entrainment, but with one exception, are less than 5 percent for individual taxa and less than 3 percent for total fish and eggs. Annual estimates for individual taxa, total fish, and total eggs range from 0.01 to 2.31, 0.47 and 1.37, and 0.14 to 0.26 percent, respectively.

TVA's evaluation of these data yields the conclusion that the impact of entrainment of icthyoplankton into the intake system at BNP is insignificant and that no changes in present intake design or proposed operation of this intake system are merited. Therefore, the proposed intake system of the Bellefonte Nuclear Plant can be operated as designed.

SAMPLING METHODS

1975--Samples were taken each week in the Bellefonte transect (TRM 392) and biweekly (every other week) at the downstream transects (TRM 385 and 369), according to procedures provided as Appendix A. One change in the procedures was made. Growth of Eurasian milfoil in the overbank (backwater) area prevented sampling in that area; sampling stations in the inshore area immediately outside of the backwater area were established.

1976--Accepted and documented procedures were again followed. Herbicidal treatment of Eurasian milfoil allowed re-establishment of sampling in the backwater area. Two changes involving sampling gear were made:

1. Mesh size on all nets was reduced from 0.79 mm to 0.50 mm to increase the effectiveness of capture of eggs and the smallest sizes of fish larvae.
2. The primary sampling gear used in 1975 (1 m diameter push net) was replaced by a 0.5 m tow net. This net was towed in an oblique path to gain more representative samples with respect to the entire water column, because the push net only sampled the extreme upper stratum (1-1.5 m depth) and vertical nets were not judged to be yielding completely representative and comparable samples owing to reduced volumes of water filtered.

ANALYTICAL METHODS

Samples were individually preserved and transported to the laboratory where contents were sorted, identified to lowest possible taxon (Hogue, et al., 1976), counted and measured to the nearest mm total length.

Calculation of estimated entrainment is performed using Marcy's (1973) approach. Results of the hydrodynamic investigations show that the initial assumption regarding recruitment of water to the intake is incorrect. Water from Town Creek embayment flows primarily to the river channel rather than through the backwater area. In addition, the design of the intake channel is such that the intake will draw water from all strata of the river channel. Therefore, entrainment estimates are calculated by the equation:

$$E = \frac{D_i}{D_r} \times \frac{Q_i}{Q_r} \times 100$$

where Q_i = plant intake flow (3.675×10^5 m^3/day)

Q_r = reservoir flow (m^3/day)

D_i = density of larvae or eggs vulnerable to the intake

D_r = mean density of larvae or eggs in the Bellefonte plant transect

E = entrainment

Reservoir flows for each sample date are obtained from the River Control Branch, Division of Water Management, TVA; intake water demand is the maximum design demand (∿150 cfs). Densities of larvae and eggs vulnerable to the intake are assumed to be the weighted mean densities of the strata nearest the plant intake; day and night densities are averaged to yield a daily mean. Mean densities of larvae and eggs in the plant transect are obtained by subdividing the areas of the cross-sectional transect profile into areas

sampled by each type of gear at each station. Weighted mean densities are then calculated as $\Sigma (D_s W_s)$ where D_s = unweighted sample density and W_s = station weight.

Estimates of numbers and percent of transported organisms entrained are calculated for each taxon, total fish, and eggs for each sampling period. In addition, estimates of total entrainment for each taxon, total fish, and eggs over the entire sampling season are made. For these estimates, average D_i and D_r values are calculated as above and multipled by the respective 24-hour reservoir flow and intake demand to yield 24-hour estimates of numbers of fish. The areas under the curves of numbers vs. time for entrainment and reservoir transect samples are integrated to yield estimates of total numbers of larvae or eggs entrained and total numbers passing the plant. The ratio of these numbers are then converted to a percentage.

RESULTS AND DISCUSSION

In 1975, 19 weekly samples were taken, yielding a total of 1,407 samples; in 1976, 18 weekly samples were taken, yielding a total of 702 samples (Table 1). The smaller number of samples taken in 1976 was due to the elimination of stationary nets and vertical nets, neither of which added substantially to the quality of the data gathered in 1975. As seen in Table 1, the sampling dates for each period were comparable for the two years.

SPECIES COMPOSITION AND RELATIVE ABUNDANCE

Twenty-nine taxa of larvae were identified from the 1975 samples (Table 2). Clupeids (probably Dorosoma) dominated the catch in all three transects, ranging from 72 percent of the catch at the plant site (TRM 392) to 90 percent at the downstream transect (TRM 369). Three other families each contributed 2 percent or more of the catch at all transects: cyprinids, catostomids, and sciaenids (Aplodinotus).

In 1976, 38 taxa were identified from the four transects sampled (Table 3). As in 1975, clupeids dominated the ichthyofauna; only in the backwater area (TRM 393) did the percentage of clupeids in the catch fall below 90. Only one other family (the cyprinids) consistently contributed more than 1 percent of the catch. Sciaenids contributed from 2 to 6 percent except in the backwater transect, while centrarchids contributed 10 percent of the backwater catch.

The substantial increase in catch in 1976 is due probably to a combination of three factors: natural fluctuations in spawning success, improved sampling methods, and the reduction in mesh size of the sampling nets from 0.79 mm to 0.50 mm. Analysis of length-frequency data (early 1978) may confirm the effect of reduced mesh size on catch.

Few consistent trends in relative abundance among the transects were noted. Generally, the proportion of clupeids in the catch increased in a downstream direction. Catostomids showed a reverse trend in 1975 but no trend (and only about one-tenth the numbers) in 1976. Sciaenids were most abundant in the middle transect (TRM 385). Centrarchids were most abundant in the backwater area in 1976; high densities of centrarchids were also found in the backwater area in 1974.

Appendices B (1975) and C (1976) contain detailed plots of weekly densities of observed taxa of larvae and eggs. These plots show that the densities observed in the plant transect are generally equal to or higher than observed densities at the other transects, regardless of collection gear.

The increased number of taxa identified in 1976 is most likely due to the increased development of taxonomic expertise. Problems in taxonomy still remain, especially in the cyprinid, catostomid, and percid groups, as well as in the clupeids, where only prolarvae or postlarvae greater than 17 mm total length can be identified to species.

TRANSPORT AND ENTRAINMENT

Figures 1 and 2 present estimates of reservoir discharge and 24-hour transport of commonly occurring taxa of larvae for each sampling period. Reservoir discharges (flows) were higher in 1975 than in 1976 (Figures 1 and 2), but except for catostomids and unidentified fish, the transport of all commonly occurring taxa was higher in 1976 and the estimates of total transport of fish and eggs were higher in 1976 by factors of 7 and 3.5, respectively (see Tables 6 and 7).

Weekly estimates of larval fish entrainment in 1975 range from 0.01 to 4.68 percent of the transported population; estimates for eggs range from 0.01 to 2.14 percent (Table 4). For clupeids, 5 of 14 weekly estimates are below 1 percent and only 2 of 14 exceed 3 percent. Weekly estimates for catostomids, ictalurids, and percichthyids never exceed 1 percent. Weekly estimates for total larval entrainment range from 0.14 to 2.61 percent. With the exception of one sample period, estimates of egg entrainment are less than 1 percent; for total eggs, weekly estimates range from 0.01 to 1.42 percent.

Similar results are obtained from 1976 estimates (Table 5) except that the range of weekly estimates (all fish taxa) is from 0.01 to 8.66 percent. The high value is obtained from unidentified fish; for identifiable taxa, no weekly estimate of larval entrainment exceeds 2.86 percent, and 73 of 106 individual weekly estimates do not exceed 1 percent; and for total fish, weekly estimates range from 0.05 to 1.49 percent. Estimates of egg entrainment range from 0.05 to 1.52 percent; for total eggs, estimates range from 0.05 to 0.92 percent.

Estimates of annual transport and annual entrainment of larvae and eggs are presented in Tables 6 and 7. Estimates of annual entrainment of larval taxa

in 1975 range from 0.01 percent (hiodontids) to 1.82 percent (clupeids); the estimate for all larvae combined is 1.37 percent (Table 6). Estimated egg entrainment range from 0.14 percent (sciaenid eggs) to 0.19 percent (unidentified eggs). In 1976, estimated entrainment of larval taxa range from 0.17 percent (percids) to 2.13 percent (catostomids); estimated entrainment of all larvae is 0.47 percent (Table 7). Estimates of egg entrainment range from 0.25 percent (sciaenid eggs) to 0.33 percent (unidentified eggs); entrainment of all eggs is estimated to 0.26 percent.*

The entrainment estimates presented here are predictions based on intake design and hydraulic flow characteristics; furthermore, they are based on the assumption that biotic entrainment (fish and eggs) is equal to hydraulic entrainment (percent of river flow withdrawn by the intake). Figure 3 presents comparisons of biotic and hydraulic entrainment for six operating TVA steam plants, based on recent FWPCA Section 316(b) demonstrations for those plants. These comparisons indicate that the assumption of equivalence between biotic and hydraulic entrainment is conservative, i.e., hydraulic entrainment in most cases would overestimate biotic entrainment. The reasons for this are not entirely known, but probably are associated with the non-homogeneous distribution, both temporally and spatially, of ichthyoplankton and with the behavior of fish larvae, e.g., their association with shelter or substrate and their ability to withstand and escape from low velocity water currents. Given the experience gained from the FWPCA Section 316(b) investigations on operating plants, the estimates presented in this report are likely to be conservative.

*It should be noted that the estimates fall below the threshold of 5 percent entrainment that had been proposed by the AEC-ANL staff as evidence of nonsignificant impact.

LITERATURE CITED

Hogue, J. J., Jr., R. Wallus, and L. K. Kay 1976. Preliminary guide to the identification of larval fishes in the Tennessee River. Tech. Note B19. Division of Forestry, Fisheries & Wildlife Development, TVA, Norris, Tennessee 67 pp.

Marcy, B. D., Jr., 1973. Vulnerability and survival of young Connecticut River fish entrained at a nuclear power plant. J. Fish. Res. Bd. Canada 30: 1195 - 1203.

Table 1. Calendar dates associated with sampling periods, Guntersville Reservoir, Alabama, 1975 and 1976.

Sample Period	1975	1976
1	3/26	3/22
2	4/01	3/30
3	4/08	4/06
4	4/15	4/13
5	4/22	4/20
6	4/28	4/26
7	5/06	5/04
8	5/13	5/11
9	5/20	5/18
10	5/28	5/25
11	6/03	6/02
12	6/09	6/08
13	6/17	6/15
14	6/24	6/22
15	7/02	6/28
16	7/07	7/07
17	7/15	7/12
18	7/21	7/20
19	7/29	-
Total Samples	1,407	702

Table 2. Number and relative abundance (percent) of fish larvae collected from three transects of Guntersville Reservoir, Alabama, 1975. Taxonomy follows Hogue, et al. (1977).

Taxon	Transect					
	TRM 392		TRM 385		TRM 369	
	N	Percent	N	Percent	N	Percent
Unidentified fish	419	1.18	28	.68	36	.23
Polyodon spathula	13	.04			2	.01
Lepisosteus sp.	51	.14	5	.12		
Clupeidae*	20,930	59.01	907	21.92	13,715	87.08
Alosa chrysochloris	179	.50	160	3.87	283	1.80
Dorosoma sp.	4,538	12.79	1,899	45.89	134	.85
D. petenense	15	.04	4	.10	1	.01
Hiodon tergisus	30	.08			5	.03
Cyprinidae*	1,341	3.78	228	5.51	263	1.67
Cyprinus carpio	353	1.00	20	.48	39	.25
Notemigonus chrysoleucas	1	**				
Catostomidae*	3,491	9.84	179	4.33	294	1.87
Minytrema melanops	2	.01				
Ictalurus furcatus	11	.03	2	.05	1	.01
I. punctatus	132	.37	29	.70	9	.06
Pylodictus olivaris			1	.02		
Gambusia affinis	2	.01				
Morone sp.	218	.61	38	.92	52	.33
Centrarchidae*	18	.05			5	.03
Lepomis or *Pomoxis*	14	.04				
Lepomis sp.	202	.57	27	.65	399	2.53
L. macrochirus	18	.05				
Micropterus sp.					5	.03
Pomoxis sp.	16	.05	4	.10	2	.01
Percidae*	11	.03				
Unspecified darter[1]	6	.02				
Percina caprodes	632	1.78	39	.94	25	.16
Stizostedion sp.	1	**				
S. canadense	47	.13				
Aplodinotus grunniens	2,777	7.83	568	13.73	477	3.03

Table 2. Number and relative abundance (percent) of fish larvae collected from three transects of Guntersville Reservoir, Alabama, 1975. Taxonomy follows Hogue, et al. (1977). (Continued)

Taxon	Transect					
	TRM 392		TRM 385		TRM 369	
	N	Percent	N	Percent	N	Percent
Labidesthes sicculus					2	.01
Total	35,468		4,138		15,750	

*Not possible to identify further.

**Less than 0.005 percent.

1. Darter, but not *P. caprodes*.

Table 3. Number and relative abundance (%) of fish larvae collected from four transects of Guntersville Reservoir, Alabama, 1976. Taxonomy follows Hogue et al. (1977).

Taxon	Transect							
	TRM 392		TRM 393		TRM 385		TRM 369	
	N	%	N	%	N	%	N	%
Unidentified fish	267	.22	16	.12	10	.06	18	.04
Polyodon spathula	2	**						
Clupeidae*	107,050	89.54	11,639	86.56	15,869	89.42	44,353	95.07
Dorosoma sp.			1	.01				
D. cepedianum			1	.01				
D. petenense	280	.23	18	.13	44	.25	2	**
Hiodon tergisus	3	**			4	.02	1	**
Cyprinidae*	999	.84	267	1.99	185	1.04	620	1.33
Pimephales group[1]	4	**	1	.01	1	.01		
Atherinoides group[2]	19	.02	31	.23	12	.07	5	.01
Cyprinus carpio	137	.11	17	.13	10	.06	33	.07
Notemigonus chrysoleucas	1	**	1	.01	4	.02	19	.04
Notropis sp.	4	**			1	.01	4	.01
N. atherinoides	10	.01			2	.01	56	.12
N. volucellus	18	.02			9	.05		
Catostomidae*	285	.24	1	.01	94	.53	23	.05
Ictiobus-Carpiodes group[3]	6	.01						
Minytrema melanops	2	**						
Ictaluridae*							1	**
Ictalurus sp.	1	**						
I. furcatus	13	.01					7	.02
I. punctatus	81	.07			16	.09	8	.02
Pylodictis olivaris	1	**						
Morone sp.	154	.13	7	.05	2	.01	1	**
M. mississippiensis	1	**						
Morone (not *sax.*)[4]	3,745	3.13	3	.02	333	1.88	240	.51
Centrarchidae*	1	**	5	.04			1	**
Lepomis or *Pomoxis*	46	.04	1	.01				

Table 3. Number and relative abundance (%) of fish larvae collected from four transects of Guntersville Reservoir, Alabama, 1976. Taxonomy follows Hogue et al. (1977).

Taxon	Transect							
	TRM 392		TRM 393		TRM 385		TRM 369	
	N	%	N	%	N	%	N	%
Lepomis sp.	350	.29	1,390	10.34	23	.13	377	.81
L. macrochirus	3	**					1	**
L. microlophus	1	**						
Micropterus (not *dol.*)[5]	4	**	7	.05			1	**
Pomoxis sp.	138	.12	3	.02	14	.08	13	.03
P. annularis	3	**						
Percidae*	3	**					1	**
Unspecified darter[6]	718	.60	20	.15	52	.29	19	.04
Stizostedion sp.	69	.06			4	.02	2	**
Aplodinotus grunniens	5,134	4.29	6	.04	1,058	5.96	824	1.77
Labidesthes sicculus	2	**	11	.08			24	.05
Total	119,555		13,446		17,747		46,654	

*Not possible to identify further.
**Less than 0.005%.
1. Probably including the genera *Pimephales* and *Hybopsis*; see Hogue et al. (1977).
2. Probably includes species of the *Notropis* complex; see Hogue et al. (1977).
3. Probably including the genera *Ictiobus* and *Carpiodes*; see Hogue et al. (1977).
4. *Morone*, but not *M. saxatilis*.
5. *Micropterus*, but not *M. dolomieui*.
6. Percid, probably *Percina* but not *Stizostedion*.

Table 4. Estimated entrainment of fish larvae and eggs for each sampling period, Bellefonte Nuclear Plant, Guntersville Reservoir, Alabama, 1975. N = estimated number entrained; % = estimated percent of transported taxon entrained. No samples were taken in sample period 13.

Taxon		Sample Period (see Table 1)									
		1	2	3	4	5	6	7	8	9	10
Unidentified fish	N	-	-	1.16 E2	5.54 E4	1.38 E3	1.49 E3	1.01 E2	1.88 E2	3.28 E3	9.89 E1
	%	-	-	0.07	1.35	0.66	0.36	0.20	0.14	0.30	0.50
Clupeidae	N	-	1.05 E2	-	-	-	7.93 E4	3.85 E4	1.25 E5	2.98 E5	7.79 E5
	%	-	0.24	-	-	-	0.61	0.45	0.31	1.35	2.79
Cyprinidae	N	-	-	-	-	-	-	6.07 E2	5.01 E2	6.42 E3	1.18 E3
	%	-	-	-	-	-	-	0.32	0.07	0.45	0.33
Catostomidae	N	-	4.22 E2	3.37 E3	1.42 E5	6.92 E3	2.30 E3	2.32 E3	6.20 E3	2.96 E3	-
	%	-	0.22	0.16	0.27	0.35	0.57	0.47	0.98	0.29	-
Ictaluridae	N	-	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-	-	-
Percichthyidae	N	-	-	-	-	1.98 E3	4.66 E3	4.05 E2	6.26 E2	1.98 E2	-
	%	-	-	-	-	0.57	0.96	0.13	0.14	0.09	-
Centrarchidae	N	-	-	-	-	-	1.01 E2	1.72 E3	1.25 E2	-	1.96 E2
	%	-	-	-	-	-	3.29	1.48	0.08	-	0.31
Percidae	N	7.52 E2	6.33 E2	2.28 E4	5.62 E4	2.08 E3	1.86 E4	2.12 E3	2.97 E3	6.91 E2	9.8 E1
	%	0.47	0.10	1.09	1.14	0.85	4.14	0.58	0.15	0.06	0.03
Sciaenidae	N	-	-	-	-	-	-	-	1.25 E2	1.99 E3	2.93 E2
	%	-	-	-	-	-	-	-	0.01	0.27	0.05
TOTAL FISH	N	7.52 E2	1.16 E3	2.63 E4	2.54 E5	1.24 E4	1.06 E5	4.58 E4	1.36 E5	3.14 E5	7.85 E5
	%	0.47	0.14	0.60	0.41	0.43	0.71	0.46	0.30	1.11	2.57
Unidentified eggs	N	-	-	1.16 E2	-	1.48 E4	-	-	-	1.98 E2	9.8 E1
	%	-	-	0.54	-	0.33	-	-	-	0.01	0.53
Sciaenid eggs	N	-	-	-	-	-	3.95 E4	1.32 E3	9.46 E4	1.29 E4	2.27 E4
	%	-	-	-	-	-	1.57	0.03	0.38	0.05	0.05
TOTAL EGGS	N	-	-	1.16 E2	-	1.48 E4	3.95 E4	1.32 E3	9.46 E4	1.31 E4	2.28 E4
	%	-	-	0.35	-	0.33	1.42	0.01	0.34	0.04	0.07

Table 4. Estimated entrainment of fish larvae and eggs for each sampling period, Bellefonte Nuclear Plant, Guntersville Reservoir, Alabama, 1975. N = estimated number entrained; % = estimated percent of transported taxon entrained. No samples were taken in sample period 13. (Continued)

Taxon		Sample Period 11	12	13	14	15	16	17	18	19
Unidentified fish	N	5.25 E2	-	-	-	-	-	6.85 E2	-	-
	%	0.18	-	-	-	-	-	2.15		
Clupeidae	N	7.14 E5	4.22 E5	-	2.20 E5	4.25 E5	4.70 E4	6.85 E3	2.20 E4	4.34 E2
	%	2.70	1.83	-	3.07	4.68	1.19	1.24	2.20	0.17
Cyprinidae	N	1.18 E3	1.74 E4	-	5.86 E4	4.83 E4	3.93 E3	1.71 E3	5.74 E2	3.25 E2
	%	0.17	1.27	-	2.87	1.60	0.39	0.34	0.30	0.13
Catostomidae	N	-	5.70 E2	-	-	-	-	-	-	-
	%	-	0.39	-	-	-	-	-	-	-
Ictaluridae	N	-	2.85 E2	-	1.17 E2	-	2.30 E2	1.14 E2	-	1.95 E3
	%	-	0.06	-	0.03	-	0.07	0.10	-	0.99
Percichthyidae	N	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-	-
Centrarchidae	N	3.94 E2	3.80 E2	-	1.52 E3	7.84 E3	2.30 E2	3.42 E2	1.15 E2	4.78 E3
	%	0.51	0.37	-	0.90	1.79	0.01	0.24	0.77	2.13
Percidae	N	-	9.5 E1	-	-	-	-	-	-	-
	%	-	0.41	-	-	-	-	-	-	-
Sciaenidae	N	1.57 E3	7.99 E4	-	1.30 E5	3.38 E4	4.46 E4	9.00 E4	7.65 E4	1.73 E3
	%	0.05	1.46	-	2.17	0.50	0.65	1.35	2.37	0.18
TOTAL FISH	N	7.17 E5	5.21 E5	-	4.10 E5	5.15 E5	9.60 E4	9.97 E4	9.92 E4	9.22 E3
	%	2.31	1.70	-	2.61	2.61	0.69	1.21	2.22	0.48
Unidentified eggs	N	-	-	-	-	-	-	1.14 E2	-	-
	%	-	-	-	-	-	-	2.14	-	-
Sciaenid eggs	N	6.70 E4	3.33 E5	-	3.06 E5	1.00 E4	2.13 E5	2.10 E4	1.87 E4	4.08 E4
	%	0.08	0.12	-	0.16	0.05	0.29	0.05	0.19	0.22
TOTAL EGGS	N	6.70 E4	3.33 E5	-	3.06 E5	1.00 E4	2.13 E5	2.12 E4	1.87 E4	4.08 E4
	%	0.08	0.12	-	0.16	0.05	0.29	0.05	0.19	0.22

Table 5. Estimated entrainment of fish larvae and eggs for each sampling period, Bellefonte Nuclear Plant, Guntersville Reservoir, Alabama, 1976. N = estimated number entrained; % = estimated percent of transported taxon entrained.

Taxon		Sample Period (see Table 1)								
		1	2	3	4	5	6	7	8	9
Unidentified fish	N	-	-	1.09 E3	5.40 E2	3.65 E3	-	1.06 E3	3.22 E4	4.85 E2
	%	-	-	0.17	1.44	0.48	-	1.24	8.66	1.87
Clupeidae	N	-	-	1.63 E3	2.57 E5	5.95 E5	8.70 E5	1.24 E6	8.89 E4	3.62 E5
	%	-	-	0.01	0.15	0.66	1.11	1.14	0.47	0.33
Cyprinidae	N	-	-	1.09 E3	-	7.04 E3	1.49 E4	2.13 E3	1.01 E3	1.46 E3
	%	-	-	0.83	-	0.55	1.37	0.74	1.52	0.18
Catostomidae	N	-	-	9.14 E3	-	-	-	-	-	-
	%	-	-	0.19	-	-	-	-	-	-
Ictaluridae	N	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-	-
Percichthyidae	N	1.60 E3	3.94 E3	2.72 E3	1.49 E4	4.35 E4	8.44 E4	5.78 E4	1.87 E4	1.52 E3
	%	0.06	0.05	0.02	0.20	0.52	0.80	0.90	2.85	0.29
Centrarchidae	N	-	-	-	-	9.79 E2	6.05 E3	1.59 E3	5.04 E2	1.02 E4
	%	-	-	-	-	0.47	0.62	0.93	1.30	0.56
Percidae	N	3.18 E3	3.36 E3	5.99 E3	1.49 E3	2.60 E3	4.62 E3	5.31 E2	5.04 E2	1.49 E3
	%	0.07	0.09	0.09	0.29	0.43	1.52	0.62	1.01	0.30
Sciaenidae	N	-	-	-	-	-	3.08 E3	1.06 E3	1.02 E3	1.52 E3
	%	-	-	-	-	-	1.50	0.83	0.42	0.05
TOTAL FISH	N	4.78 E3	7.30 E3	2.17 E4	2.74 E5	6.53 E5	9.83 E5	1.30 E6	1.42 E5	3.79 E5
	%	0.06	0.06	0.05	0.15	0.65	1.07	1.12	0.70	0.32
Unidentified eggs	N	-	1.47 E3	3.20 E4	1.07 E4	1.28 E5	7.97 E3	3.02 E5	-	2.23 E4
	%	-	0.26	0.53	0.43	0.26	1.52	0.79	-	0.20
Sciaenid eggs	N	-	-	-	-	3.96 E4	1.97 E4	1.28 E5	1.83 E5	1.71 E5
	%	-	-	-	-	0.30	0.43	0.35	0.29	0.39
TOTAL FISH	N	-	1.47 E3	3.20 E4	1.07 E4	1.68 E5	2.77 E4	4.30 E5	1.83 E5	1.93 E5
	%	-	0.26	0.53	0.43	0.27	0.54	0.57	0.29	0.35

Table 5. Estimated entrainment of fish larvae and eggs for each sampling period, Bellefonte Nuclear Plant, Guntersville Reservoir, Alabama, 1976. N = estimated number entrained; % = estimated percent of transported taxon entrained. (Continued)

Taxon		Sample Period								
		10	11	12	13	14	15	16	17	18
Unidentified fish	N	-	-	-	-	-	5.17 E2	-	1.09 E3	1.09 E3
	%	-	-	-	-	-	0.10	-	0.75	0.64
Clupeidae	N	2.30 E6	1.66 E5	8.09 E5	8.22 E5	1.07 E6	1.64 E5	2.83 E5	1.16 E5	8.23 E4
	%	1.48	0.13	0.43	0.29	0.29	0.34	0.58	0.62	0.38
Cyprinidae	N	4.98 E3	3.11 E3	2.08 E3	8.31 E3	5.32 E2	1.03 E3	2.23 E3	1.36 E4	3.65 E4
	%	1.18	0.22	0.21	0.13	0.04	0.06	0.21	0.64	0.52
Catostomidae	N	1.21 E4	-	-	-	-	-	-	-	1.09 E3
	%	1.76	-	-	-	-	-	-	-	1.93
Ictaluridae	N	-	-	-	1.04 E3	2.13 E3	8.78 E3	1.11 E3	5.45 E2	5.45 E2
	%	-	-	-	0.57	0.41	0.86	0.26	0.21	0.16
Percichthyidae	N	8.40 E3	2.06 E3	1.05 E3	-	-	-	-	-	-
	%	1.65	0.48	0.53	-	-	-	-	-	-
Centrarchidae	N	8.19 E3	1.39 E4	1.59 E3	-	7.26 E3	-	9.53 E3	1.09 E3	2.18 E3
	%	2.86	0.63	0.98	-	0.69	-	0.33	0.34	0.29
Percidae	N	-	-	-	-	5.17 E2	-	-	-	-
	%	-	-	-	-	0.44	-	-	-	-
Sciaenidae	N	5.16 E3	5.19 E3	5.27 E3	3.58 E4	6.14 E4	1.95 E4	8.71 E4	4.33 E4	1.91 E5
	%	0.59	0.13	0.17	0.33	0.22	0.12	0.25	0.39	0.60
TOTAL FISH	N	2.34 E6	1.90 E5	8.19 E5	8.67 E5	1.14 E6	1.94 E5	3.83 E5	1.76 E5	3.14 E5
	%	1.49	0.14	0.42	0.28	0.29	0.29	0.43	0.54	0.51
Unidentified eggs	N	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-	-
Sciaenid eggs	N	1.45 E6	1.71 E6	4.66 E5	1.70 E6	1.93 E5	1.59 E5	7.97 E4	1.32 E6	3.05 E5
	%	0.92	0.35	0.24	0.20	0.22	0.05	0.05	0.33	-
TOTAL EGGS	N	1.45 E6	1.71 E6	4.66 E5	1.70 E6	1.93 E5	1.59 E5	7.97 E4	1.32 E6	3.05 E5
	%	0.92	0.35	0.20	0.20	0.22	0.05	0.05	0.33	0.14

Table 6. Estimated annual transport and entrainment of fish larvae and eggs, Bellefonte Nuclear Plant, Guntersville Reservoir, Alabama, 1975. Estimated number entrained based on intake demand of 3.675×10^5 m^3/day.

Taxon	Number Transported	Number Entrained	Percent
Unidentified fish	4.745 E7*	4.640 E5	0.98
Polyodontidae	1.169 E6	6.660 E2	0.06
Lebisosteidae	1.842 E6	4.840 E3	0.26
Clupeidae	1.387 E9	2.530 E7	1.82
Hiodontidae	5.482 E6	4.380 E2	0.01
Cyprinidae	1.024 E8	1.279 E6	1.25
Catostomidae	4.157 E8	1.195 E6	0.29
Ictaluridae	1.499 E7	2.189 E4	0.15
Poecilidae**	1.087 E6	0	-
Percichthyidae	1.344 E7	5.506 E4	0.41
Centrarchidae	2.382 E7	1.152 E5	0.48
Percidae	8.605 E7	7.496 E5	0.87
Sciaenidae	3.263 E8	3.955 E6	1.21
TOTAL FISH	2.427 E9	3.314 E7	1.37
Unidentified eggs	1.687 E8	3.215 E5	0.19
Clupeid eggs**	4.477 E6	0	-
Cyprinid eggs**	5.792 E4	0	-
Catostomid eggs**	4.296 E6	0	-
Sciaenid eggs	7.368 E9	1.036 E7	0.14
TOTAL EGGS	7.546 E9	1.068 E7	0.14

*E = exponent; i.e., E7 = 10^7

**No members of these taxa captured in sample strata assumed to be vulnerable to entrainment.

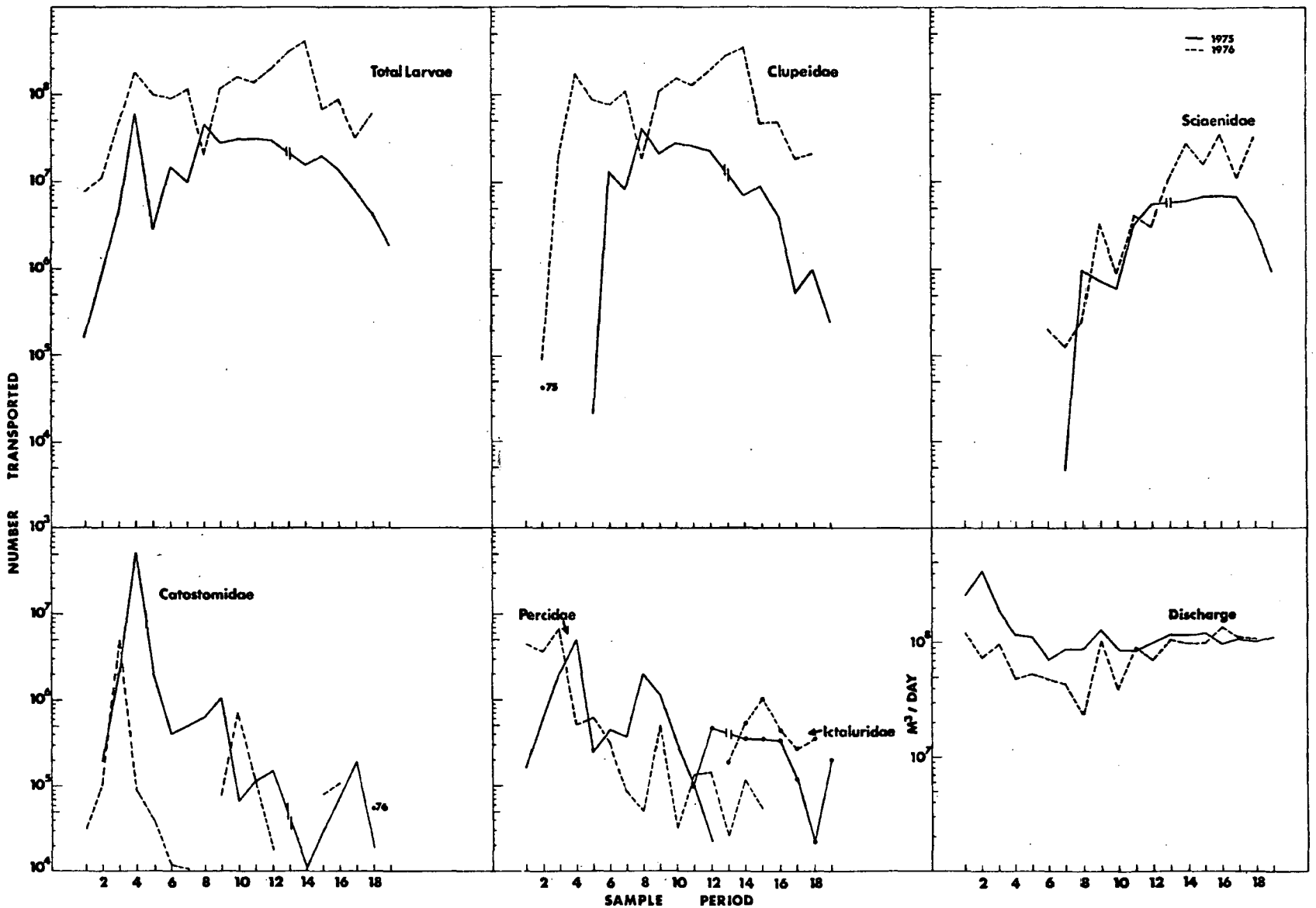
Table 7. Estimated annual transport and entrainment of fish larvae and eggs, Bellefonte Nuclear Plant, Guntersville Reservoir, Alabama, 1976. Estimated number entrained based on intake demand of 3.675×10^5 m^3/day.

Taxon	Number Transported	Number Entrained	Percent
Unidentified fish	3.597 E7	3.332 E5	0.93
Polyodontidae**	3.671 E5	0	-
Clupeidae	1.535 E10	7.318 E7	0.48
Hiodontidae**	1.920 E6	0	-
Cyprinidae	1.968 E8	6.480 E5	0.33
Catostomidae	4.620 E7	9.850 E5	2.13
Ictaluridae	1.853 E7	1.013 E5	0.55
Percichthyidae	3.966 E8	1.688 E6	0.43
Centrarchidae	8.560 E7	5.740 E5	0.67
Percidae	1.207 E8	2.080 E5	0.17
Sciaenidae	9.677 E8	2.747 E6	0.28
Atherinidae**	2.042 E5	0	-
TOTAL FISH	1.722 E10	8.046 E7	0.47
Unidentified eggs	1.399 E9	4.664 E6	0.33
Catostomid eggs**	1.576 E5	0	-
Sciaenid eggs	2.562 E10	6.517 E7	0.25
TOTAL EGGS	2.702 E10	6.983 E7	0.26

*E = exponent; i.e., E7 = 10^7

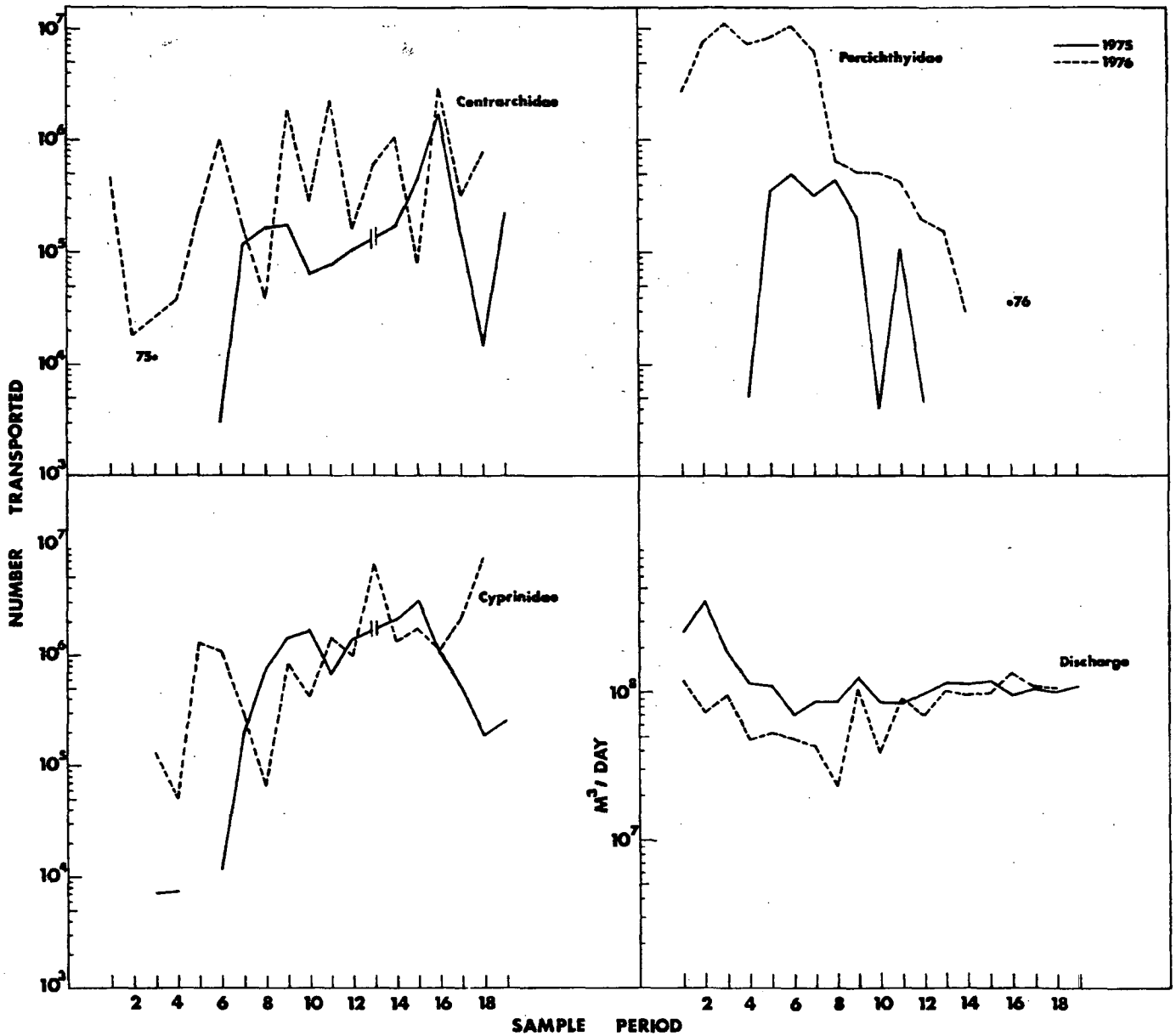
**No members of these taxa captured in sample strata assumed to be vulnerable to entrainment.

Figure 1



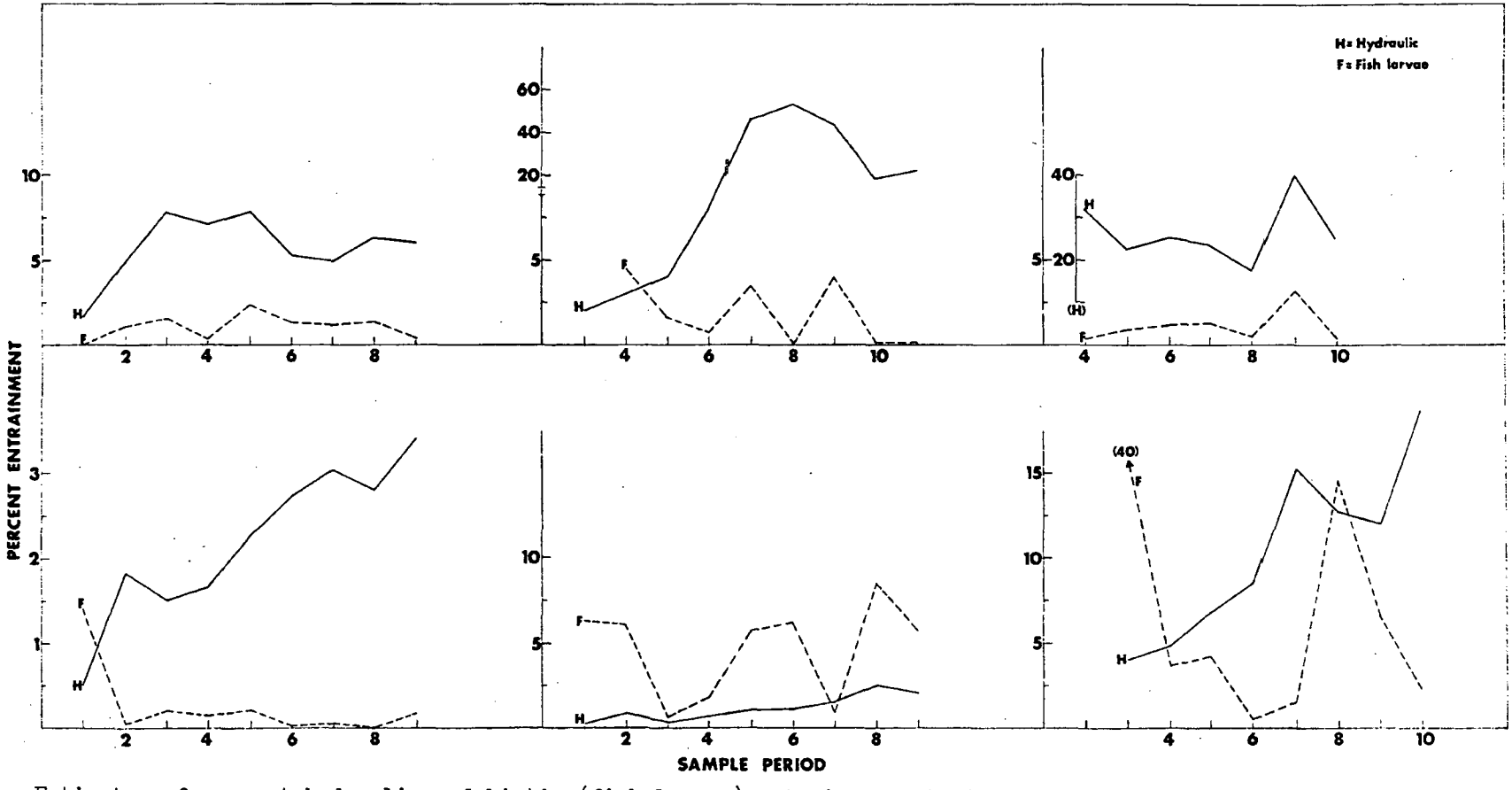
Numbers of larvae transported past the plant site and reservoir discharge for 1975 and 1976, Guntersville Reservoir, Alabama. Numbers are estimates of 24-hr transport for the sampling date representing each weekly sample period, and are based on weighted transect densities at TRM 392.

Figure 2



Numbers of larvae transported past the plant site and reservoir discharge for 1975 and 1976, Guntersville Reservoir, Alabama. Numbers are estimates of 24-hr transport for the sampling date representing each weekly sample period, and are based on weighted transect densities at TRM 392.

Figure 3



Estimates of percent hydraulic and biotic (fish larvae) entrainment at six TVA steam plants, 1975. Hydraulic entrainment is calculated using plant operating data and reservoir discharge or river flow for each sample date. Entrainment of fish larvae is calculated from densities obtained in intake samples and weighted densities of reservoir or river transects.

APPENDIX A

Procedures under which larval fish monitoring was accomplished in 1975 and 1976 at Bellefonte Nuclear Plant by the Fisheries and Waterfowl Resources Branch of the Division of Forestry, Fisheries, and Wildlife Development, TVA.

FISHERIES AND WATERFOWL RESOURCES BRANCH

PROCEDURES--LARVAL FISH MONITORING, BELLEFONTE NUCLEAR PLANT

OBJECTIVE: To provide data on the species composition, concentration and seasonal timing of larval fish in the vicinity of the Bellefonte Nuclear Plant site in order to estimate the environmental impact of the proposed intake design with respect to entrainment.

PROCEDURES:

A. Sampling

1. Samples will be taken each week during the period of availability of larval fish (approximately March through July). Day and night samples will be taken on the same day, weather conditions permitting.
2. Sampling will be concentrated in a cross-sectional transect of the reservoir and backwater area at approximately TRM 392.
3. Horizontal surface samples will be taken at six locations in the transect; two shoreline locations and one midchannel location will be sampled on each side of Bellefonte Island. Each sample will consist of an upstream and a downstream tow.
4. Vertical net samples will be taken at six locations within the transect; each sample will consist of five replicate tows.
5. Moving pumped samples over a 200-m distance will be taken on each shoreline.
6. The backwater area will be sampled by moving 10-min pumped samples as follows:
   a. Three transects in the proposed intake cove (one on each side, one in the center).
   b. Two stations in the backwater area above the intake cove; each station will consist of three parallel transects.

7. Biweekly samples will be taken in two transects (TRM's 385 and 369) to provide comparative data on concentration and species composition. Five horizontal samples and five vertical net samples will be taken at each transect. Pumped samples will be taken in shallow shoreline areas.
8. Changes in sampling design, if dictated by reservoir conditions or construction activities, will be noted in addenda to these procedures.

B. Analysis of Samples

1. All samples and associated collection data will be transported to the FWRB larval fish laboratory, Muscle Shoals, Alabama.
2. Larval fish will be removed from preserved samples, identified to the lowest possible taxon and enumerated.
3. Finished laboratory data sheets, together with field data sheets, will be forwarded to FF&WD headquarters, Norris, Tennessee, for keypunching, verifying, and inclusion of data (card, tape or disc) in the fisheries data base.
4. Data analyses will include:
   a. Species lists for each collection week.
   b. Concentration of each taxon, expressed as number per 100 m^3 of water filtered.
   c. Instantaneous estimates of numbers of larval fish in the cross-sectional reservoir and backwater transects.
5. An annual report, summarizing the above, will be prepared after all samples have been analyzed and included in the data base. Copies of the report will be transmitted to (1) the Bellefonte project manager; (2) Office of Power; and (3) FF&WD files.

ADDENDUM I--LARVAL FISH MONITORING, BELLEFONTE NUCLEAR PLANT

Growth of Eurasian milfoil in the backwater area (see A.6.) prevented sampling in the backwater areas for the major part of the sampling season. Inshore reservoir stations in the same general area and at approximately the same depth were substituted.

Should larval fish monitoring be performed in 1976, an attempt will be made to follow the original procedure (A.6.); if conditions again prove unfavorable, the procedure described in Addendum I will be followed.

APPENDIX B

Plots of log density (number/1000 m^3) of taxa of fish larvae and eggs vs. sample period, Guntersville Reservoir, Alabama, 1975.

Each plot represents the density of one taxon as obtained by one type of sampling gear, as identified in the plot legend. The ordinate is in log units, i.e., 1 = 10^1, 2 = 10^2, etc.

Transects:

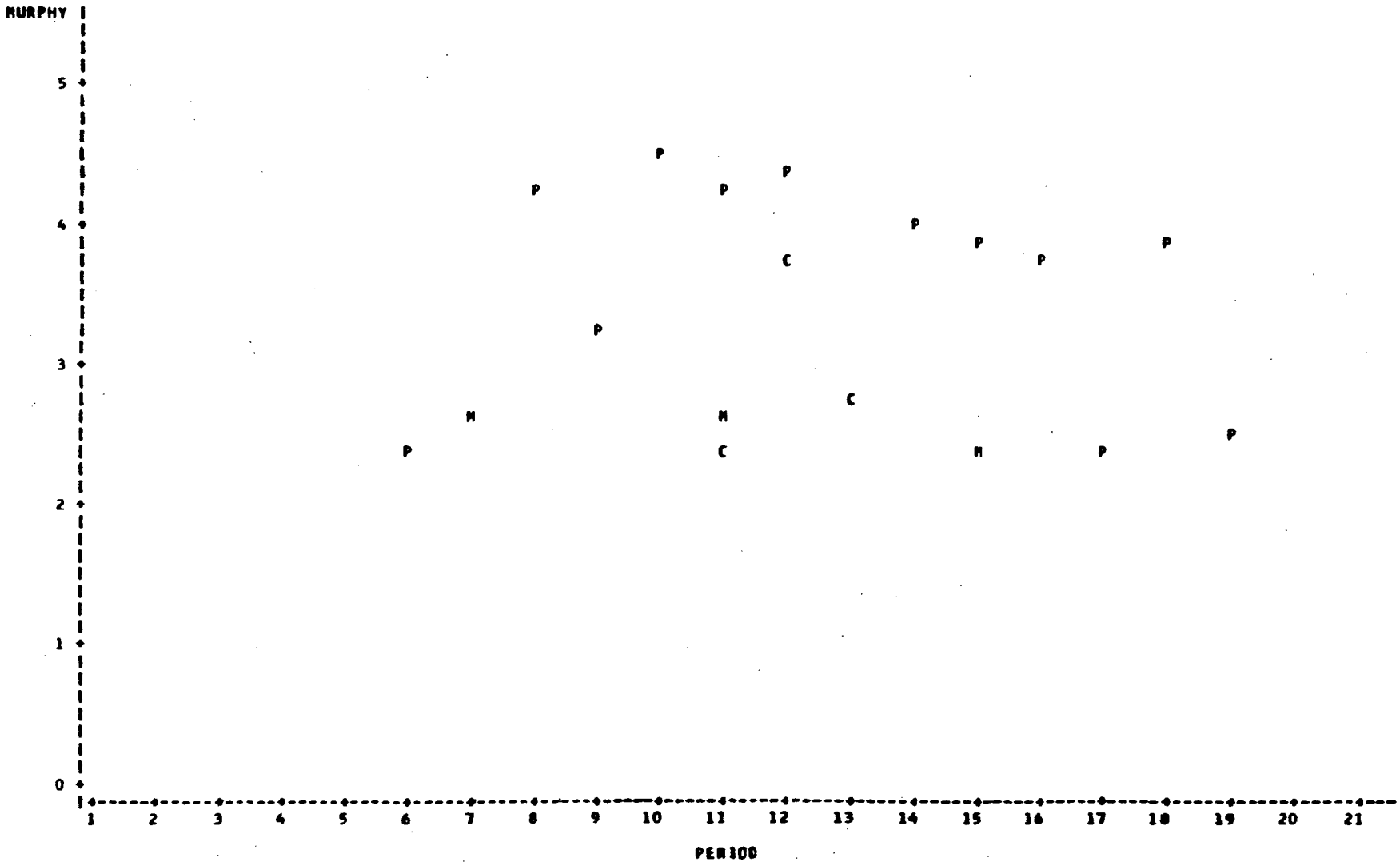
BCKWTR = TRM 393-The blackwater area at the plant site
PLANT = TRM 392-The plant transect
COMER = TRM 385
MURPHY = TRM 369

Plots composed of a single observation have been omitted.

LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975

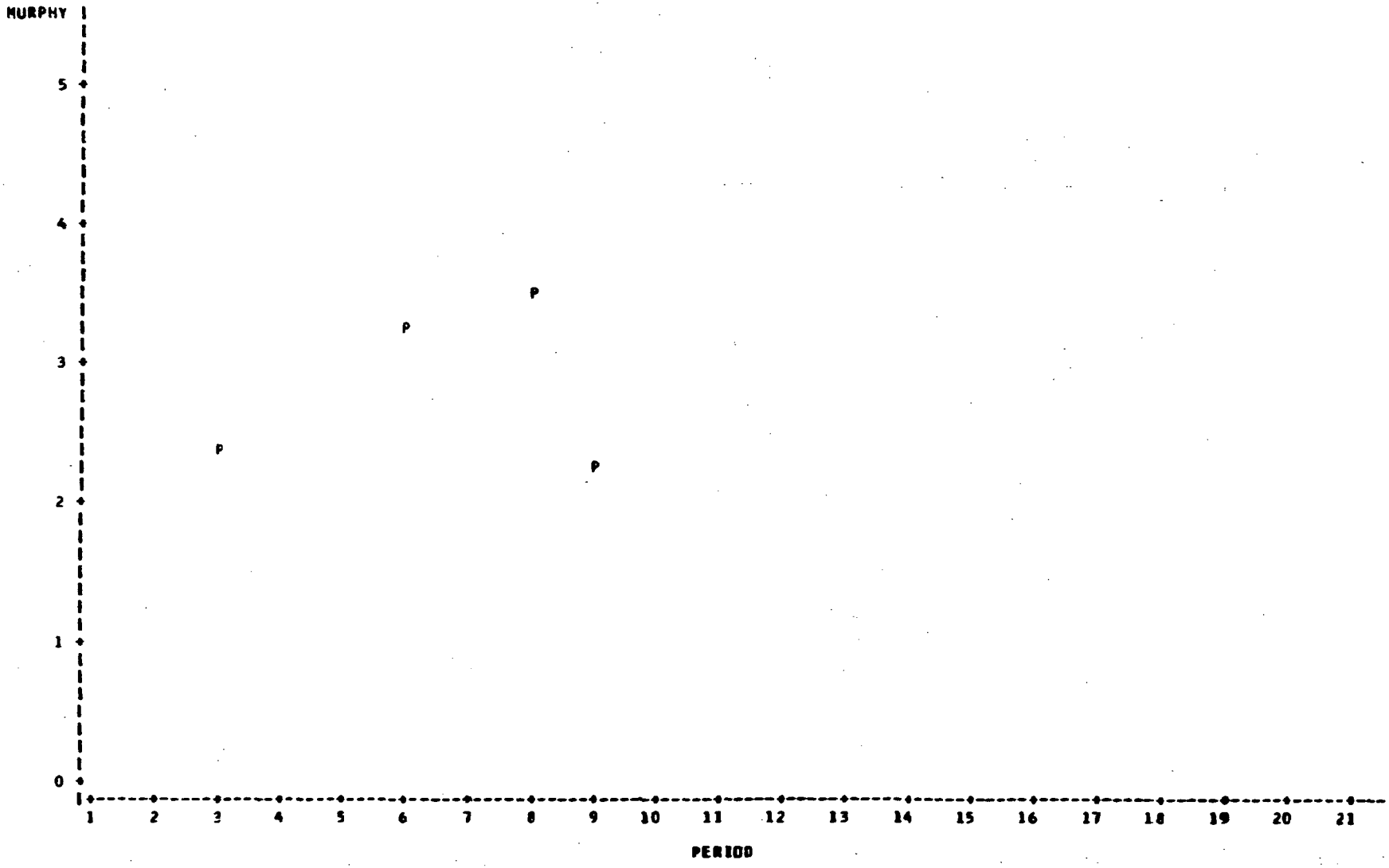
GEAR=FISH PUMP 360GPM .79MM TAXON=SCIAENID EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CORER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



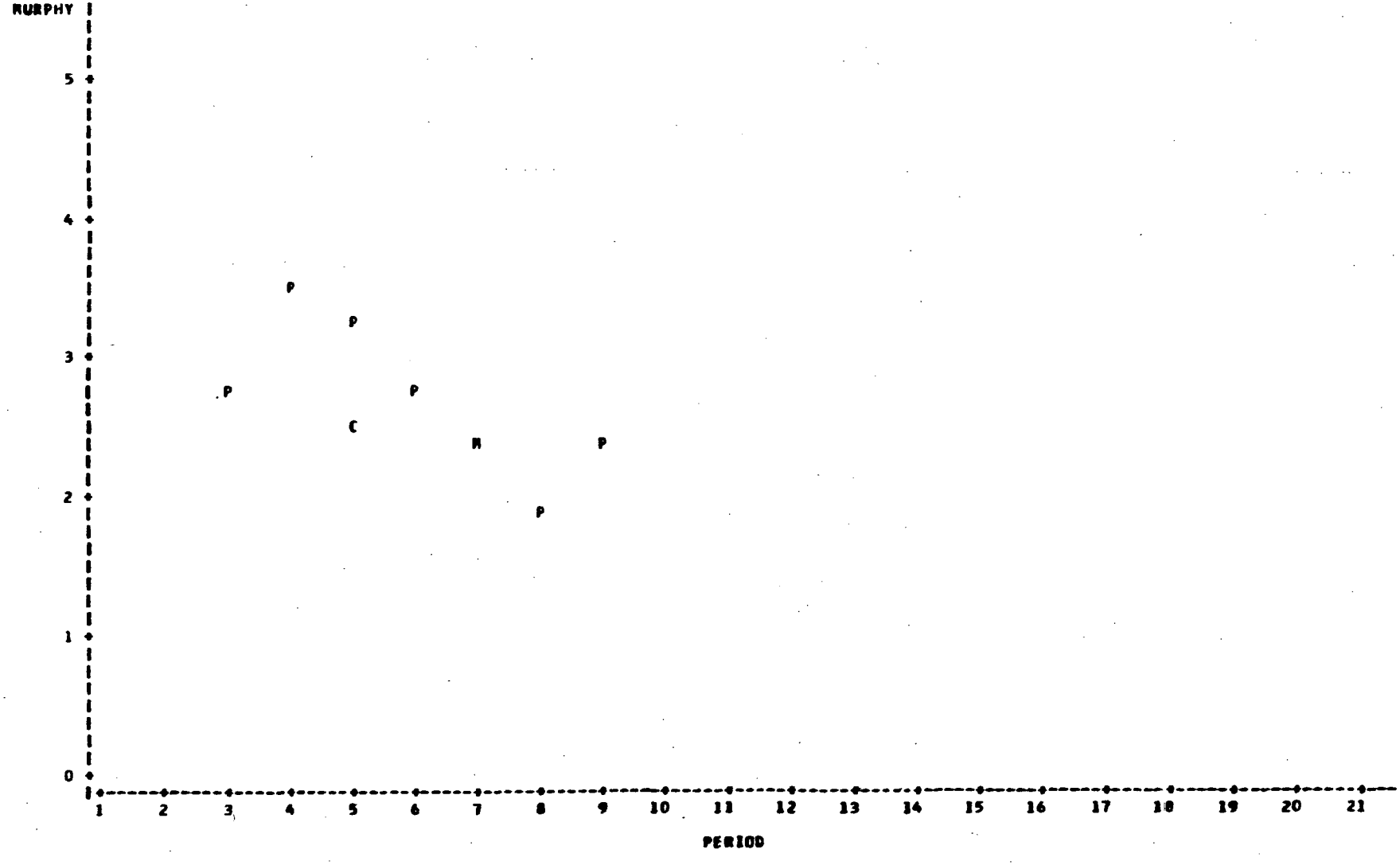
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE 9:43 MONDAY, APRIL 11, 1977 12
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=FISH PUMP 360GPM .79MF TAXON=UNIDENTIFIED FISH EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BRNTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE 9:43 MONDAY, APRIL 11, 1977 1
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=FISH PUMP 360GPM .79MM TAXON=CATOSTOMIDAE

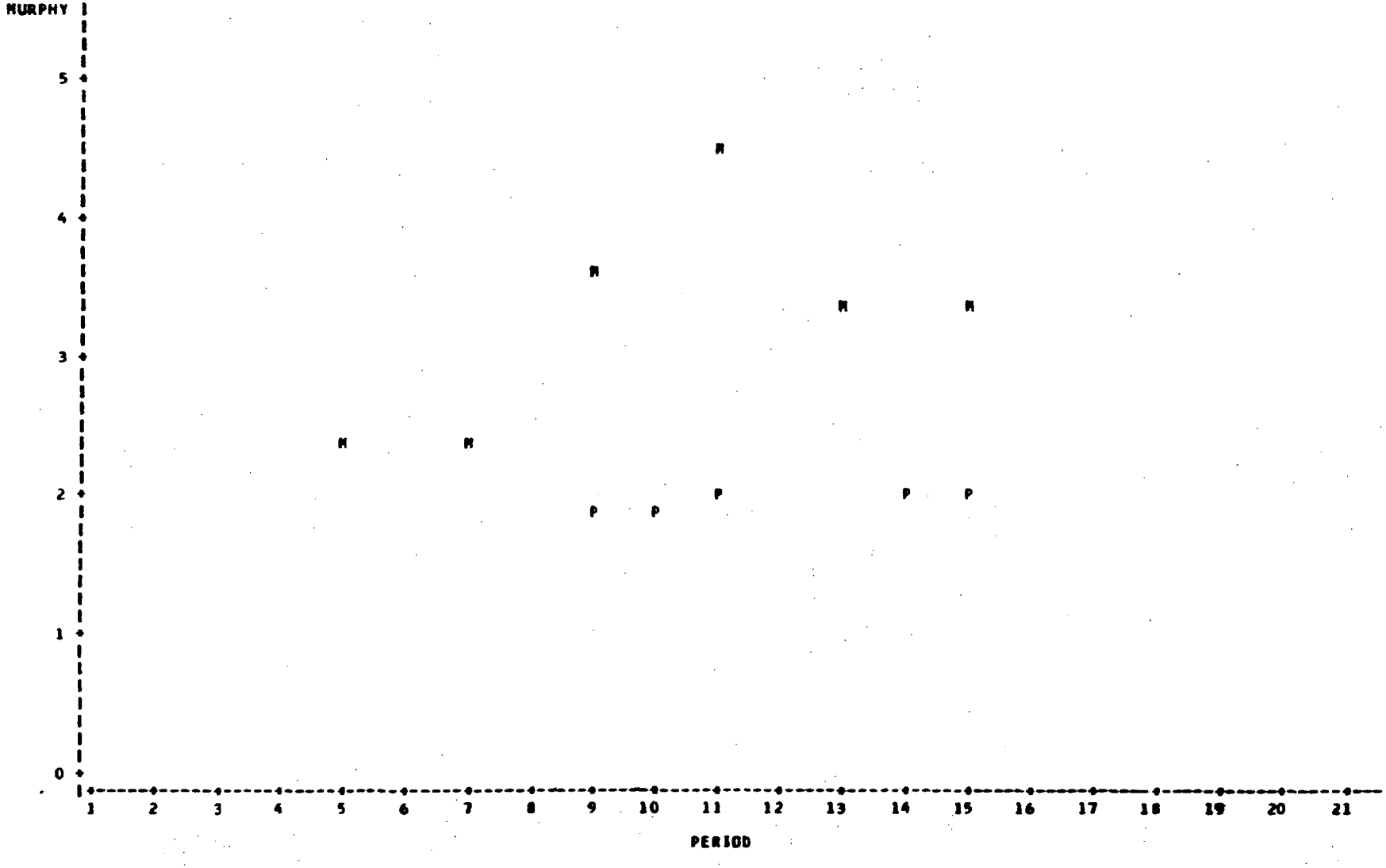
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 2

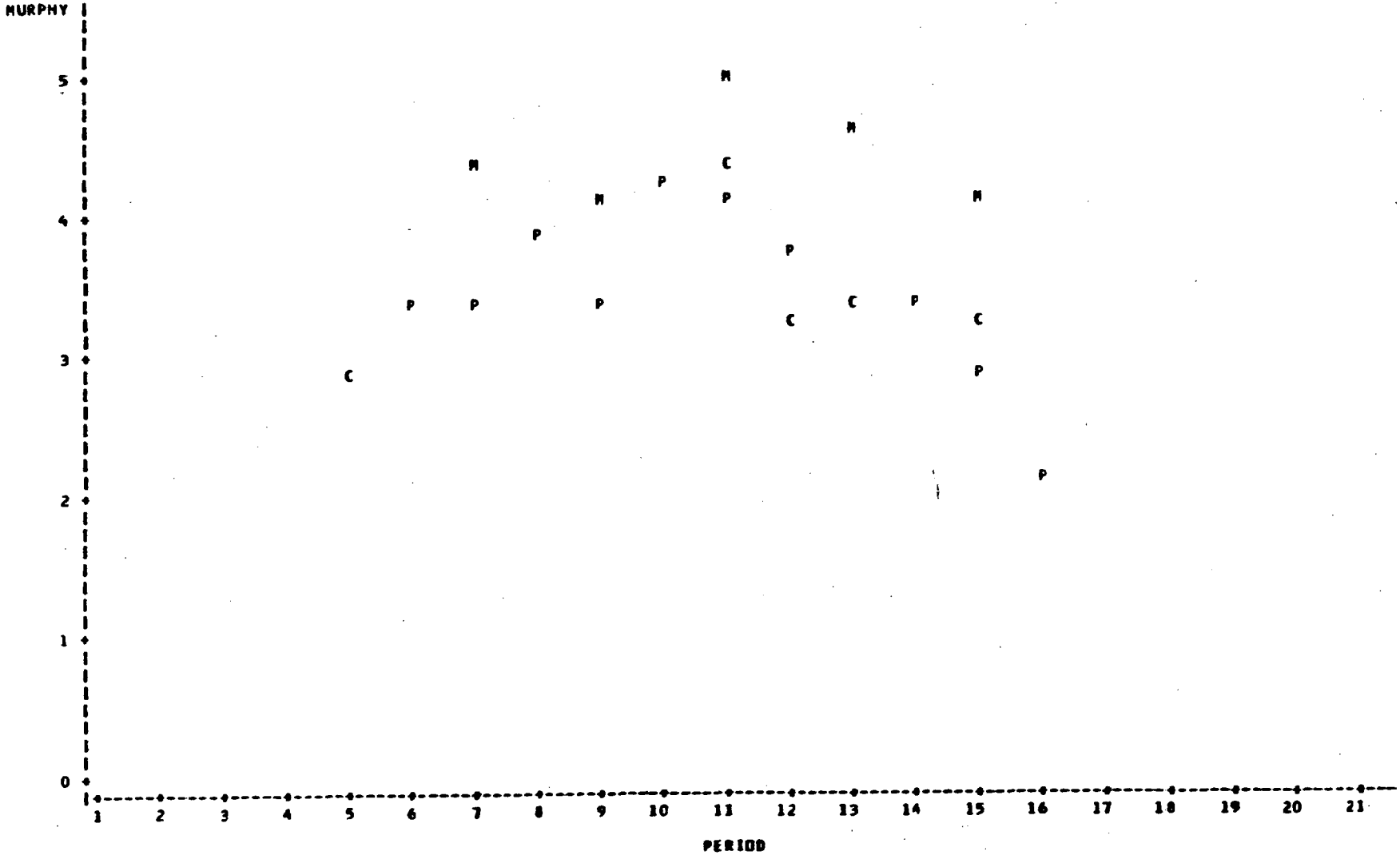
GEAR=FISH PUMP 360GPM .79MM TAXON=CENTRARCHIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



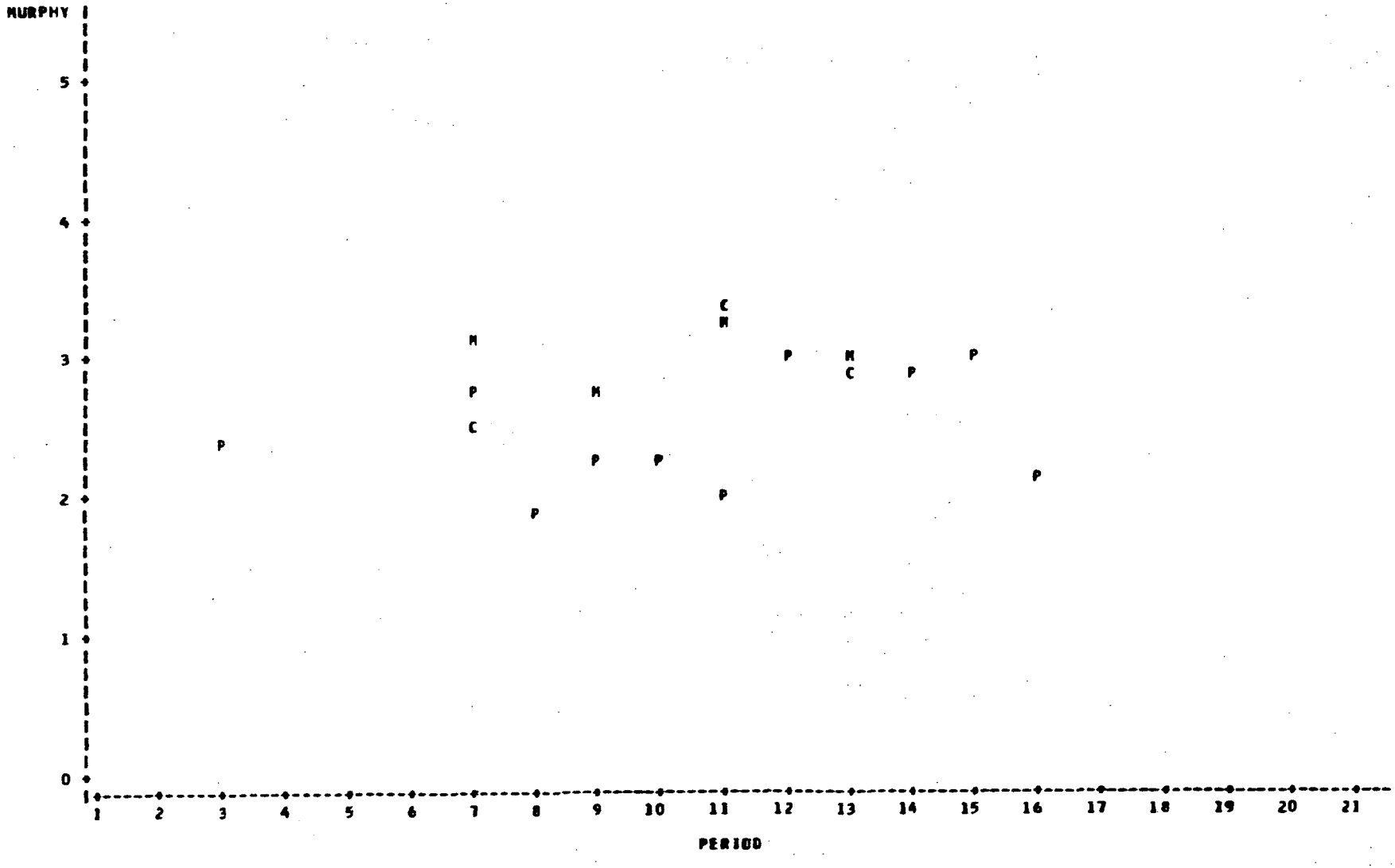
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=FISH PUMP 360GPM .79MM TAXON=CLUPEIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=FISH PUMP 360GPM .79MM TAXON=CYPRINIDAE

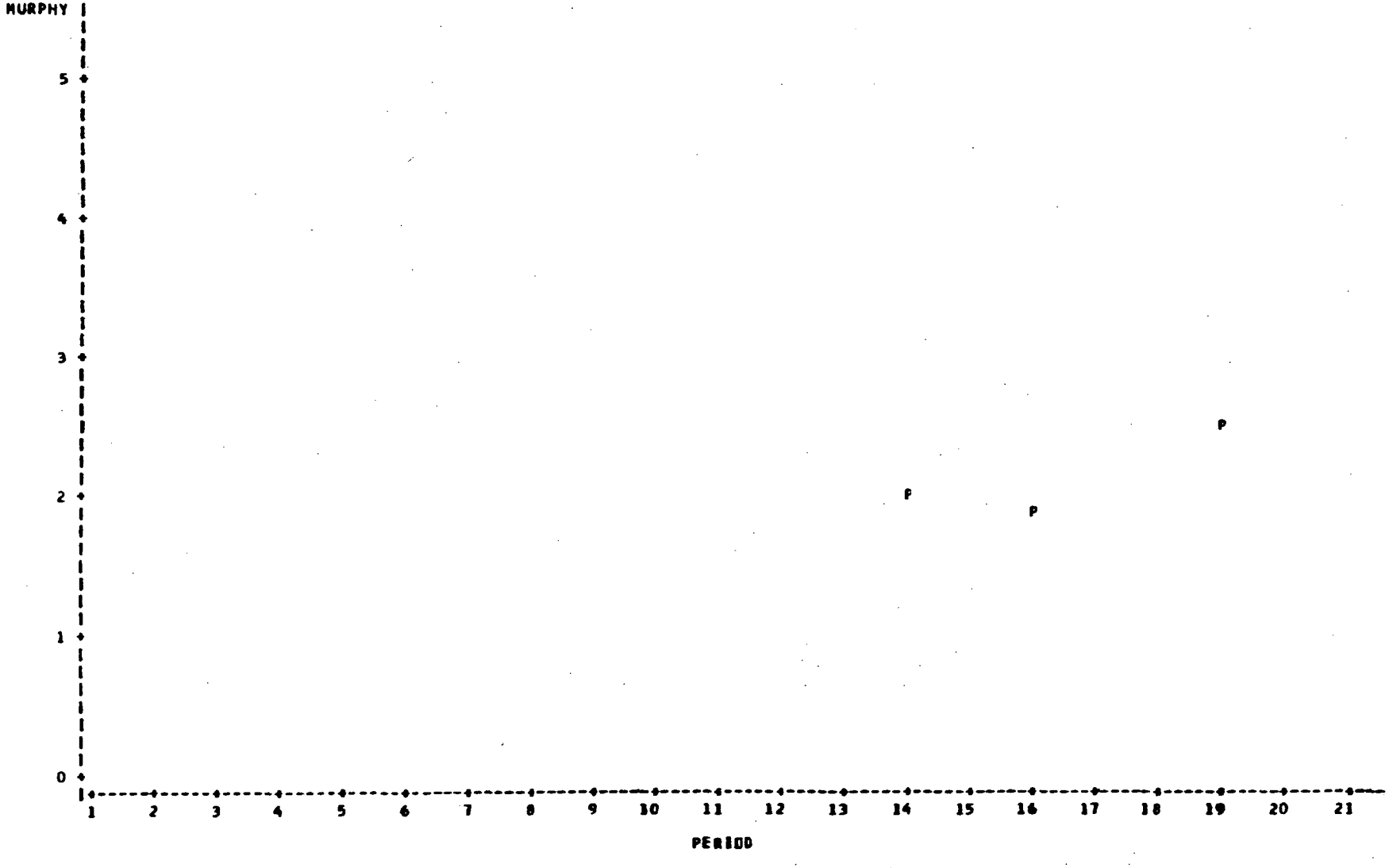
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 6

GEAR=FISH PUMP 360GPM .79MM TAXON=ICTALURIDAE

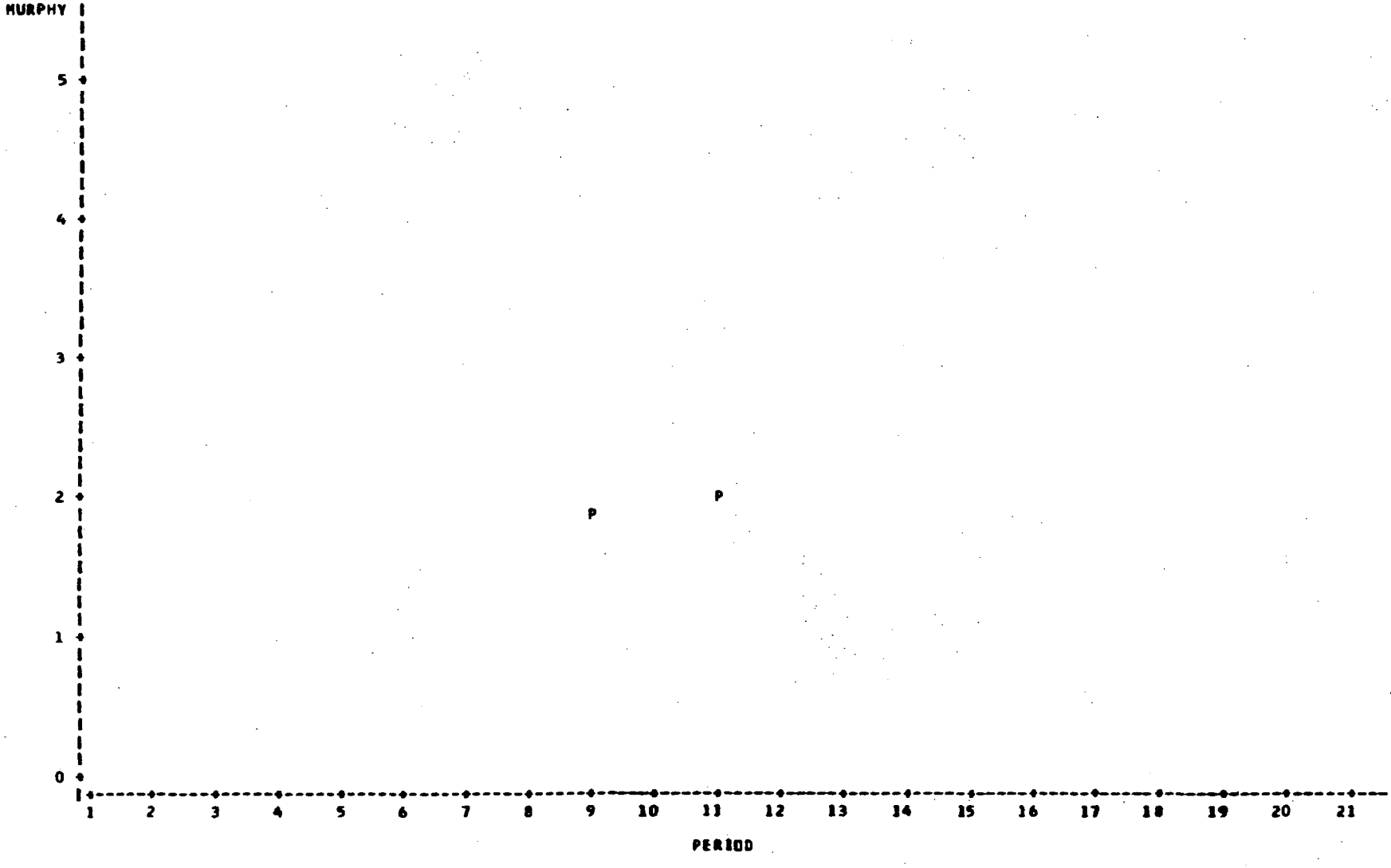
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 7

GEAR=FISH PUMP 360GPM .79MM TAXON=PERCICHTHYIDAE

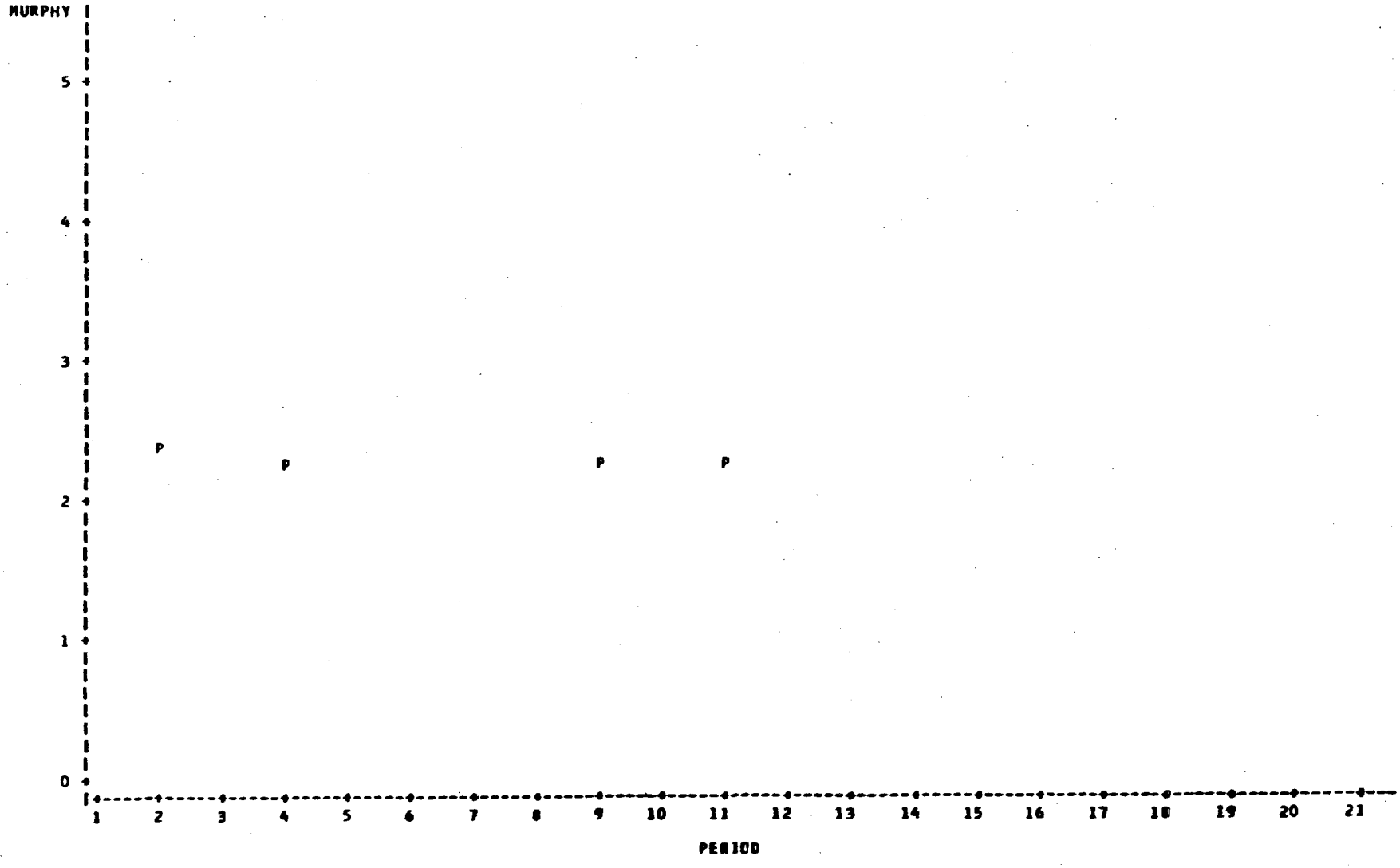
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 8

GEAR=FISH PUMP 360GPM .79MM TAXON=PERCIDAE

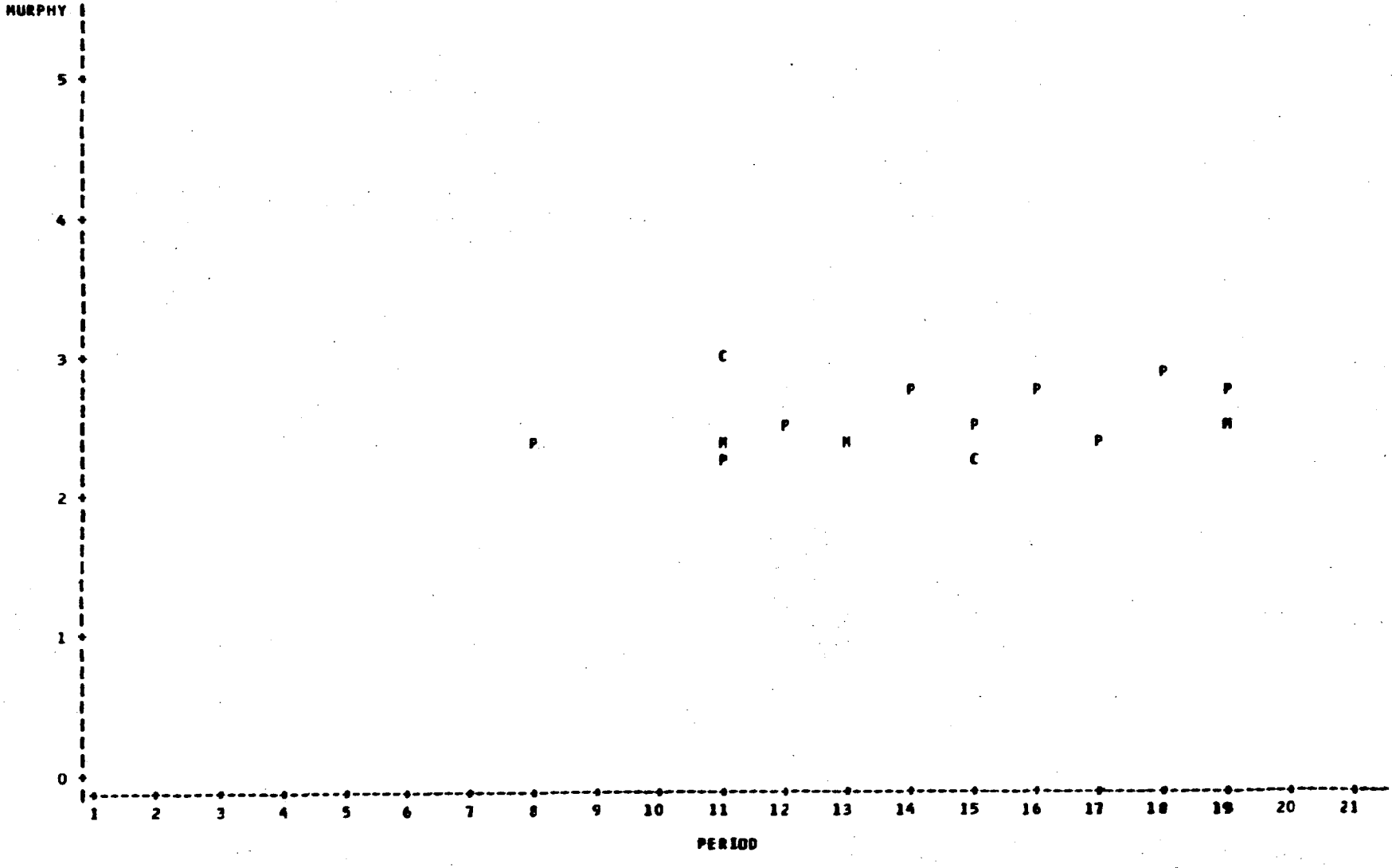
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 10

GEAR=FISH PUMP 360CPM .79MM TAXON=SCIAENIDAE

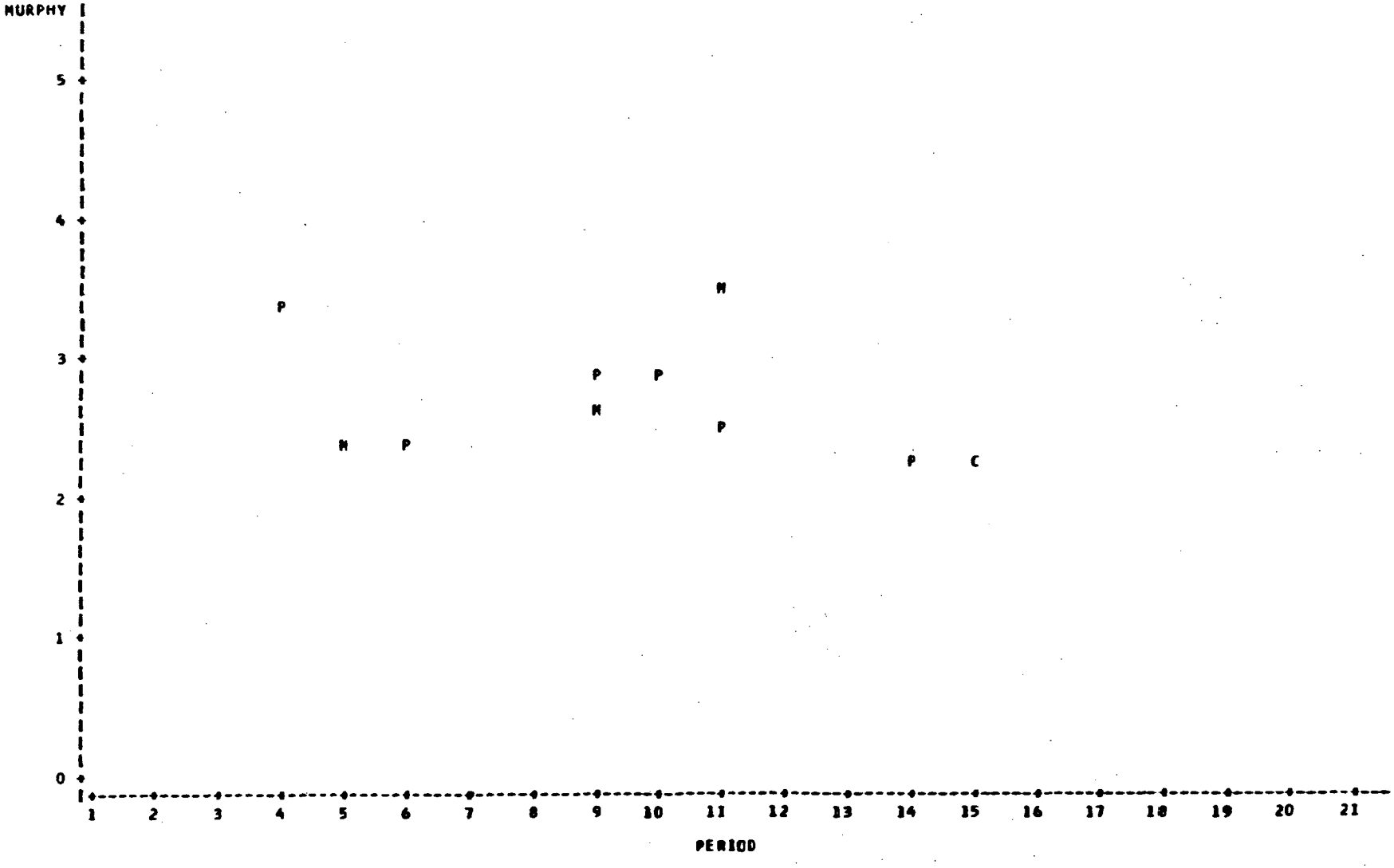
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 11

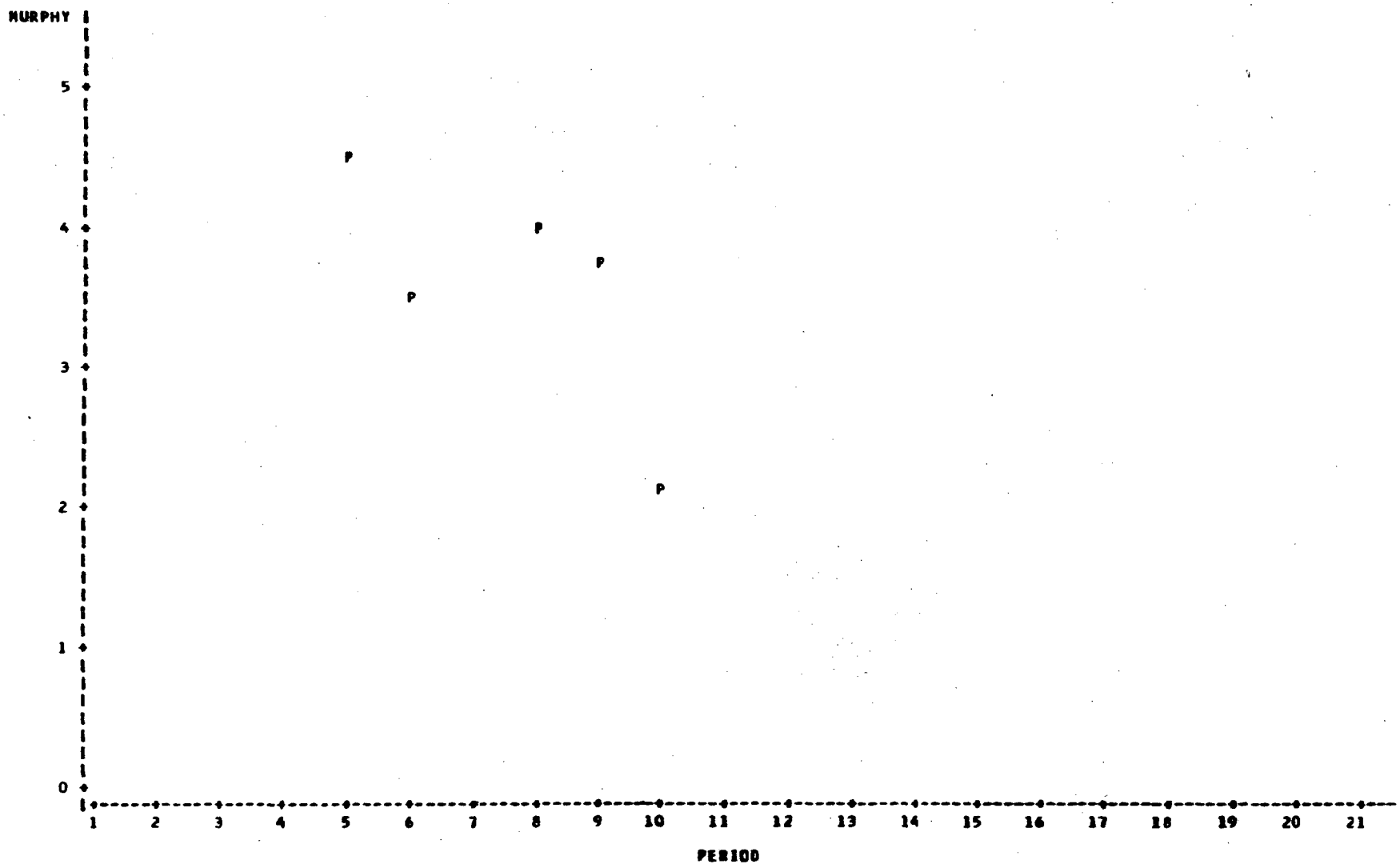
GEAR=FISH PUMP 360GPM .79MM TAXON=UNIDENTIFIED FISH

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



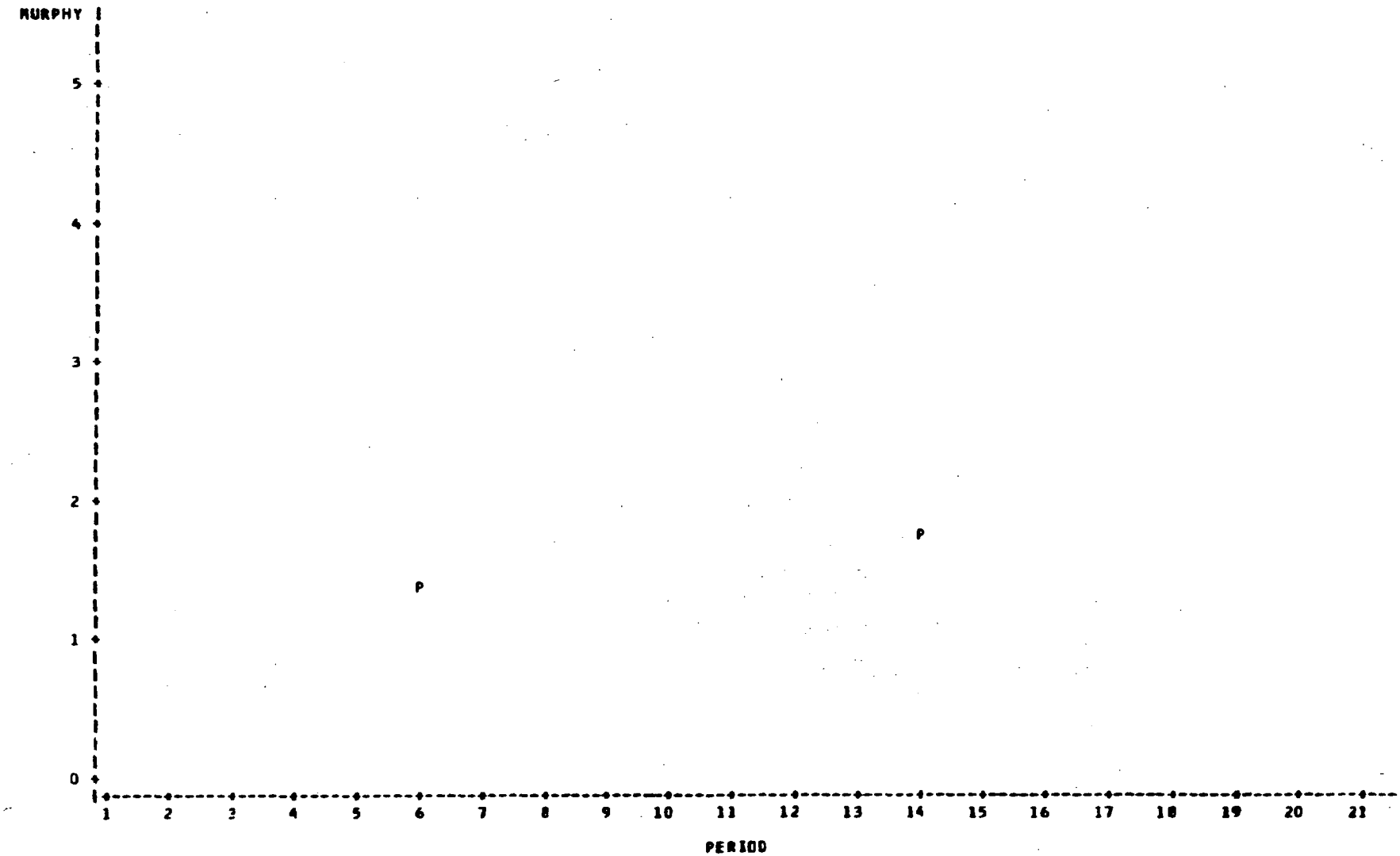
LOG(BASE-10) DENSITIES (#/100CU-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 41
GEAR=1/2M CON. STAT. NET .79MM TAXON=UNIDENTIFIED FISH EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



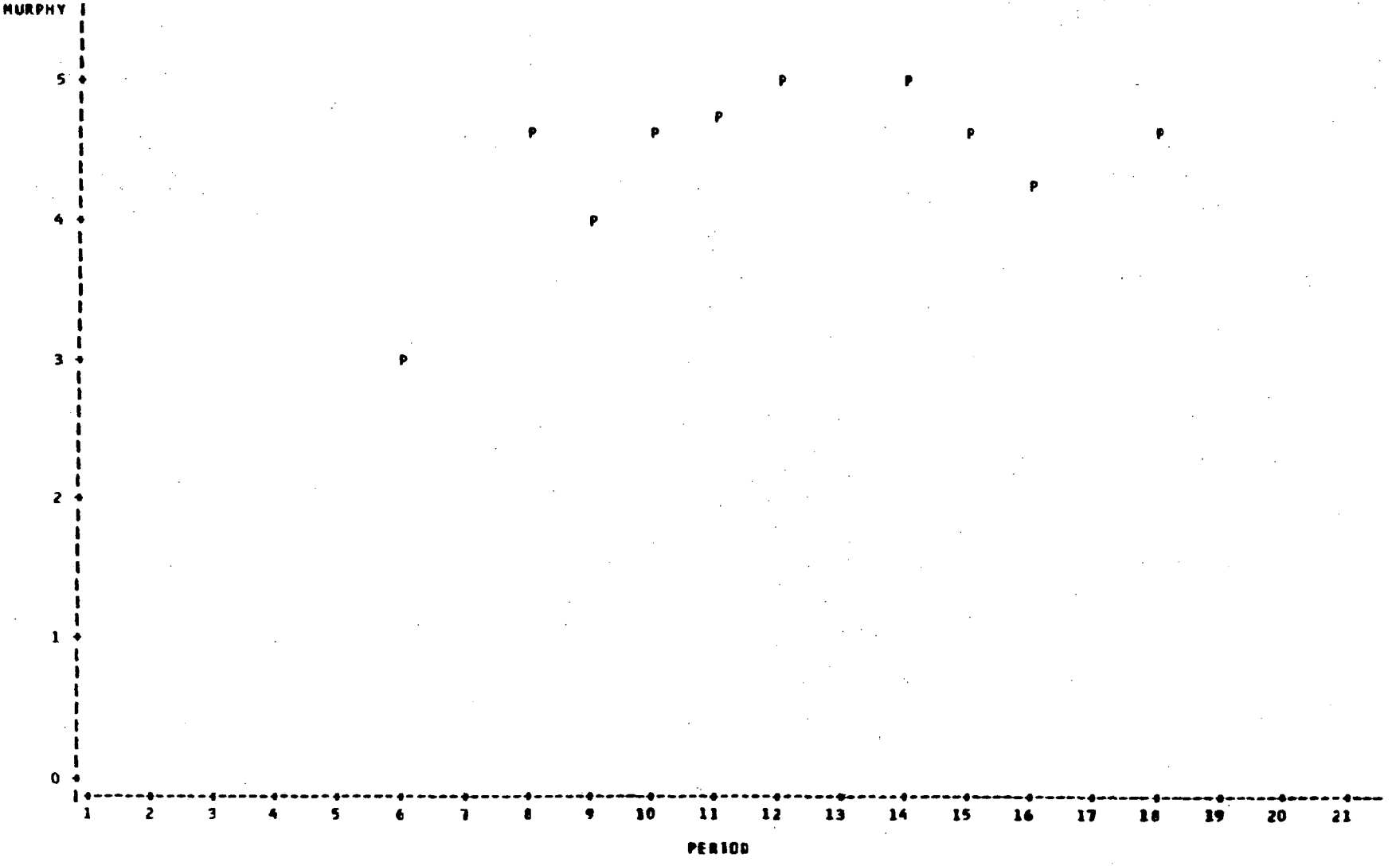
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 GEAR=1/2M CON. STAT. NET .79MM TAXON=CLUPEID EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/100CU-M3) OF LARVAL FISH AND EGGS AT THREE 9:43 MONDAY, APRIL 11, 1977 38
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1/2M CON. STAT. NET .79MM TAXON=SCIAENID EGGS

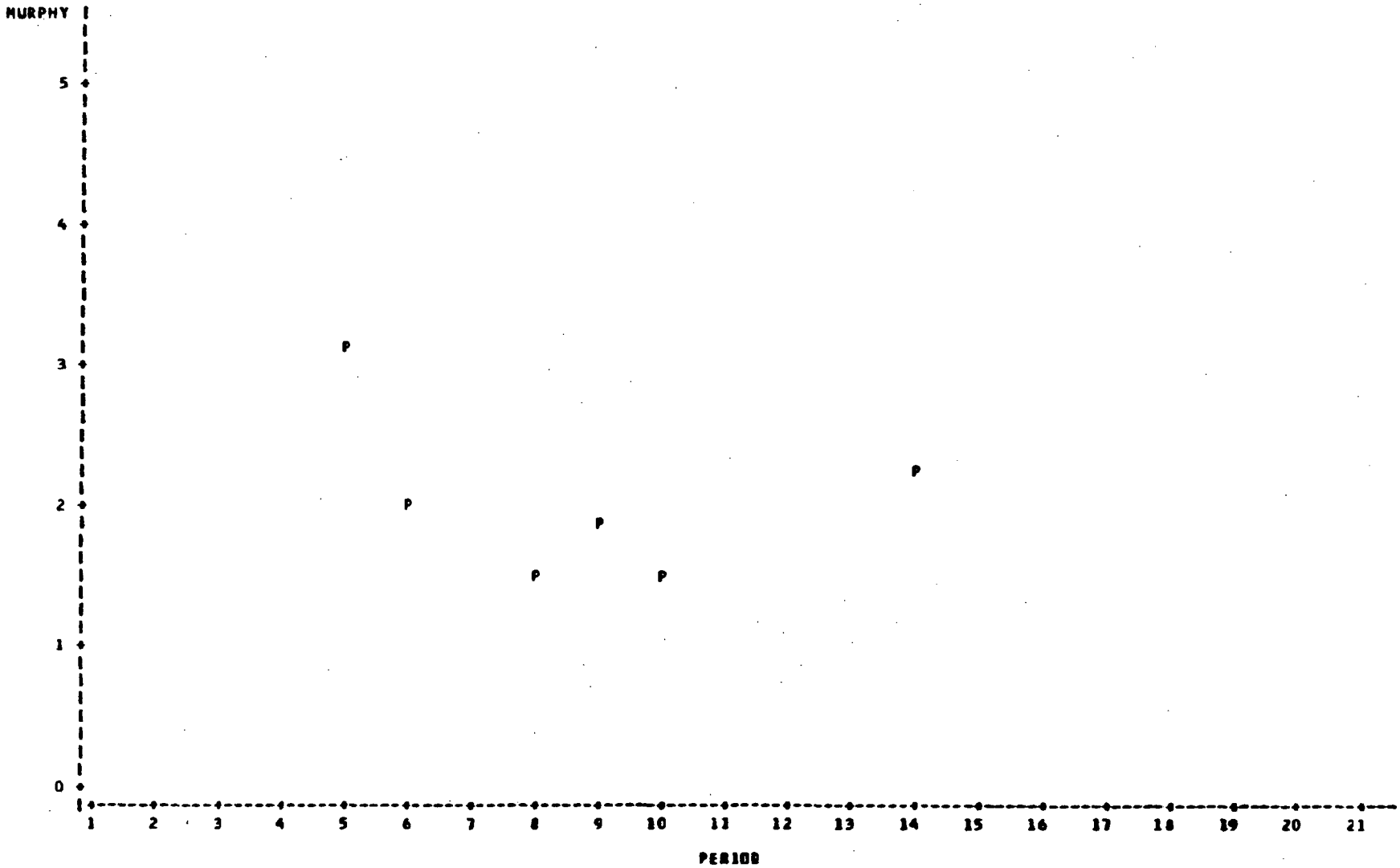
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CCMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/100CU-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 27

GEAR=1/2M CON. STAT. NET .79MM TAXON=CATOSTOMIDAE

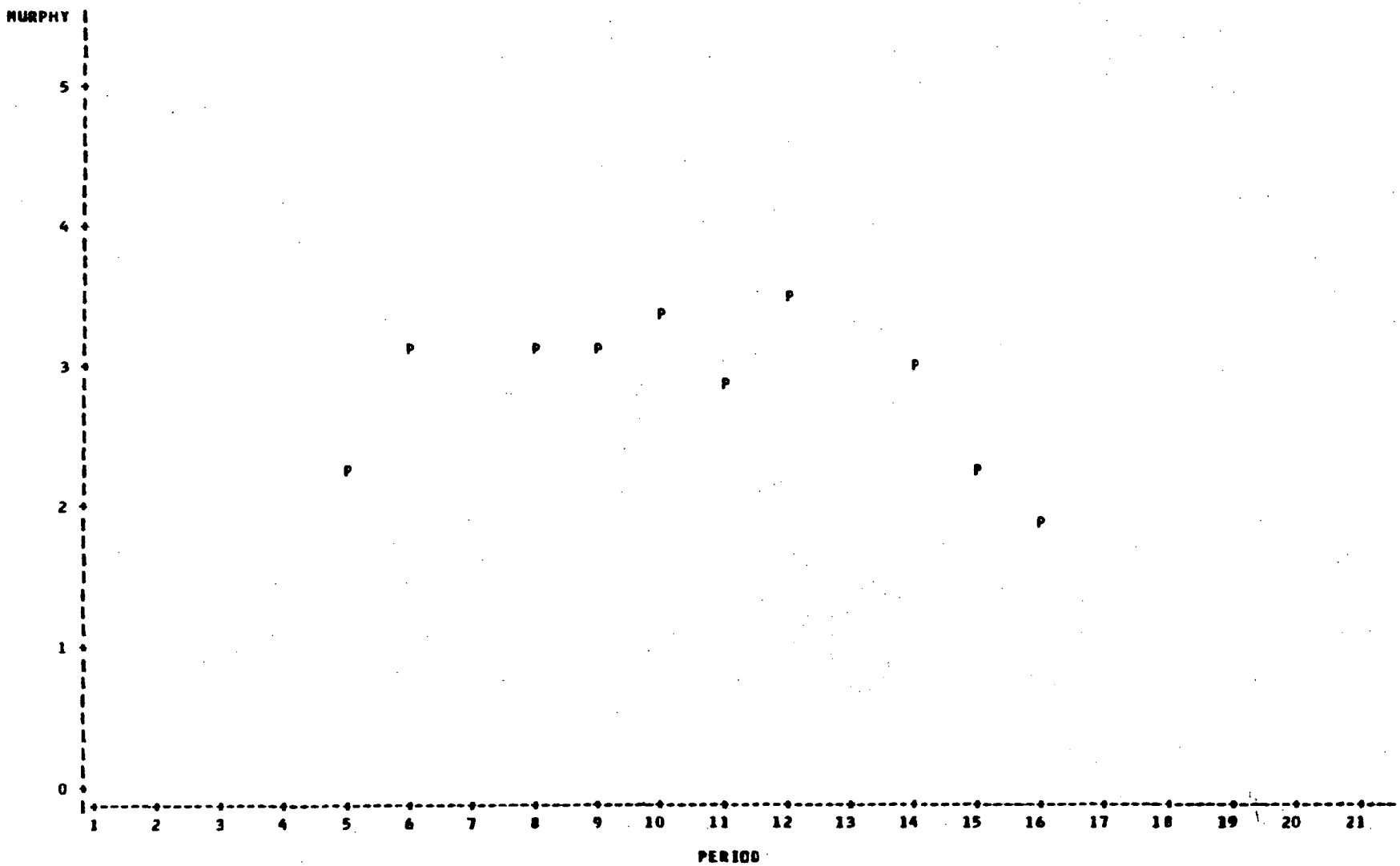
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 30

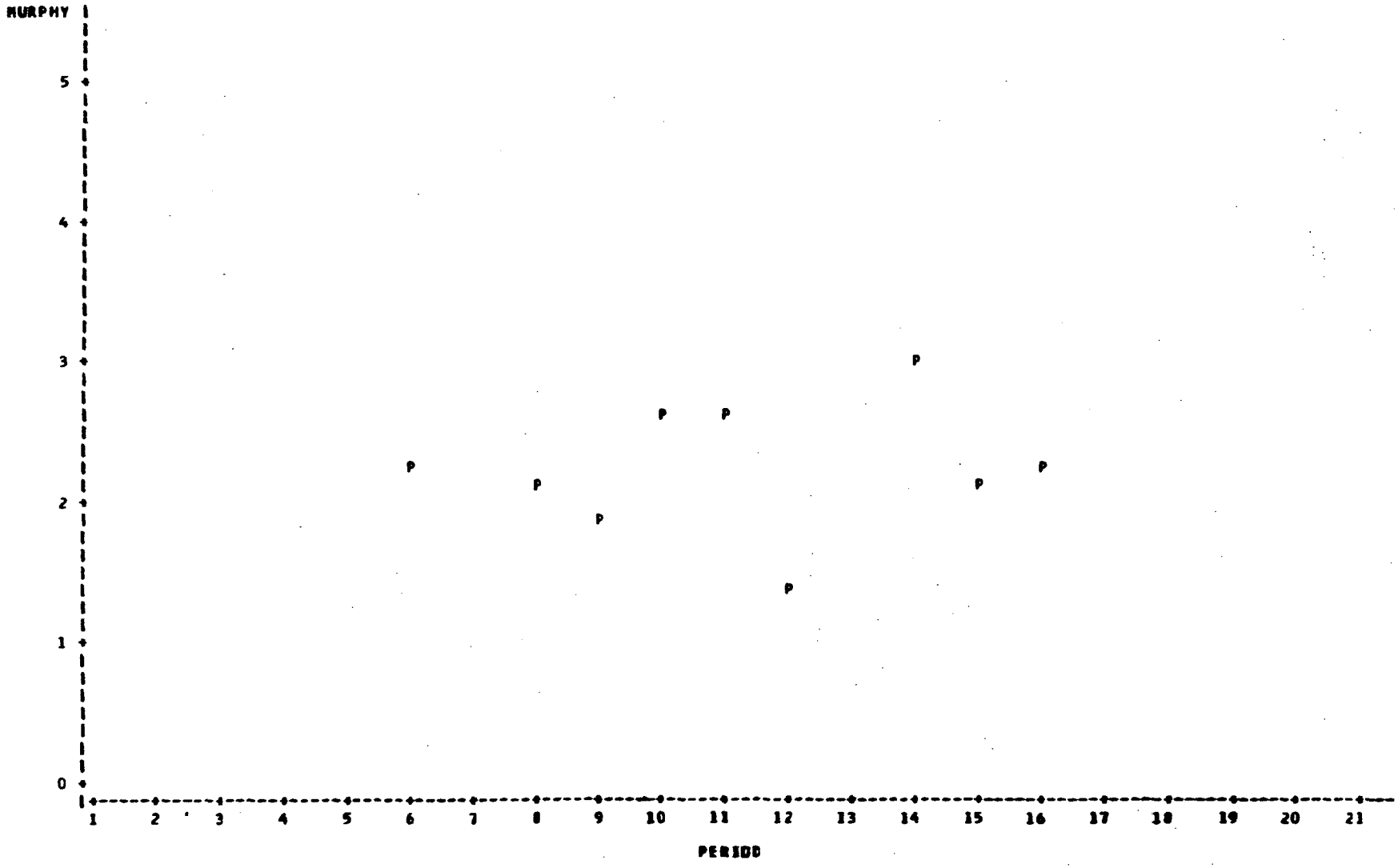
GEAR=1/2M CON. STAT. NET .79MM TAXON=CLUPEIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1/2M CON. STAT. NET .79MM TAXON=CYPRINIDAE

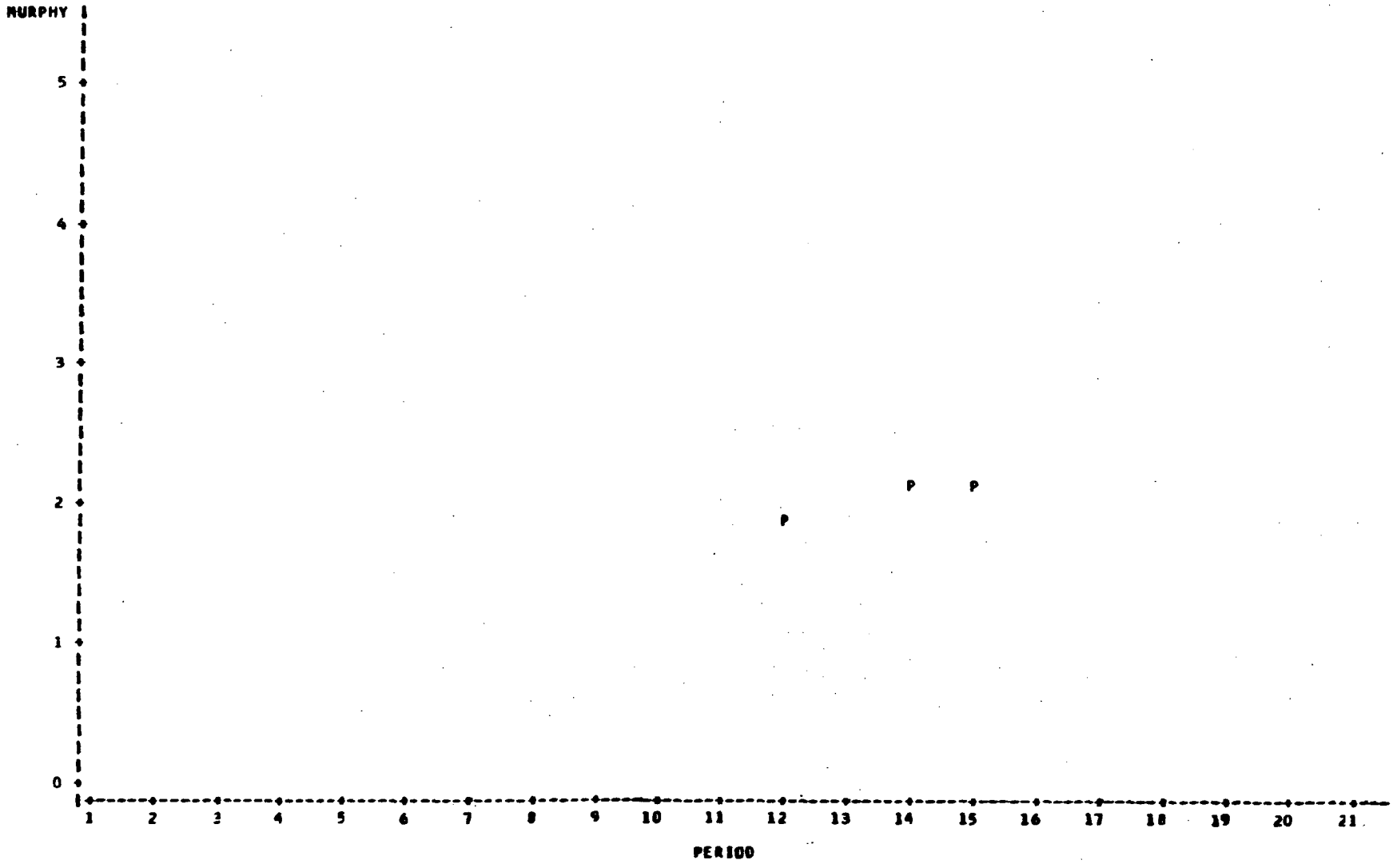
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 33

GEAR=1/2M CON. STAT. NET .79MM TAXON=ICTALURIDAE

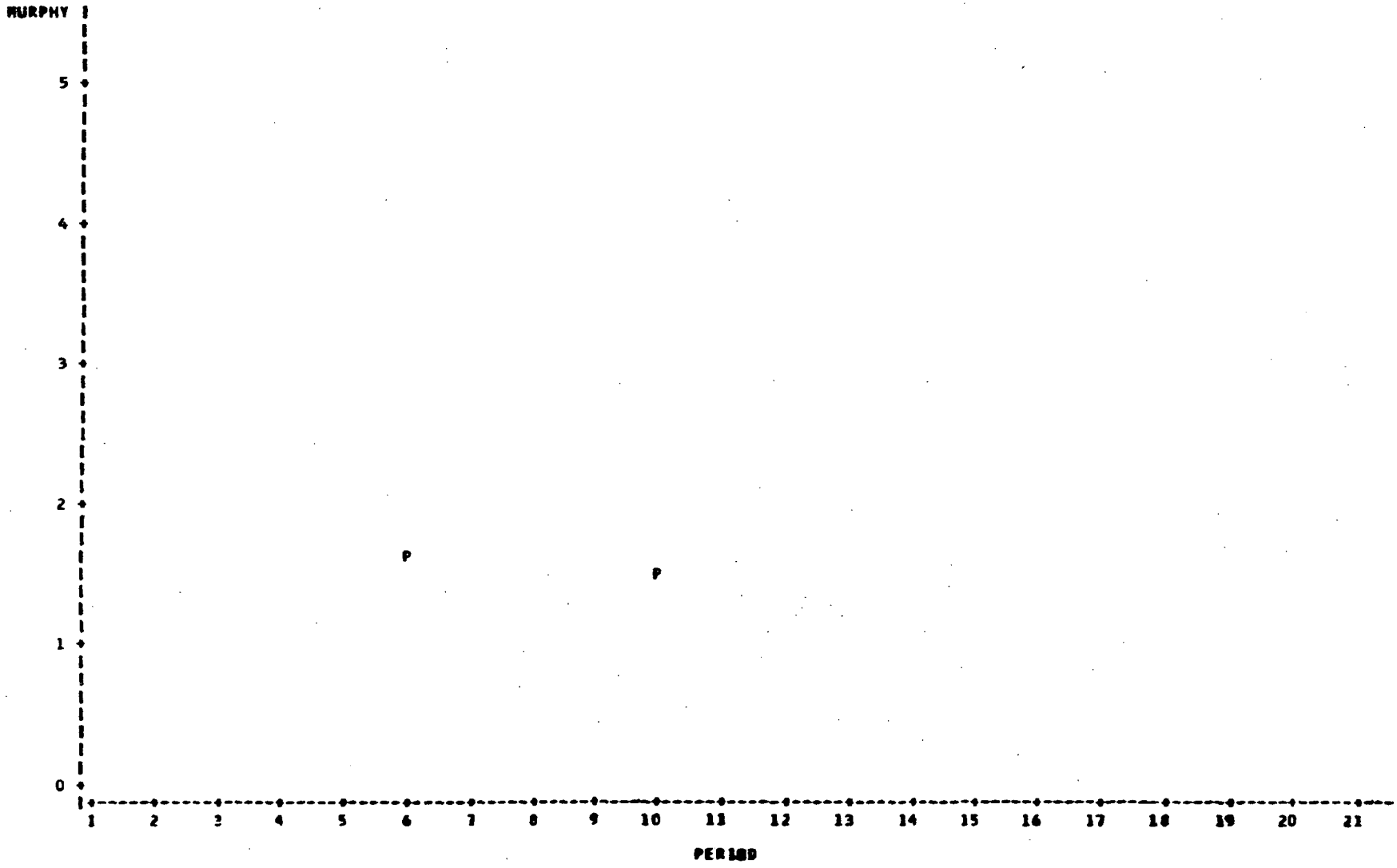
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/100C0-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 35

GEAR=1/2M CON. STAT. NET .79MM TAXON=PERCICHTHYIDAE

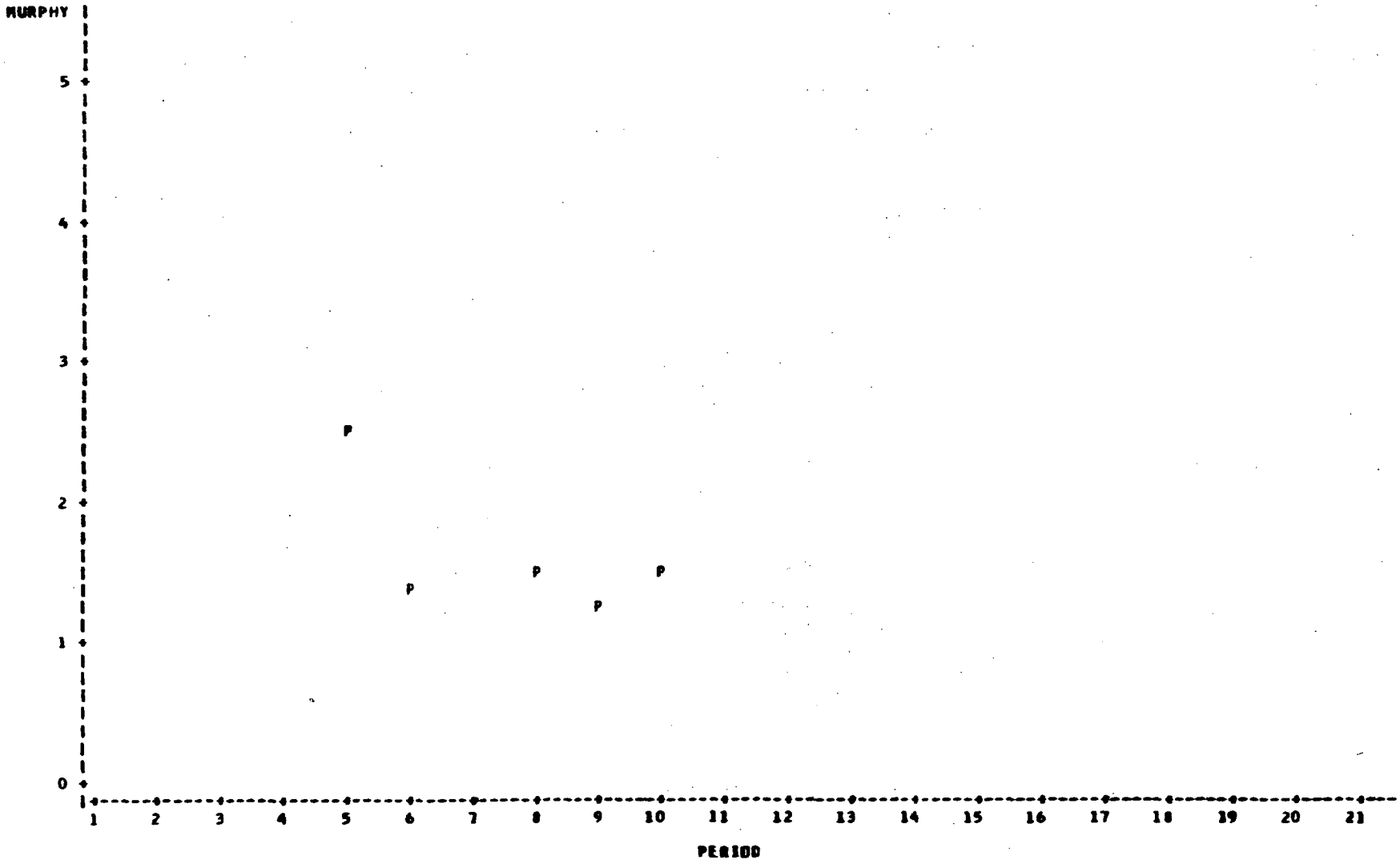
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 36

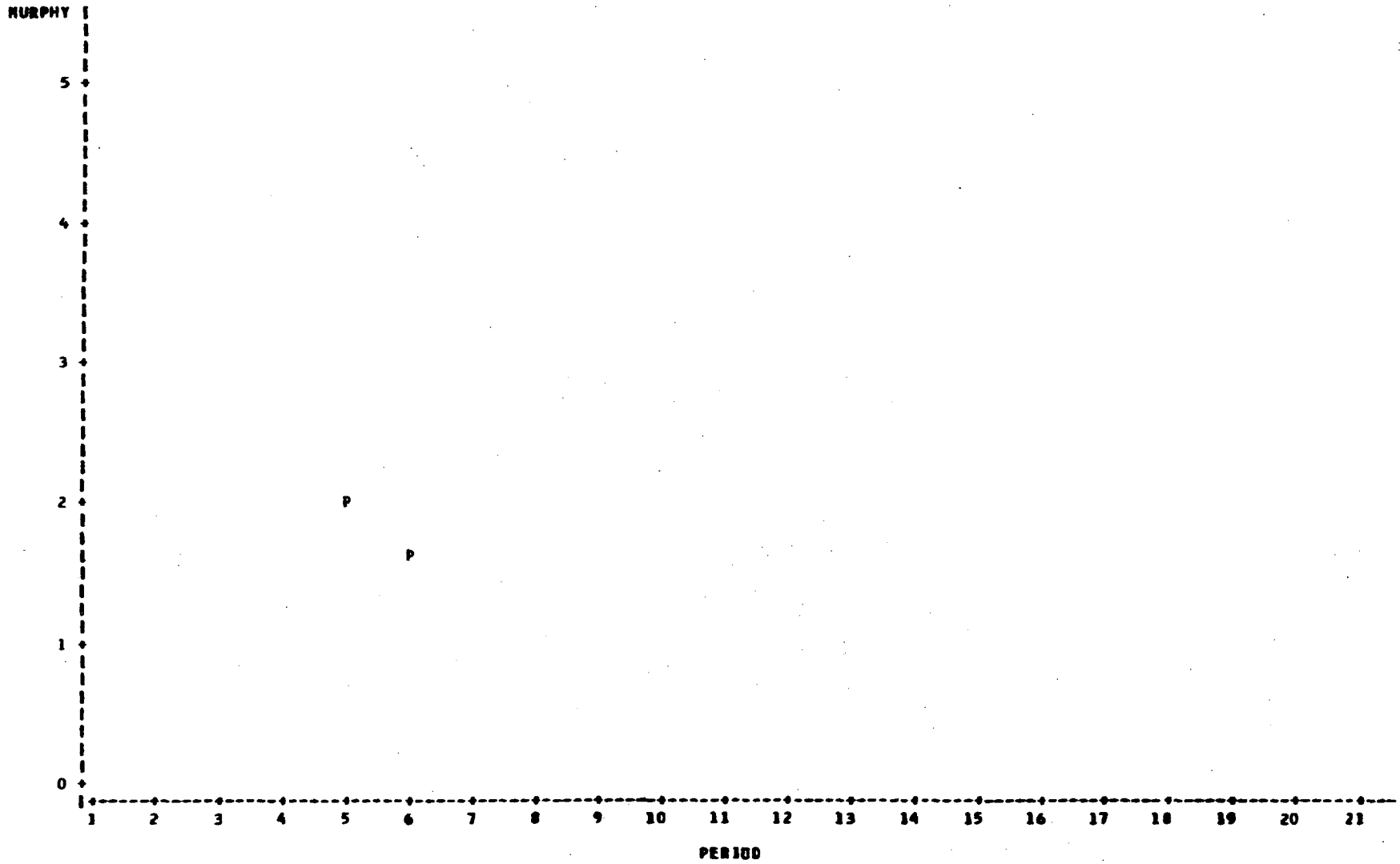
GEAR=1/2M CON. STAT. NET .79MM TAXON=PERCIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



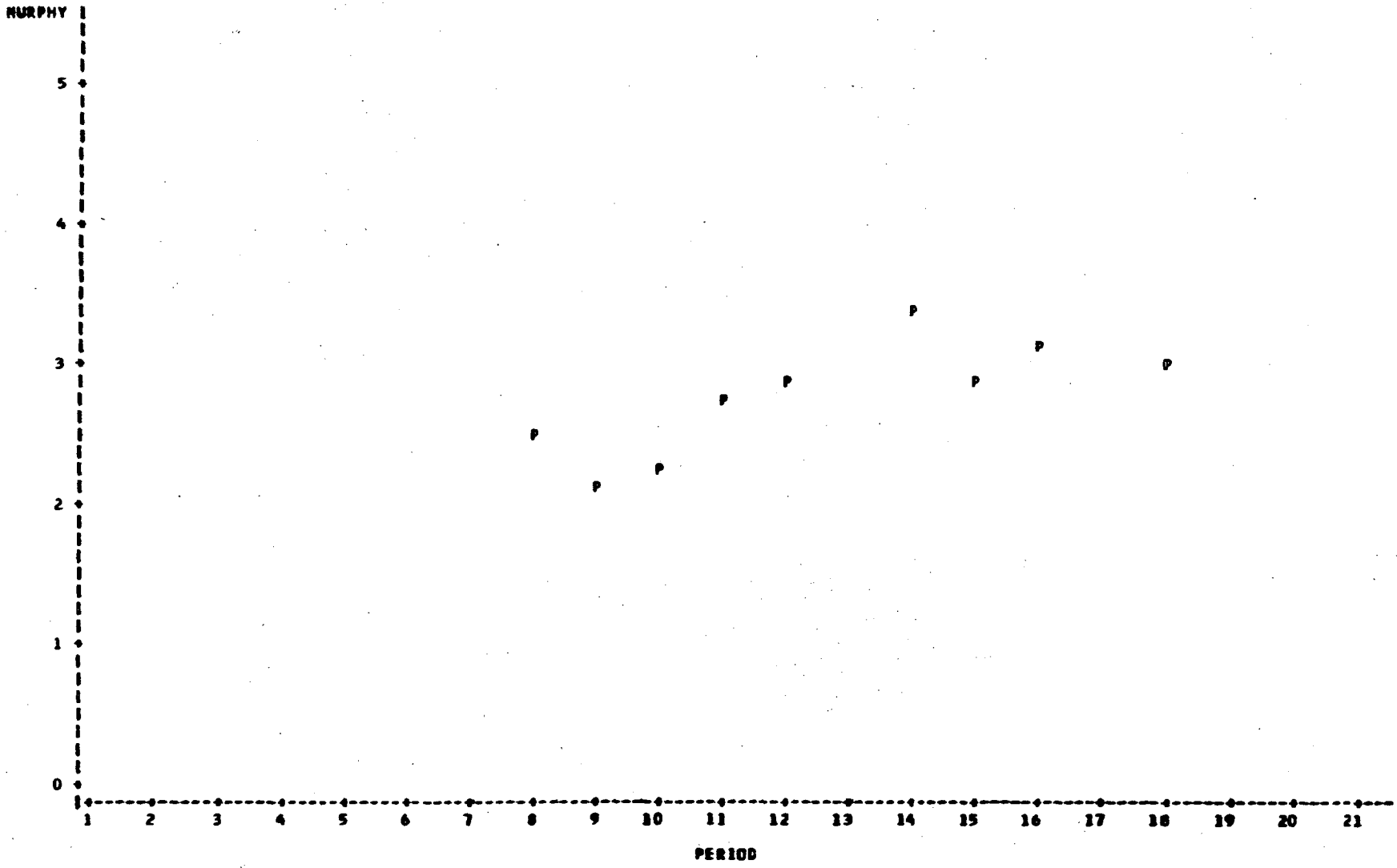
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE 9:43 MONDAY, APRIL 11, 1977 37
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1/2M CON. STAT. NET .79MM TAXON=POLYODONTIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



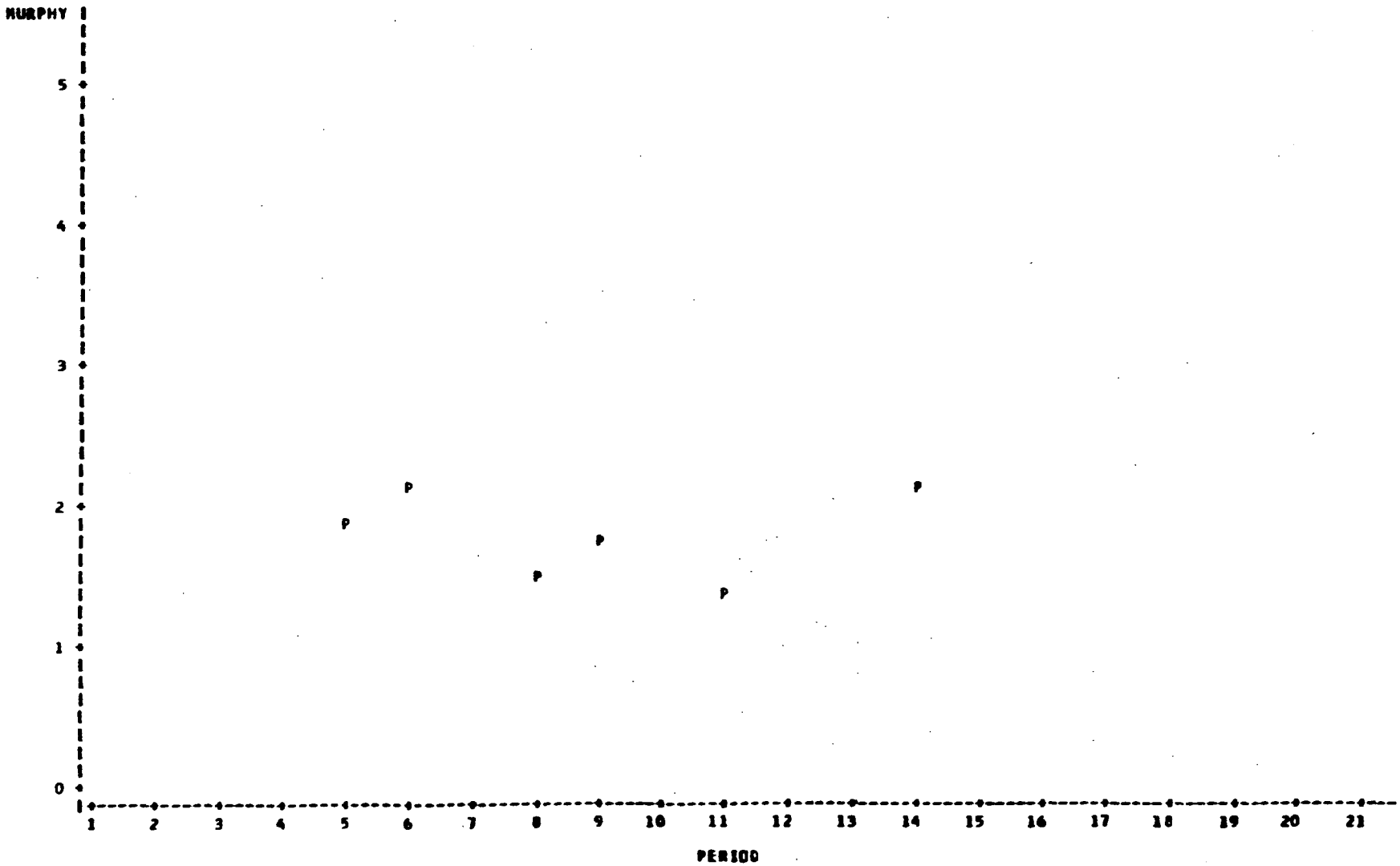
LOG(BASE-10) DENSITIES (#/100C0-M3) OF LARVAL FISH AND EGGS AT THREE
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1/2M CON. STAT. NET .79MM TAXON=SCIAENIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COWER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BRWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/100CU-M3) OF LARVAL FISH AND EGGS AT THREE 9:43 MONDAY, APRIL 11, 1977 40
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1/2M CON. STAT. NET .79MM TAXON=UNIDENTIFIED FISH

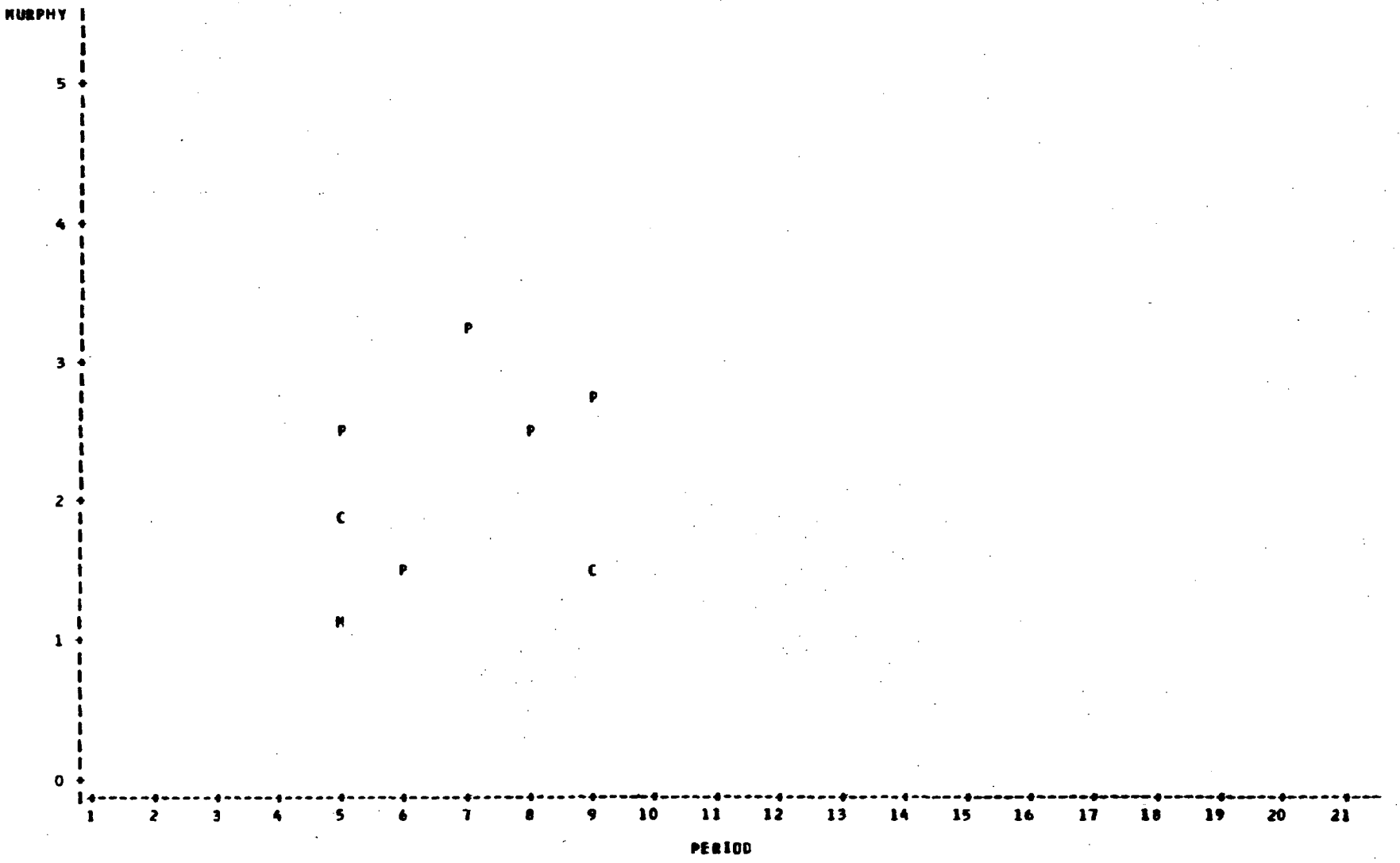
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKNTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 26

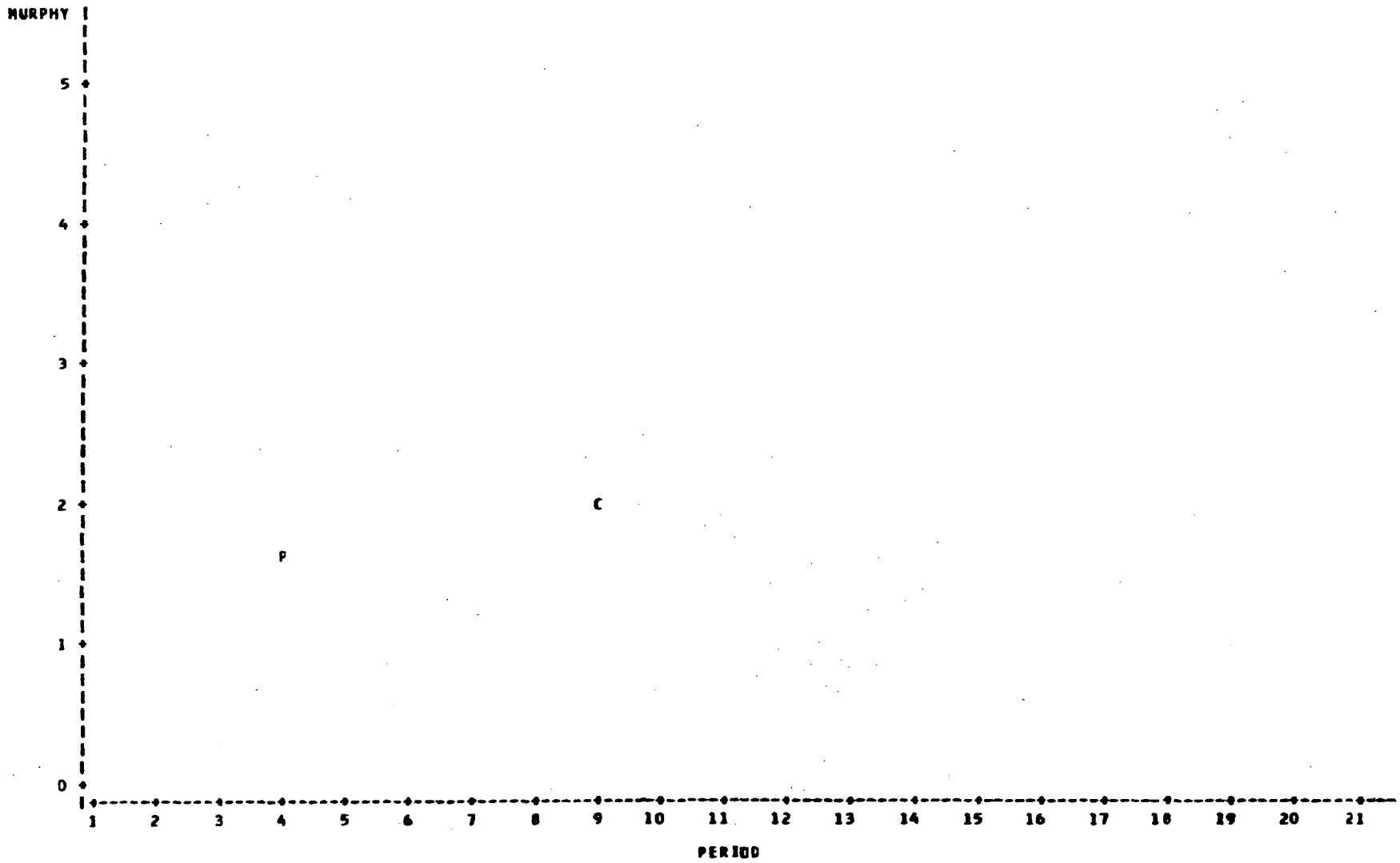
GEAR=1.37M SQ VERT. NET .79MM TAXON=UNIDENTIFIED FISH EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 GEAR=1.37M SQ VERT. NET .79MM TAXON=CLUPEID EGGS

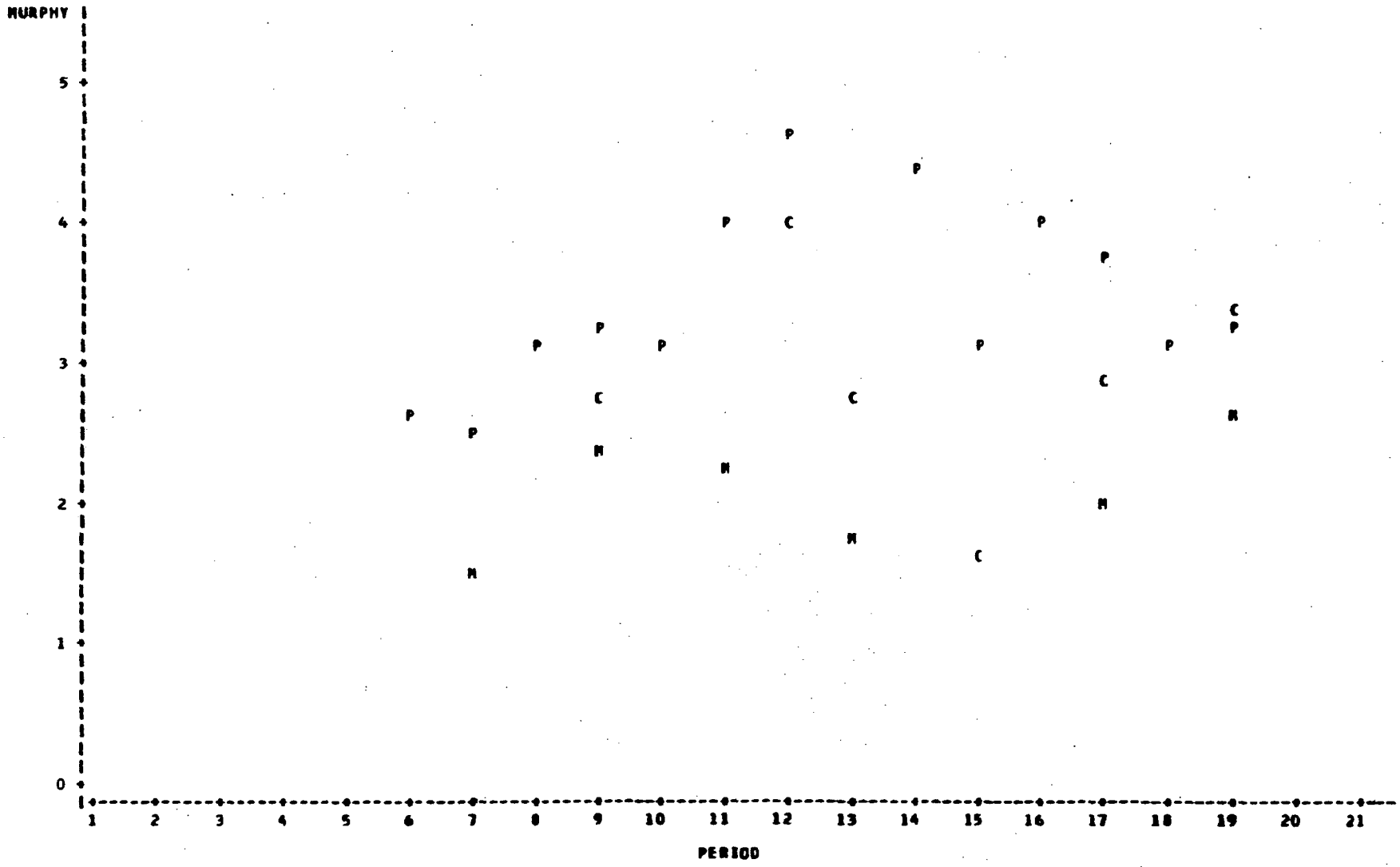
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 23

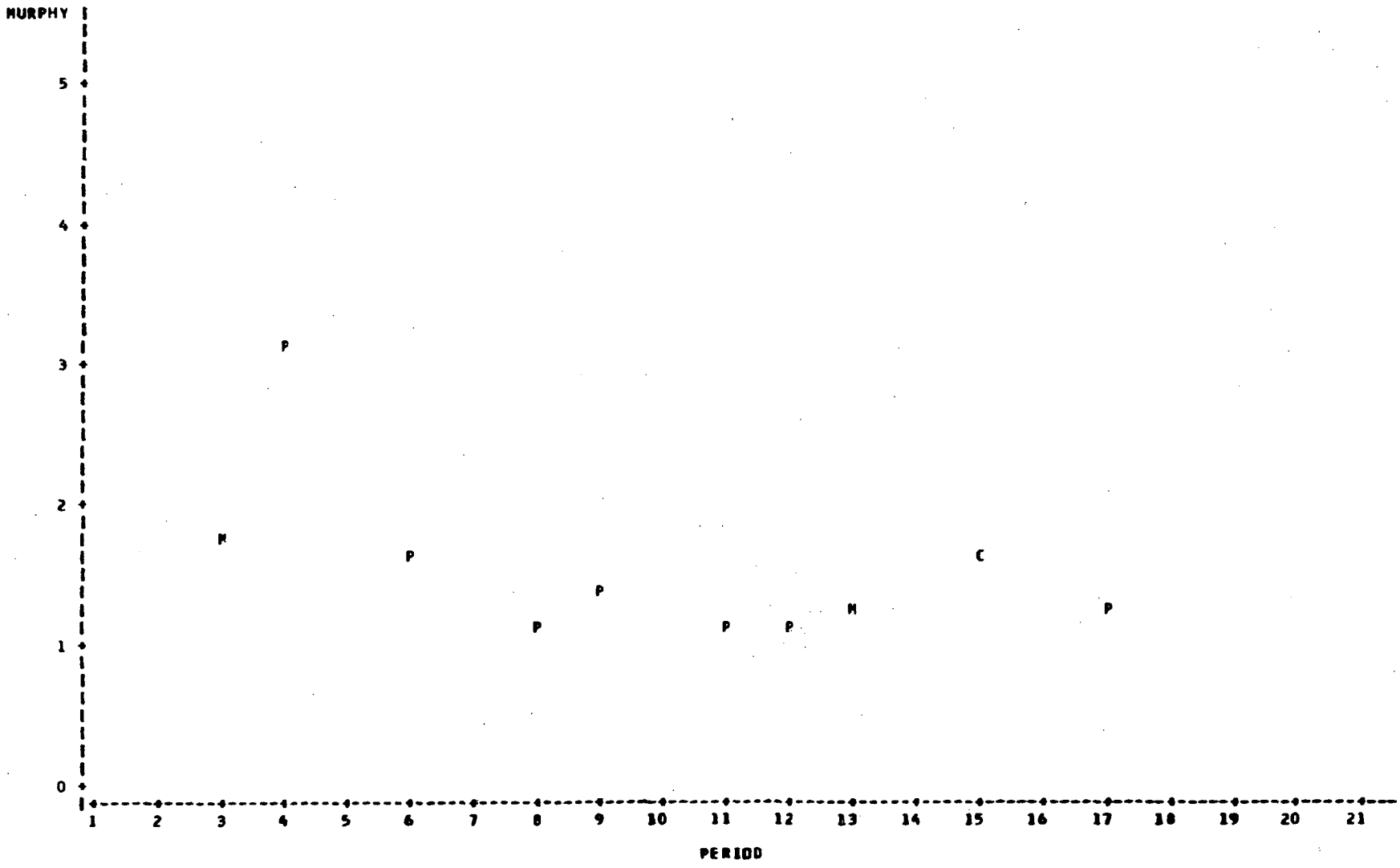
GEAR=1.37M SQ VERT. NET .79MM TAXON=SCIAENID EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE 9:43 MONDAY, APRIL 11, 1977 13
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1.37M SQ VERT. NET .79MM TAXON=CATOSTOMIDAE

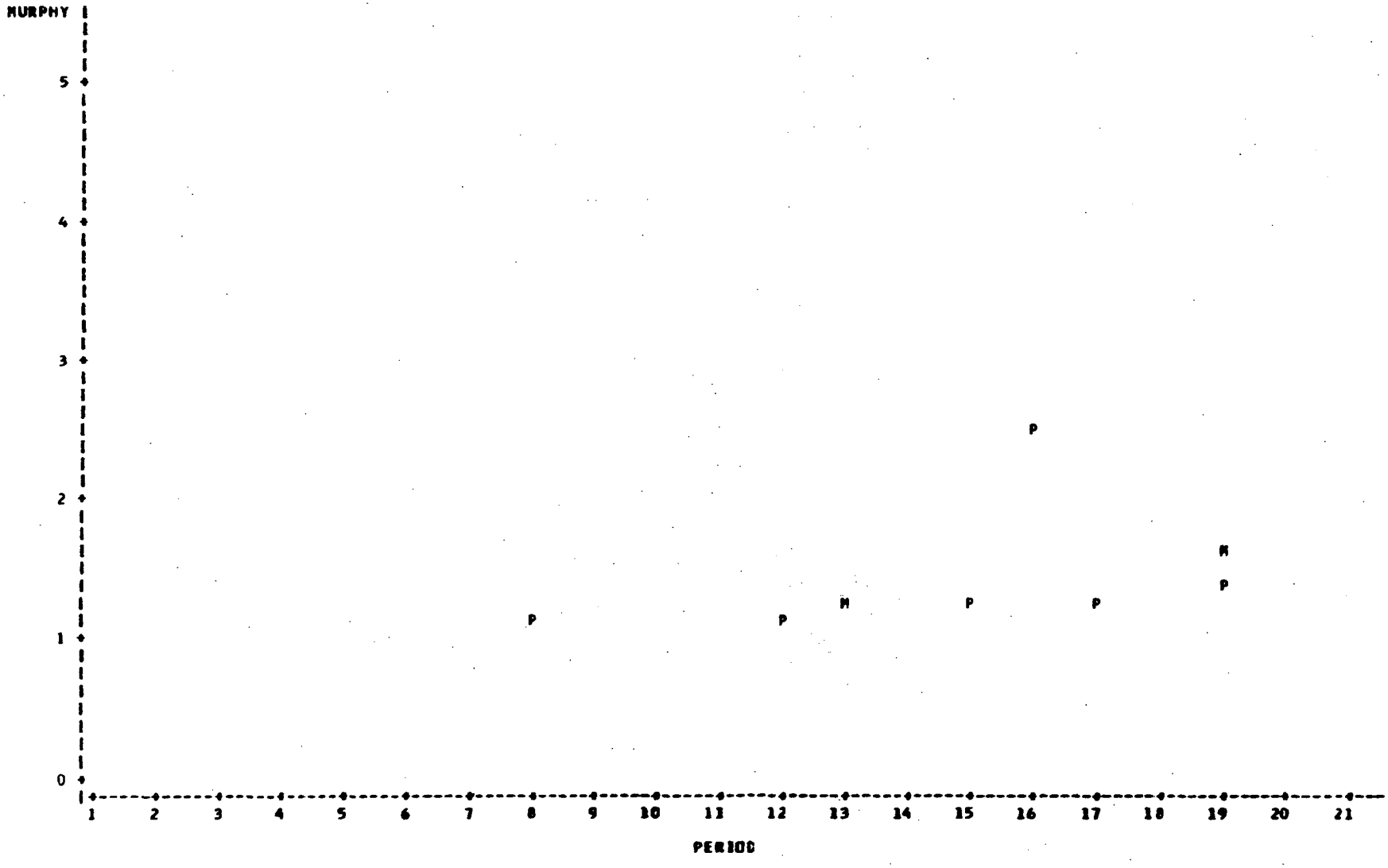
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COWER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 14

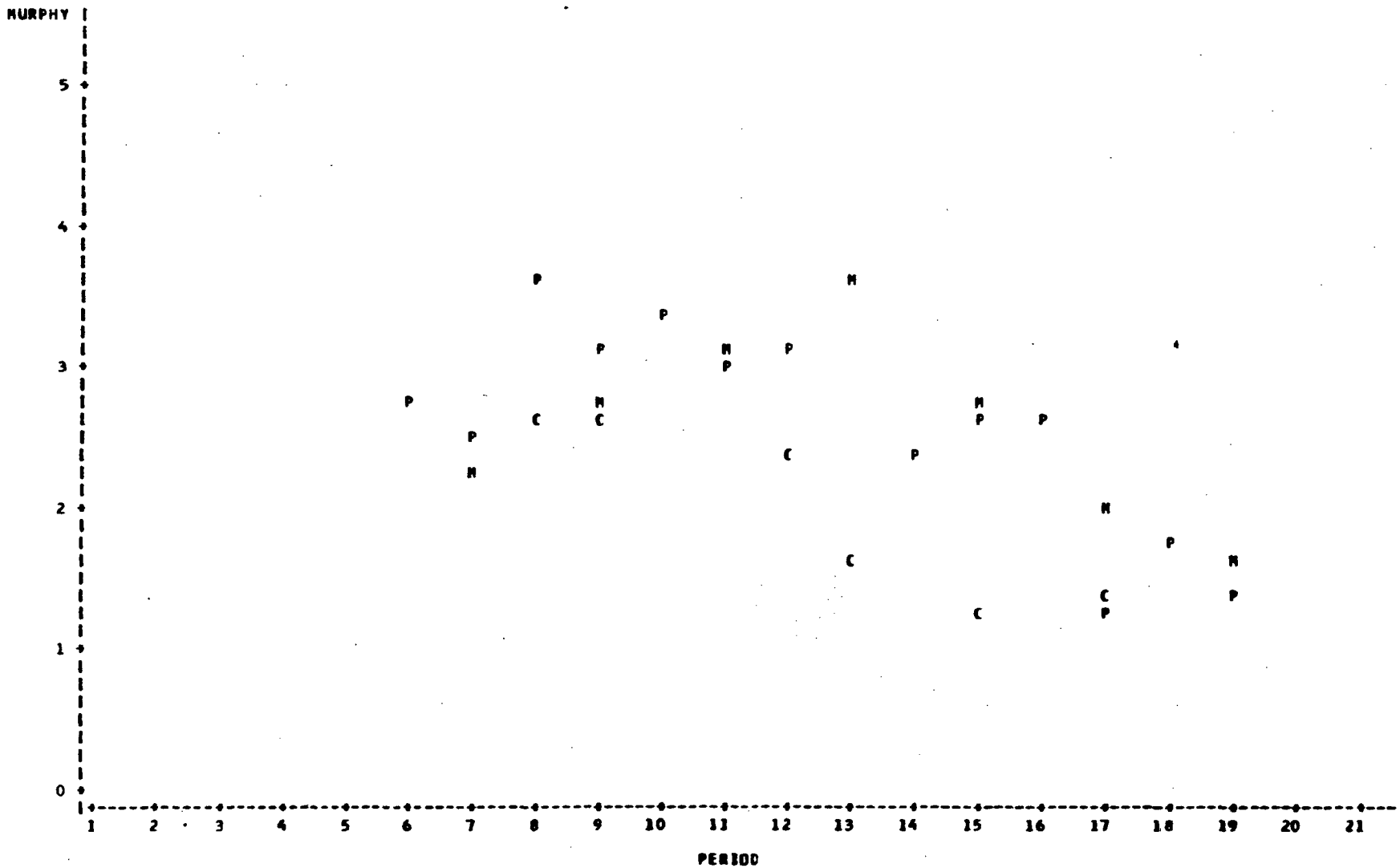
GEAR=1.37M SQ VERT. NET .79MM TAXON=CENTRARCHIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 GEAR=1.37M SQ VERT. NET .79MM TAXON=CLUPEIDAE

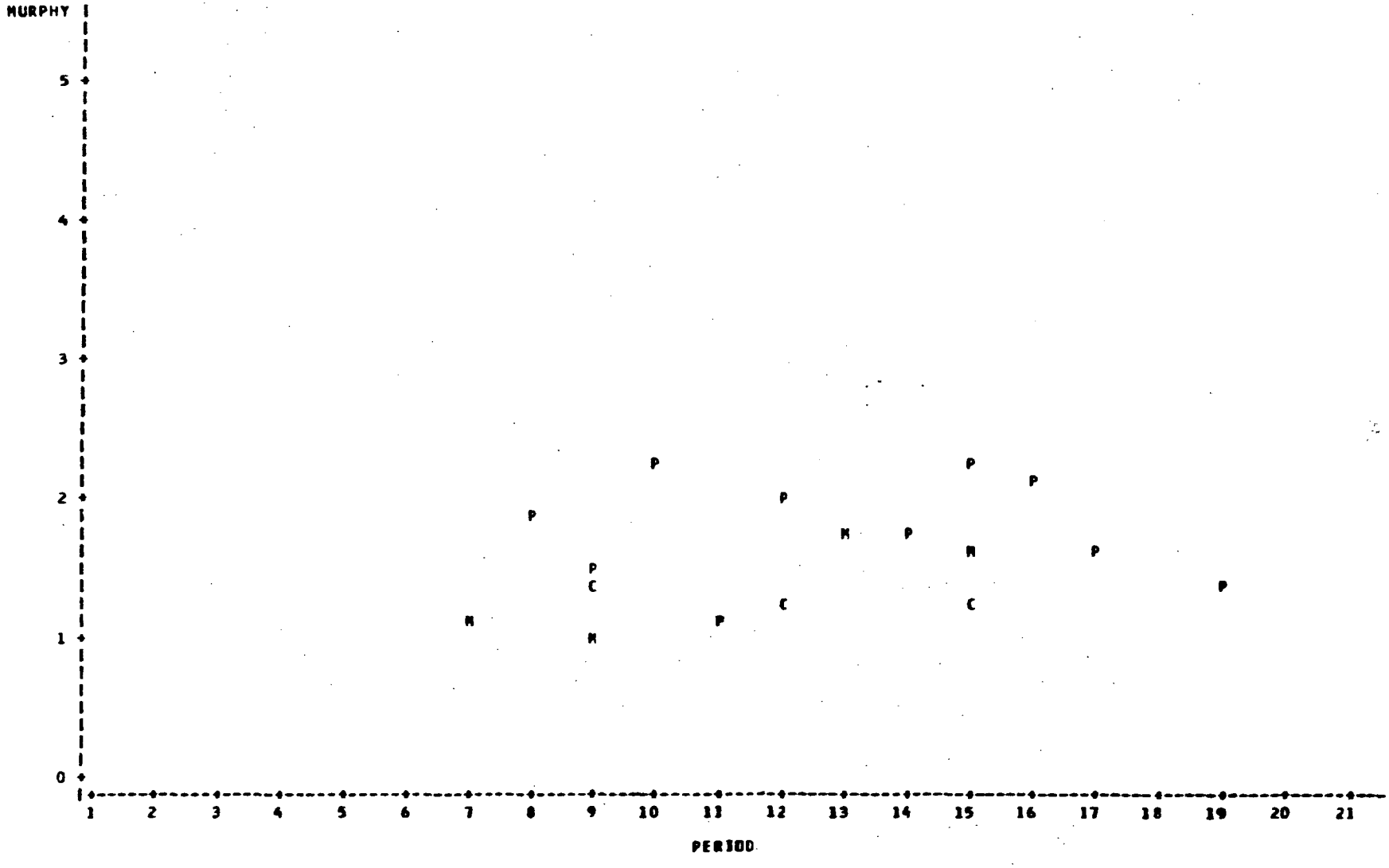
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BRWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 17

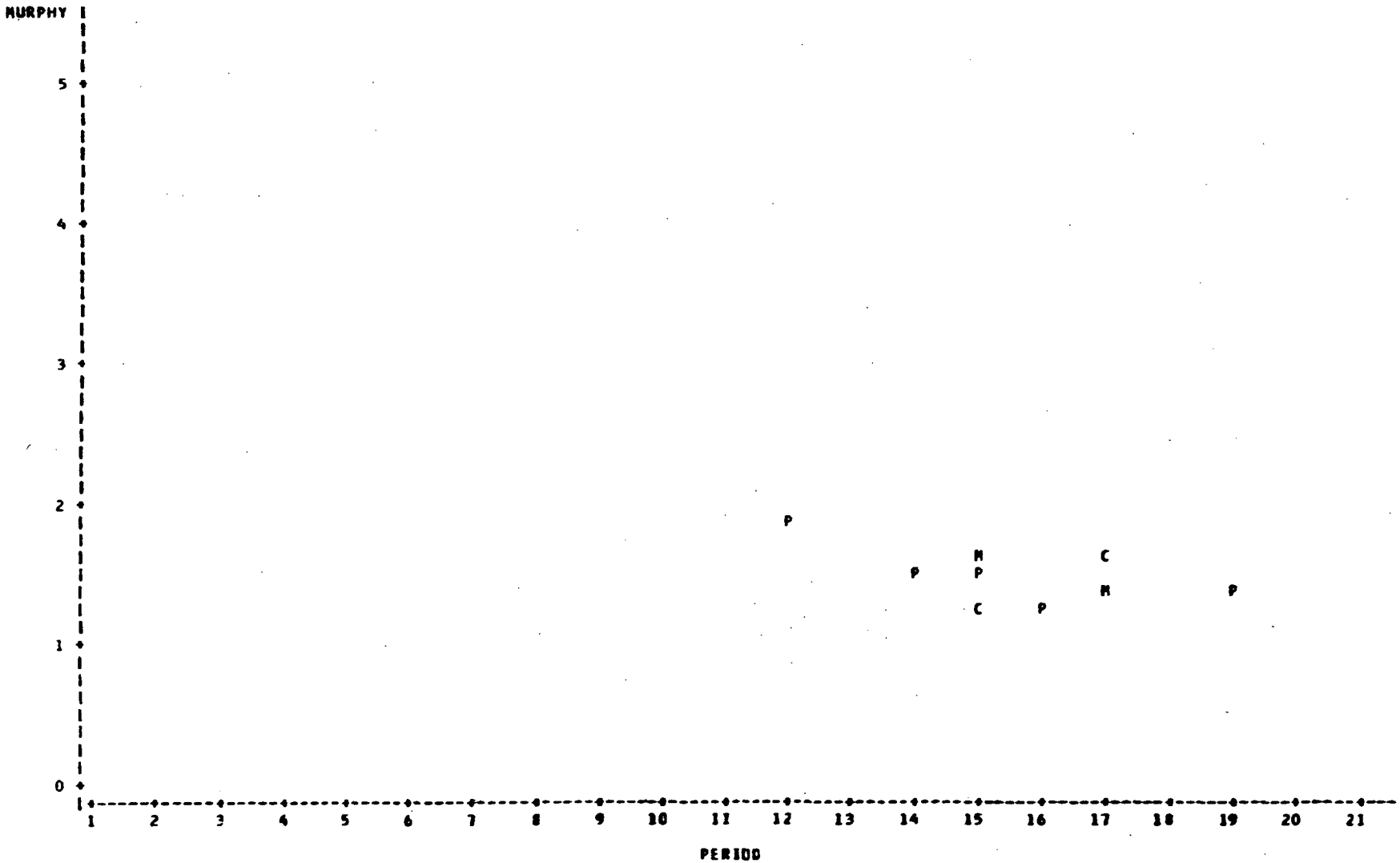
GEAR=1.37M SQ VERT. NET .79MM TAXON=CYPRINIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



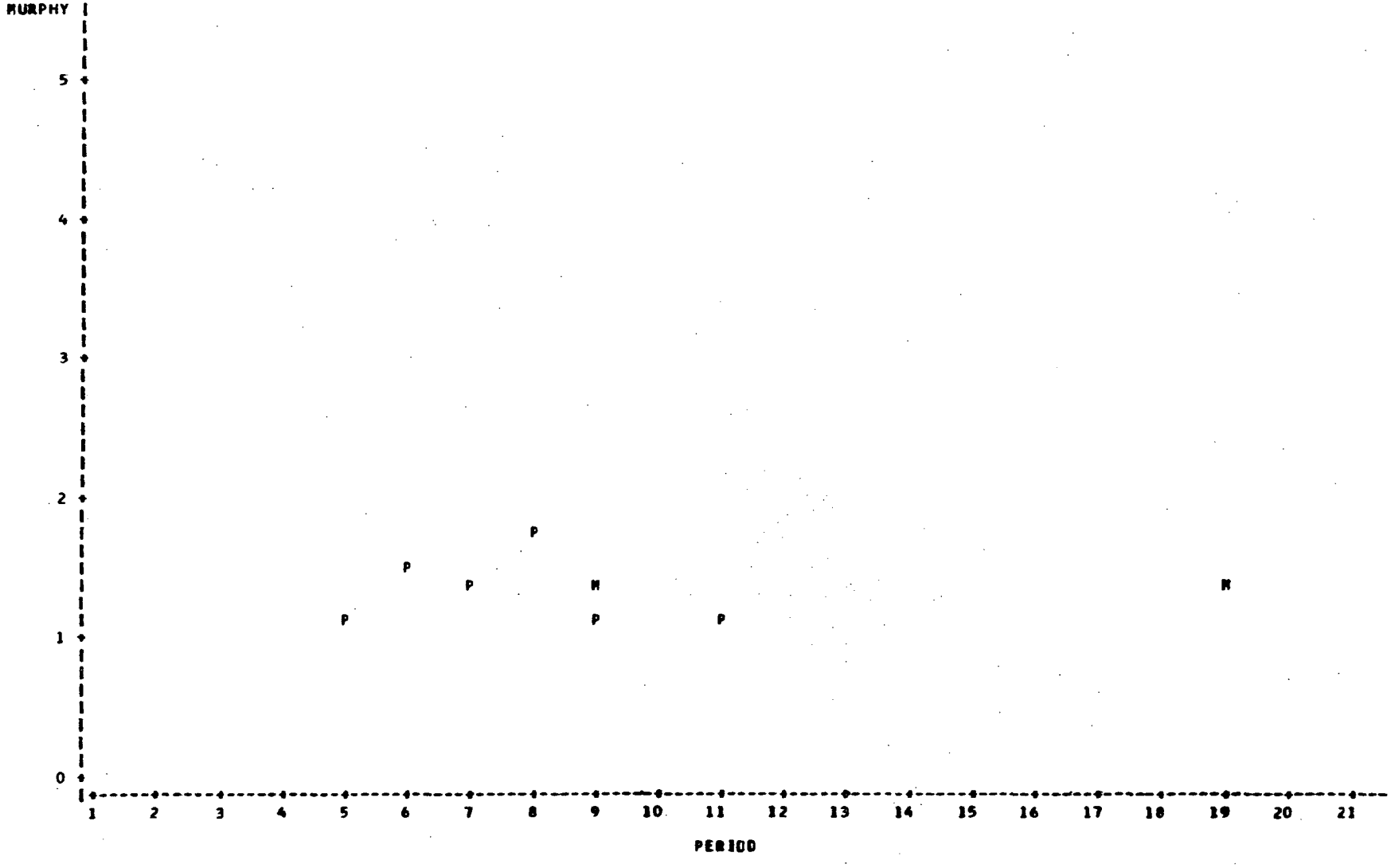
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 GEAR=1.37M SQ VERT. NET .79MM TAXON=ICTALURIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



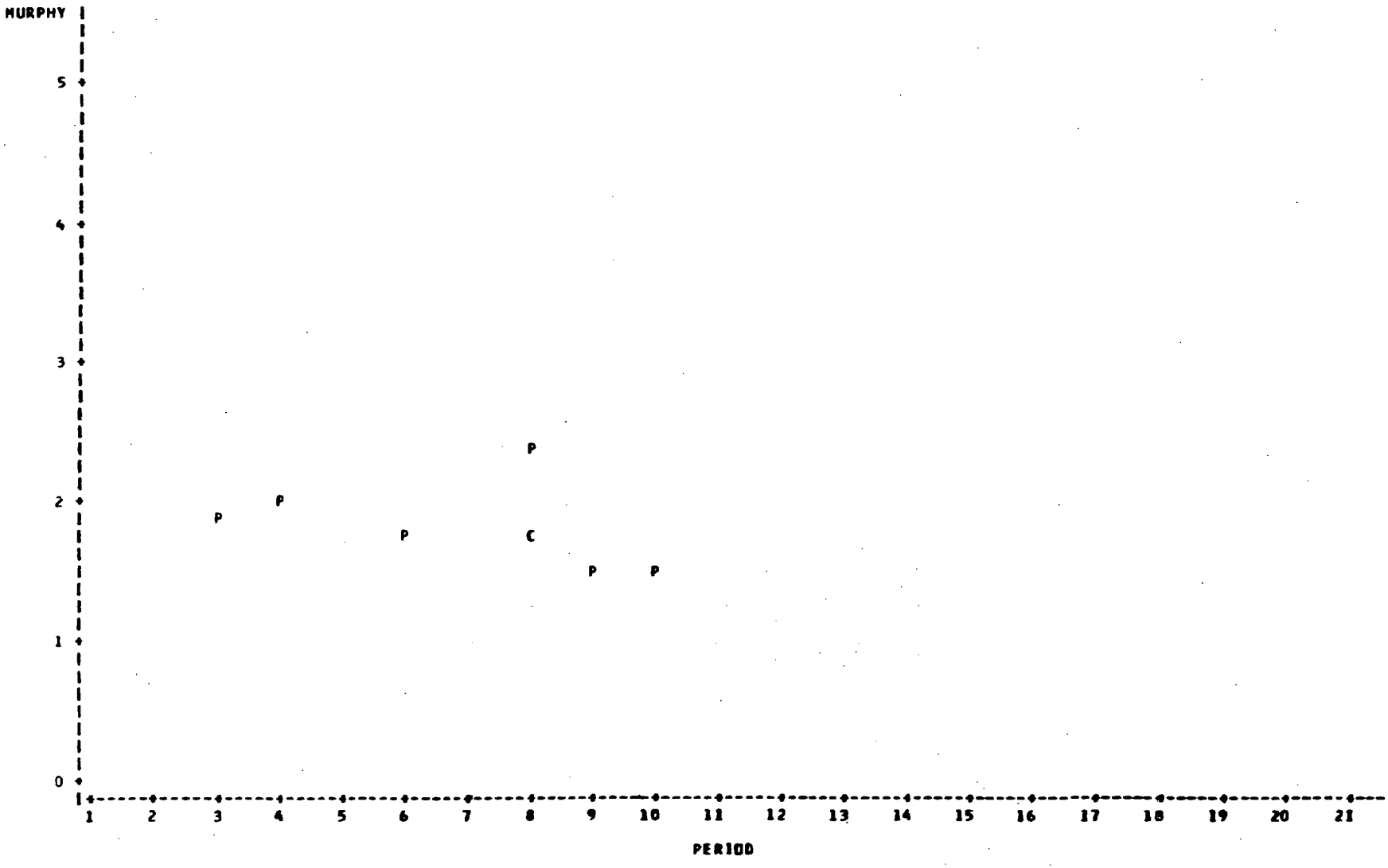
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE 9:43 MONDAY, APRIL 11, 1977 20
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1.37M SQ VERT. NET .79MM TAXON=PERCICHTHYIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 21
GEAR=1.37M SQ VERT. NET .79MM TAXON=PERCIDAE

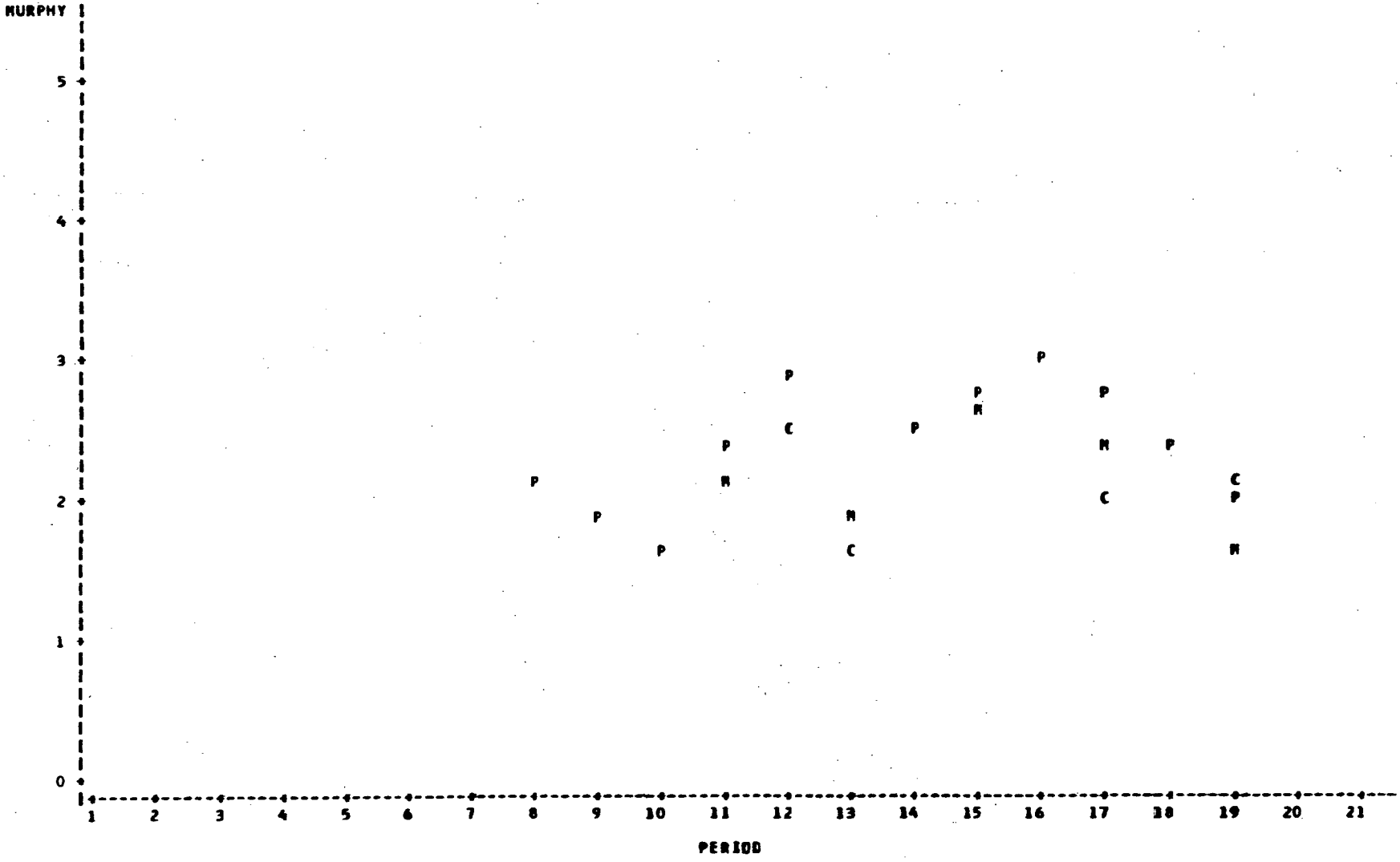
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 24

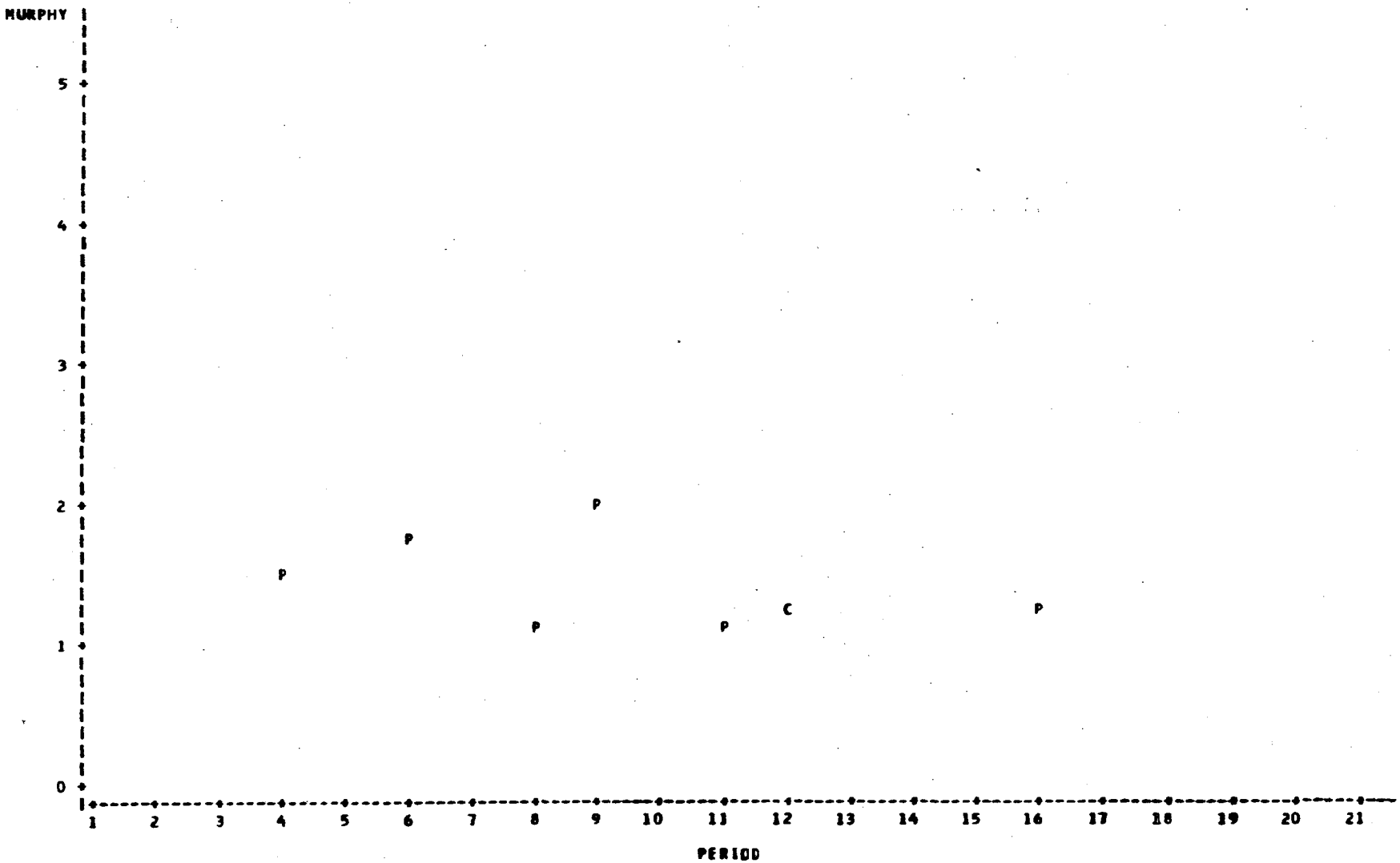
GEAR=1.37M SQ VERT. NET .79MM TAXON=SCIAENIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE 9:43 MONDAY, APRIL 11, 1977 25
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1.37M SQ VERT. NET .79MM TAXON=UNIDENTIFIED FISH

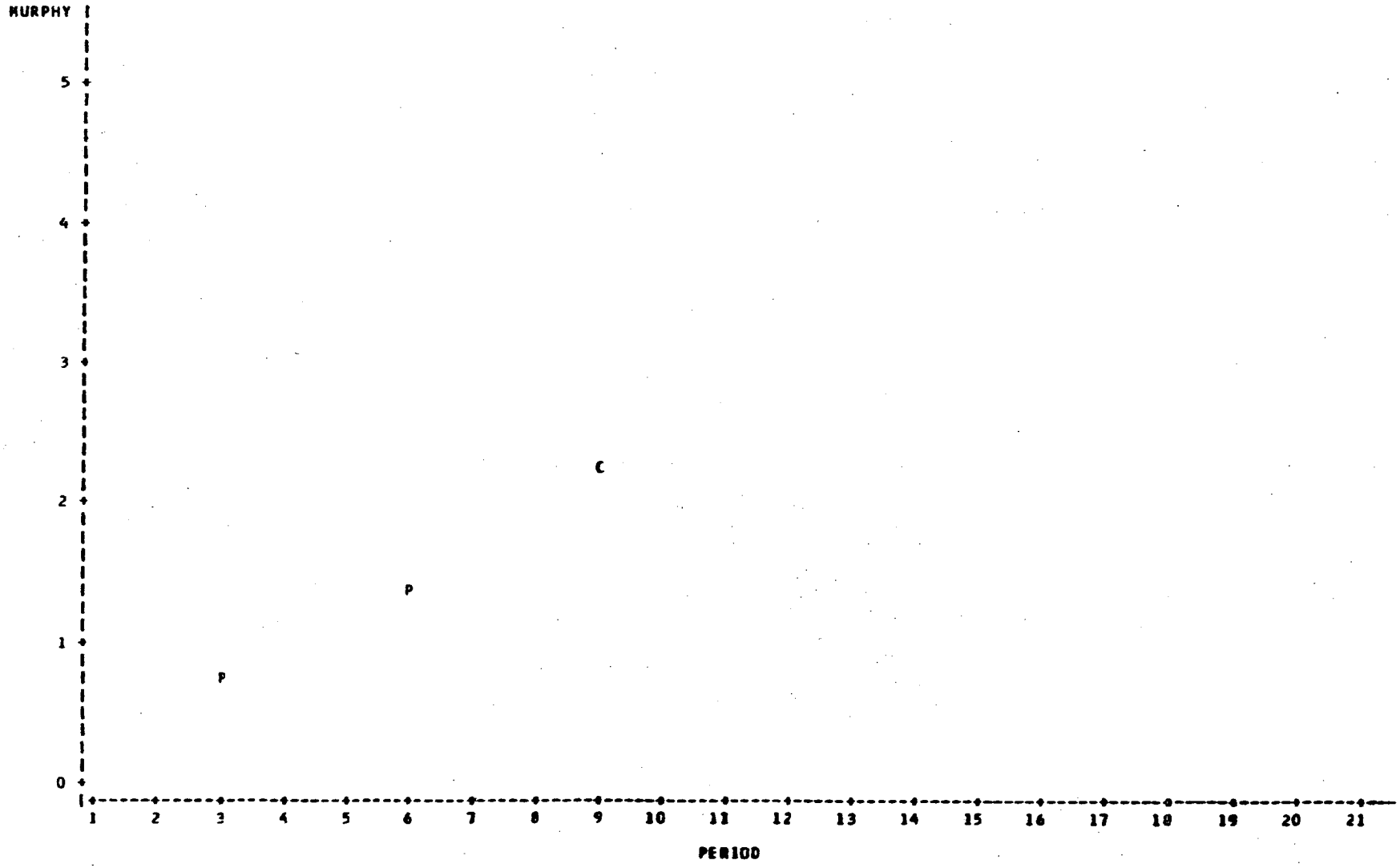
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 57

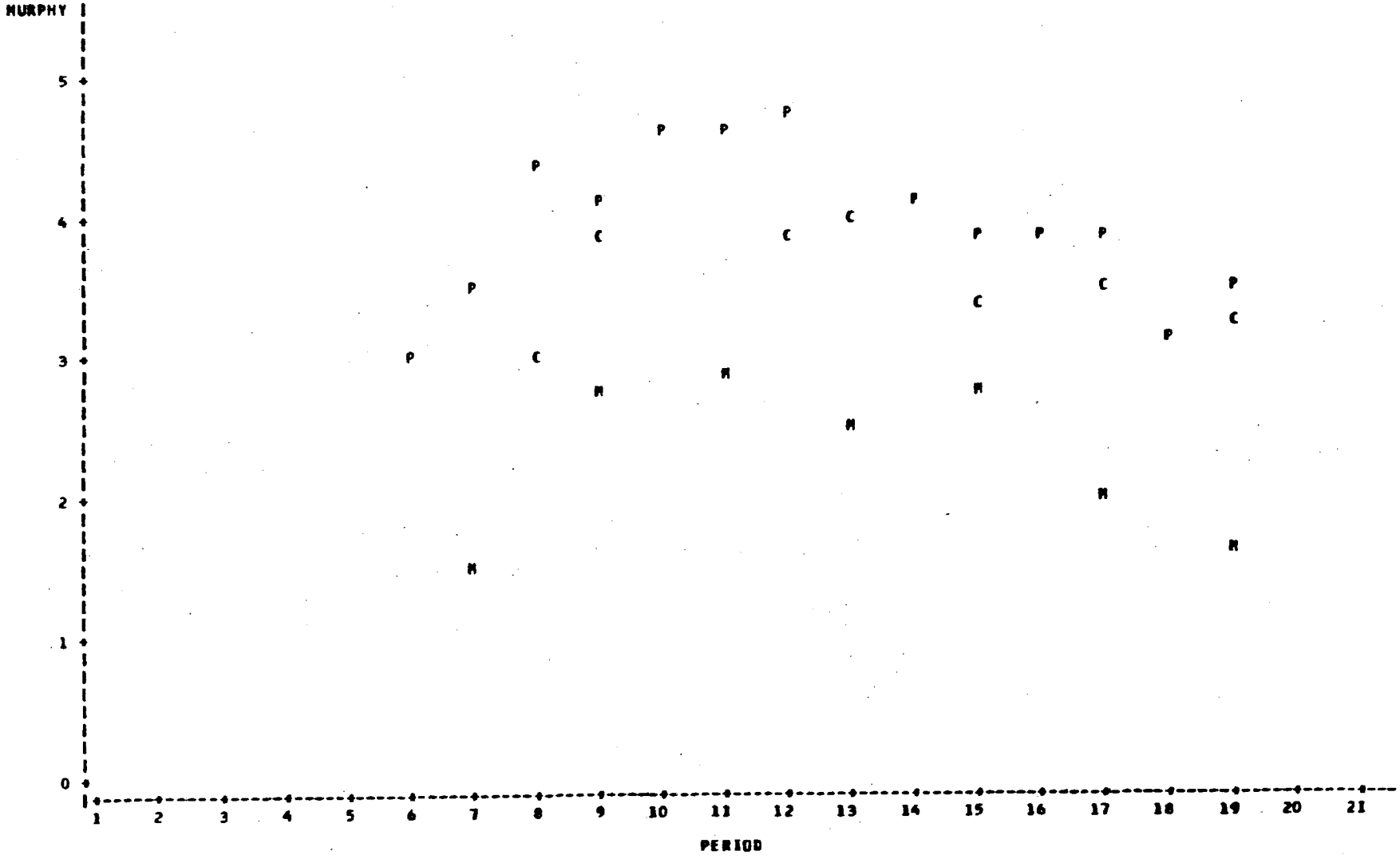
GEAR=1M CONICAL PUSH NET .79PM TAXON=CLUPEID EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



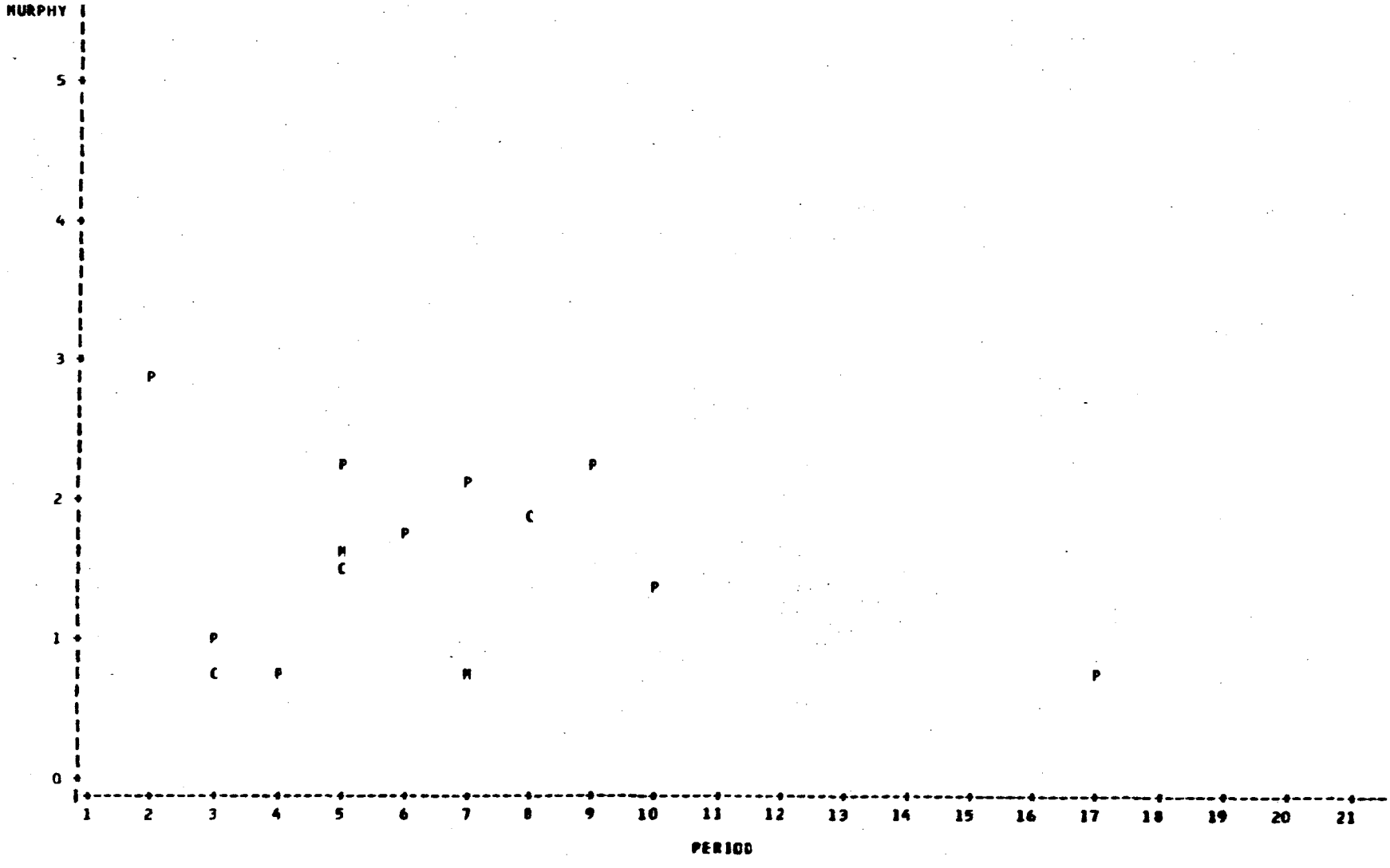
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1M CONICAL PUSH NET .79MM TAXON=SCIAENID EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



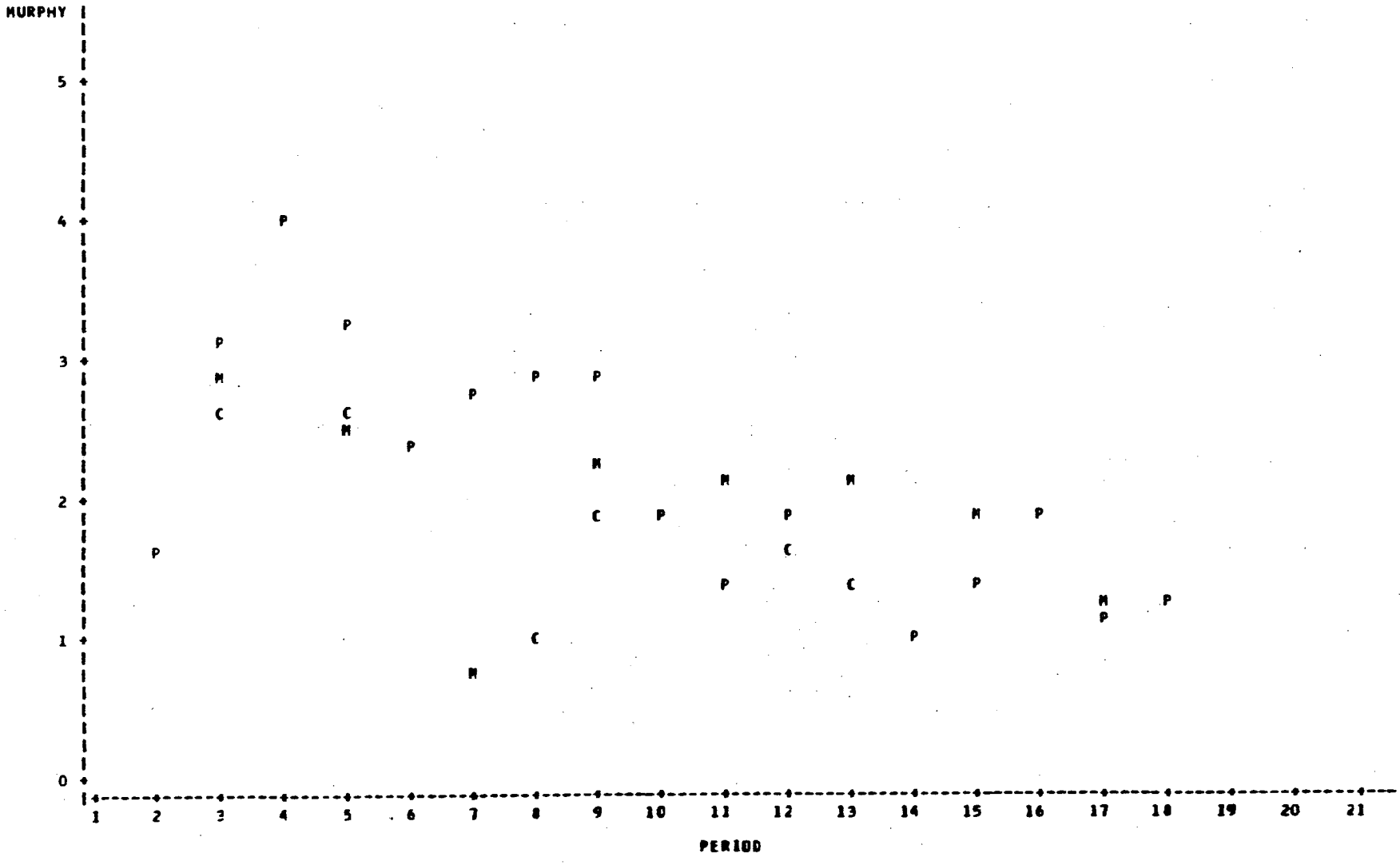
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1M CONICAL PUSH NET .79MM TAXON=UNIDENTIFIED FISH EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1M CONICAL PUSH NET .79MM TAXON=CATOSTOMIDAE

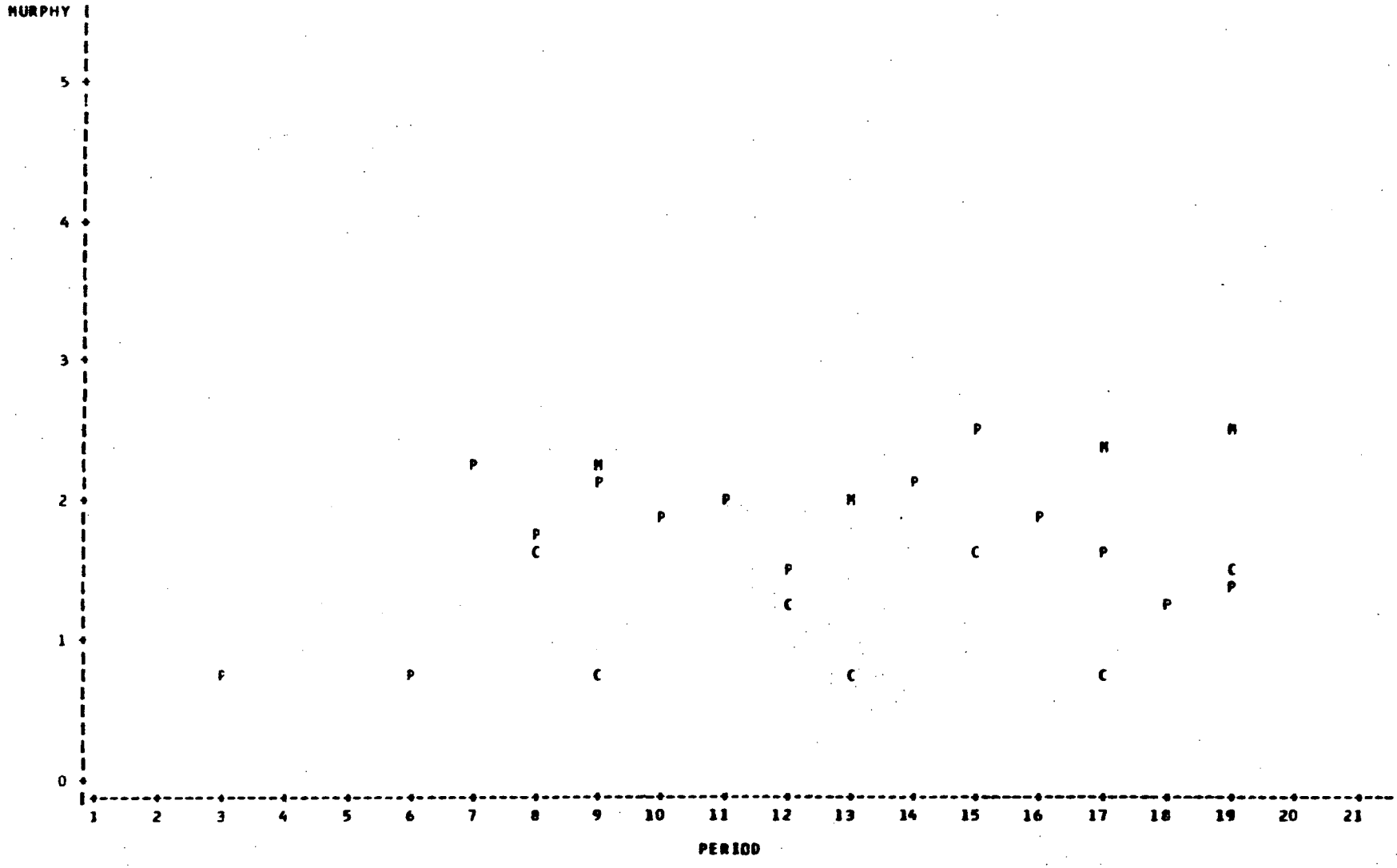
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 56

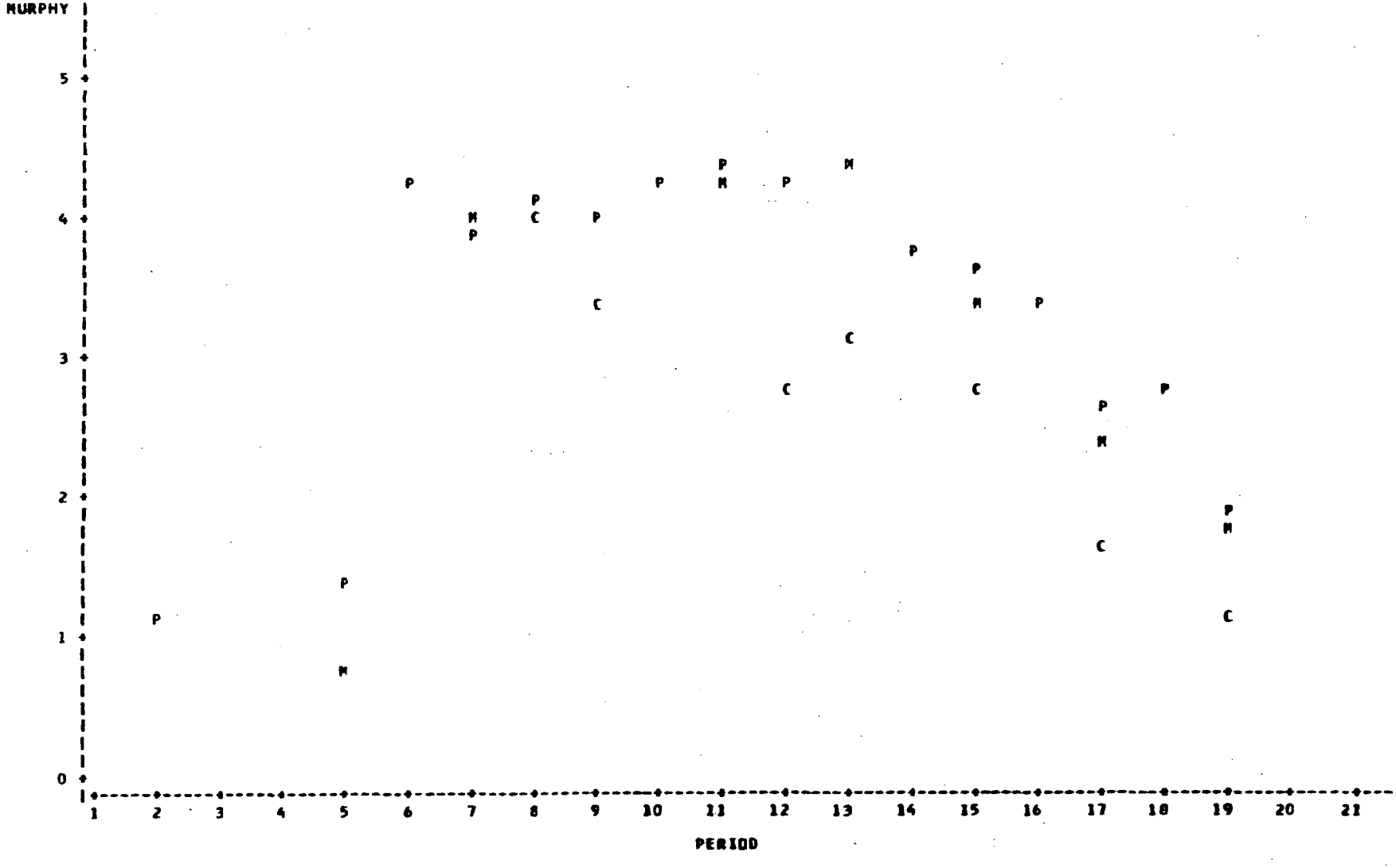
GEAR=1M CONICAL PUSH NET .79MM TAXON=CENTRARCHIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



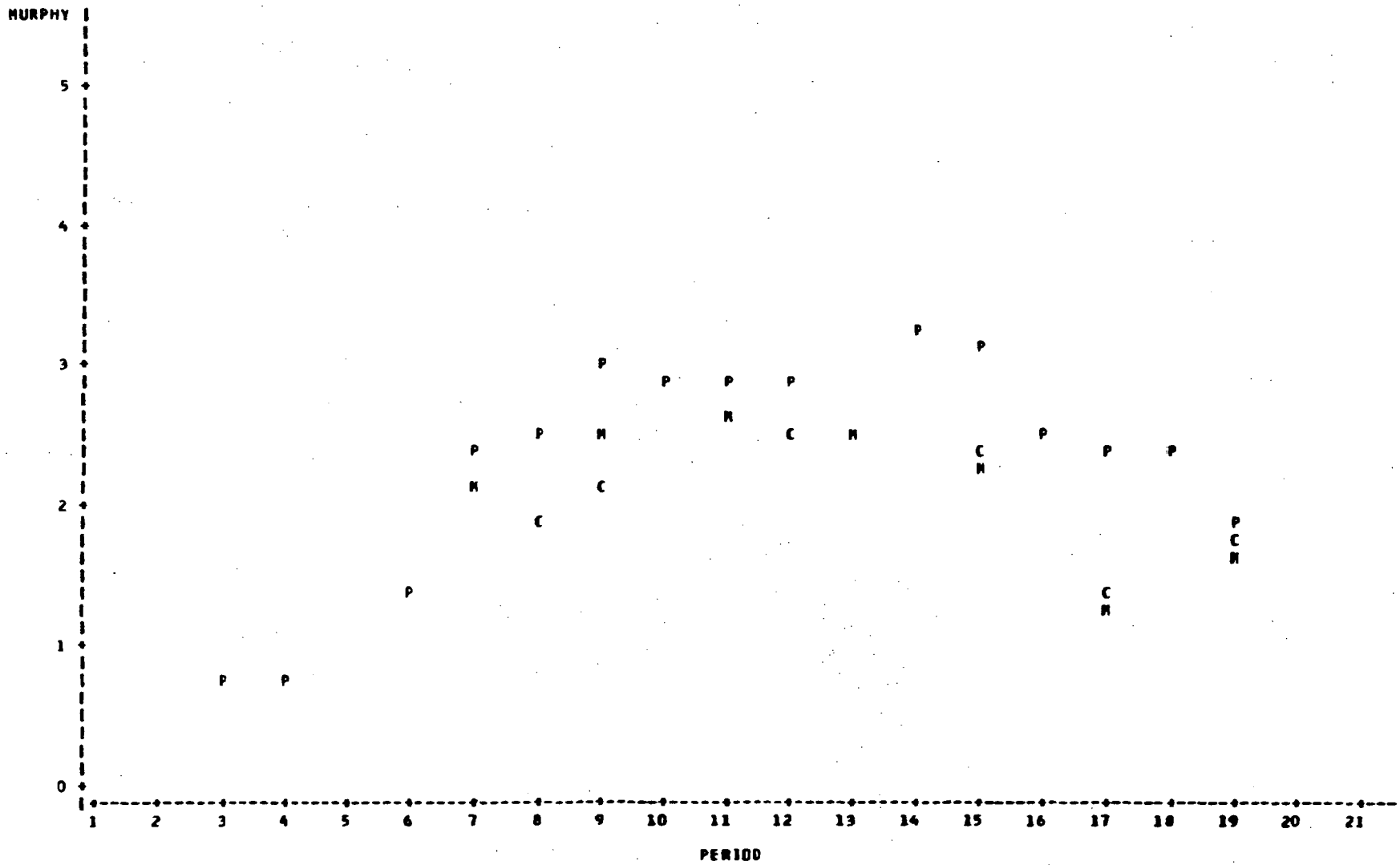
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 GEAR=1M CONICAL PUSH NET .79MM TAXON=CLUPEIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



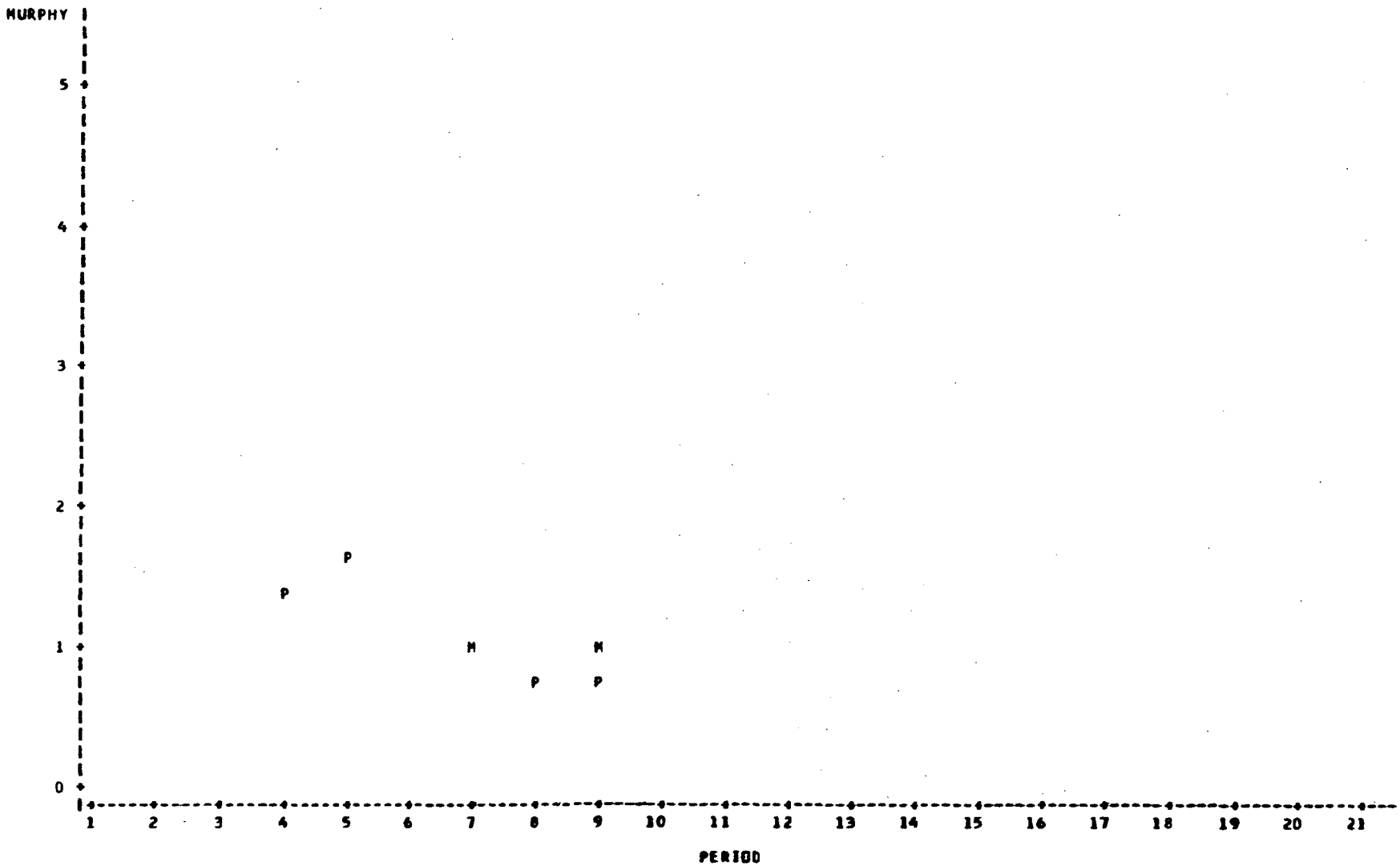
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 60
GEAR=1M CONICAL PUSH NET .79MM TAXON=CYPRINIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 GEAR=1M CONICAL PUSH NET .79MM TAXON=HIODONTIDAE

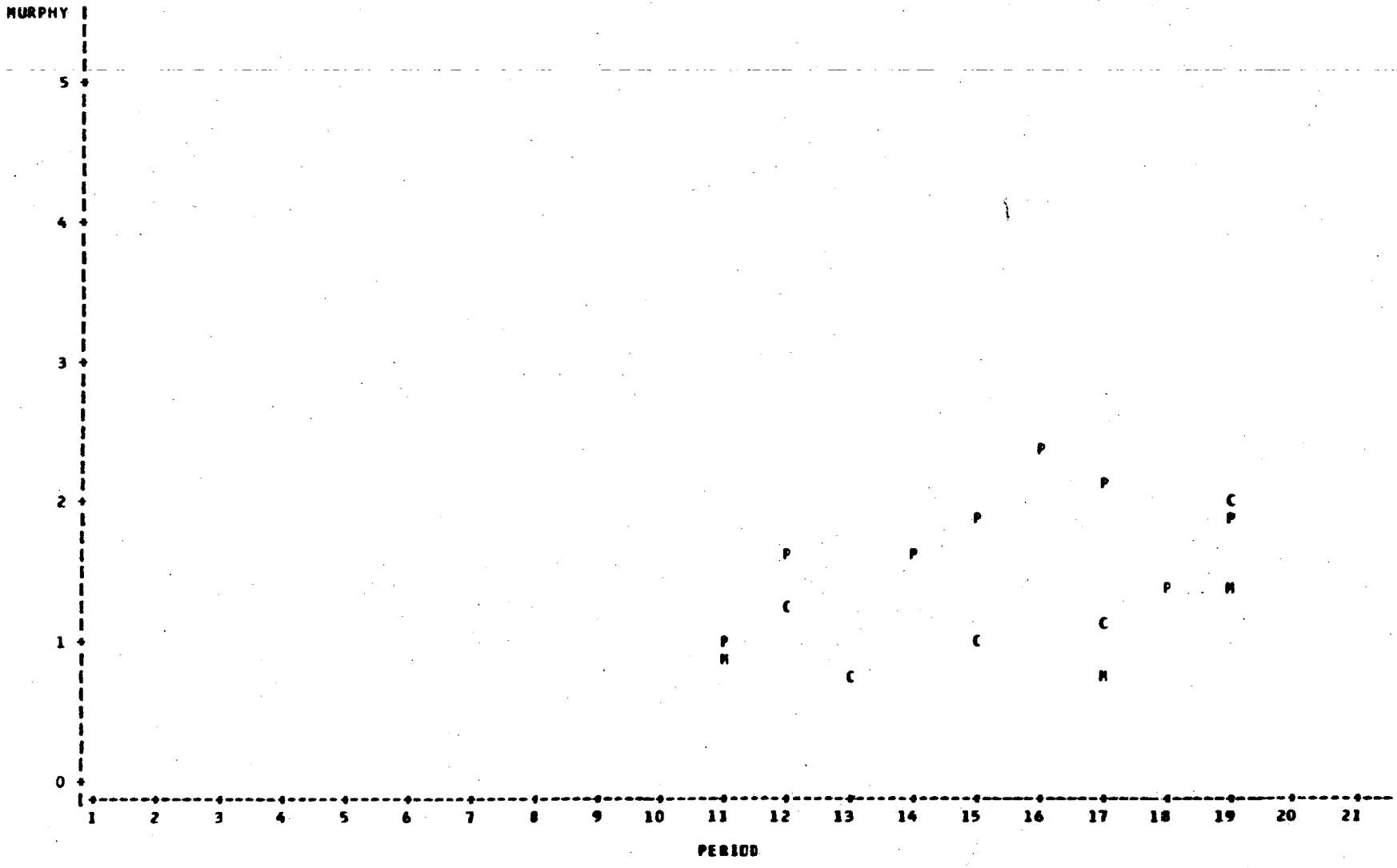
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 62

GEAR=1M CONICAL PUSH NET .79MM TAXON=ICTALURIDAE

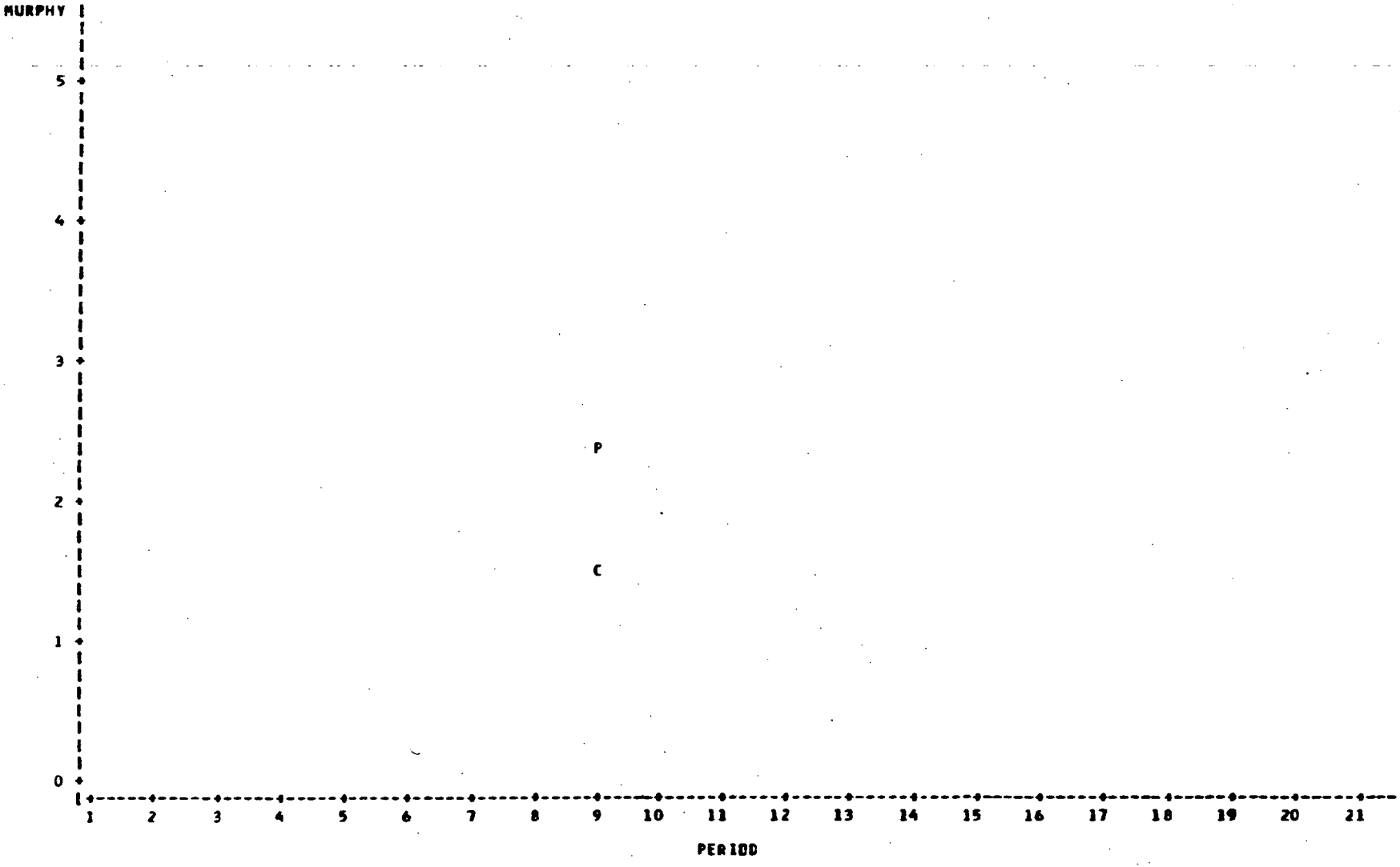
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BRNTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 63

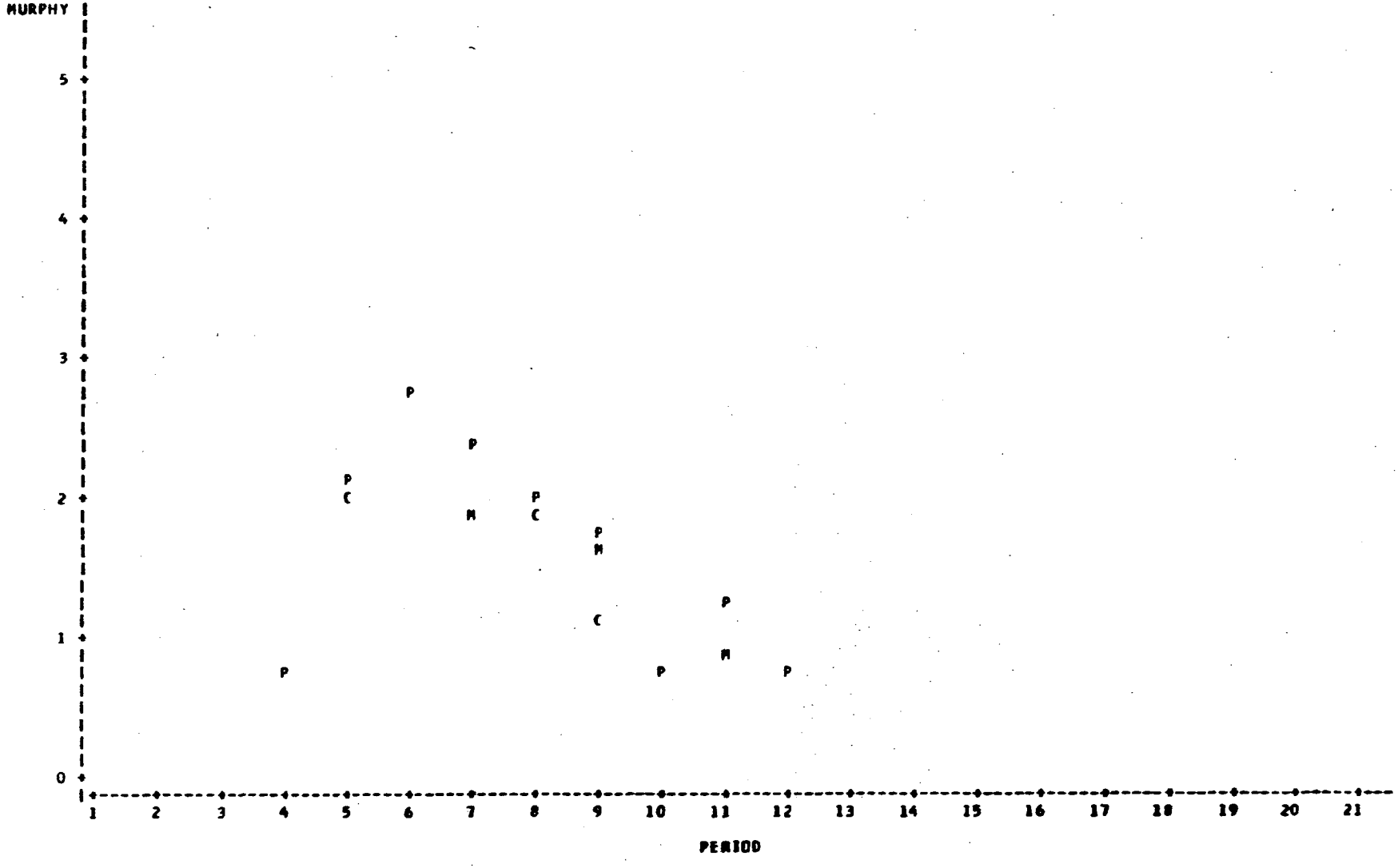
GEAR=1M CONICAL PUSH NET .79MM TAXON=LEPISOSTEIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



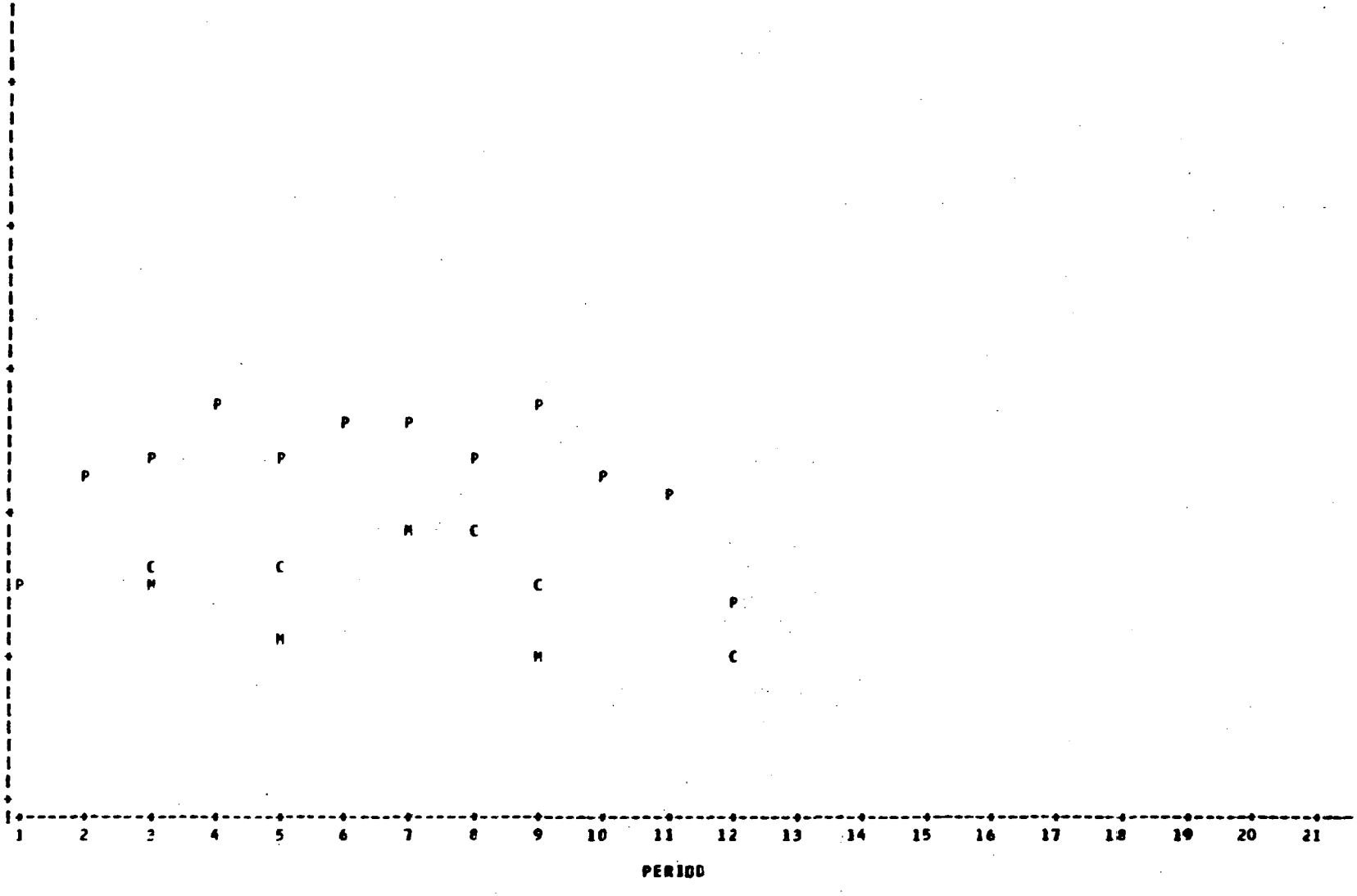
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 64
GEAR=1M CONICAL PUSH NET .79MM TAXON=PERCICHTHYIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKNTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



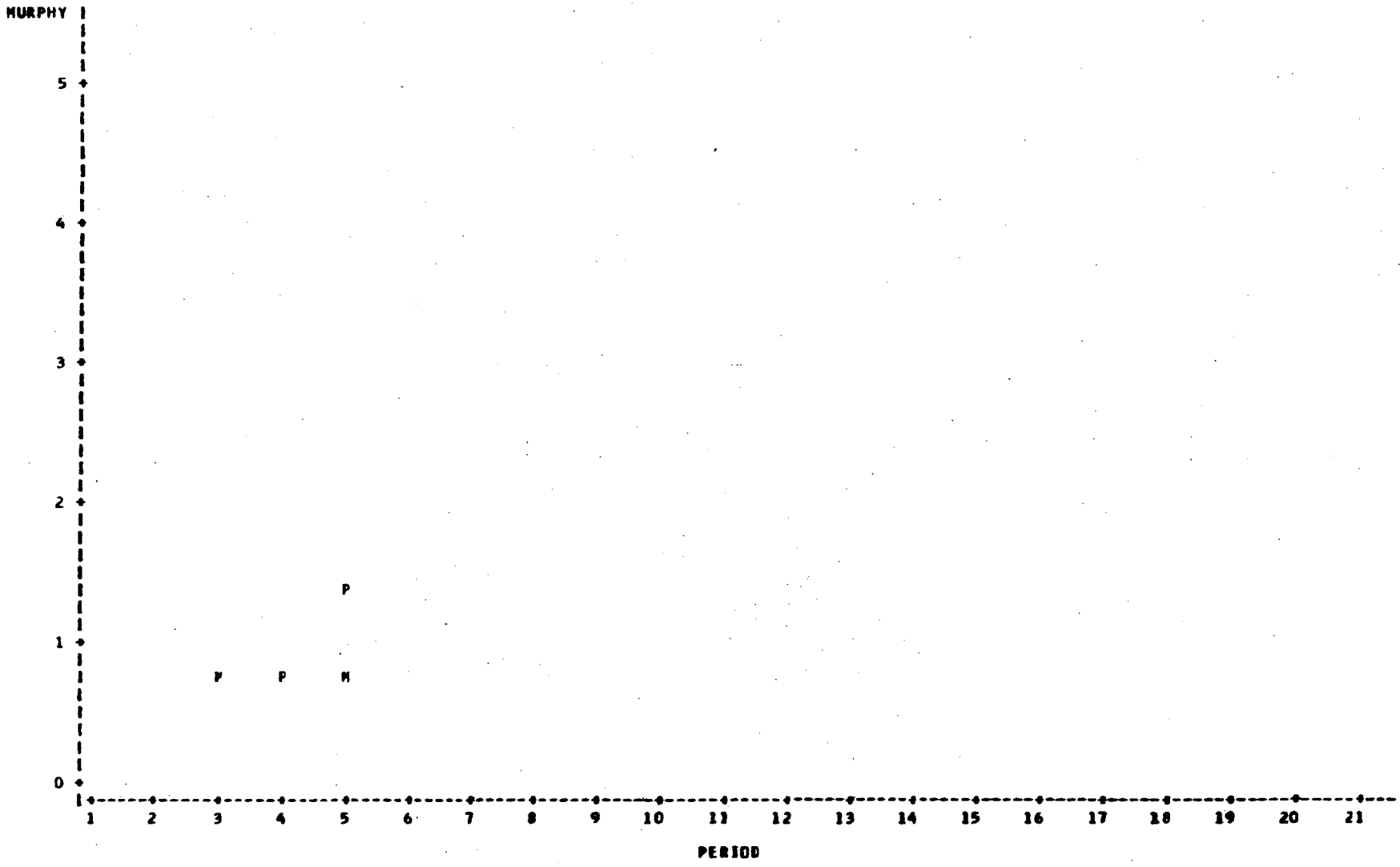
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 GEAR=1M CONICAL PUSH NET .79MM TAXON=PERCIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CORNER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



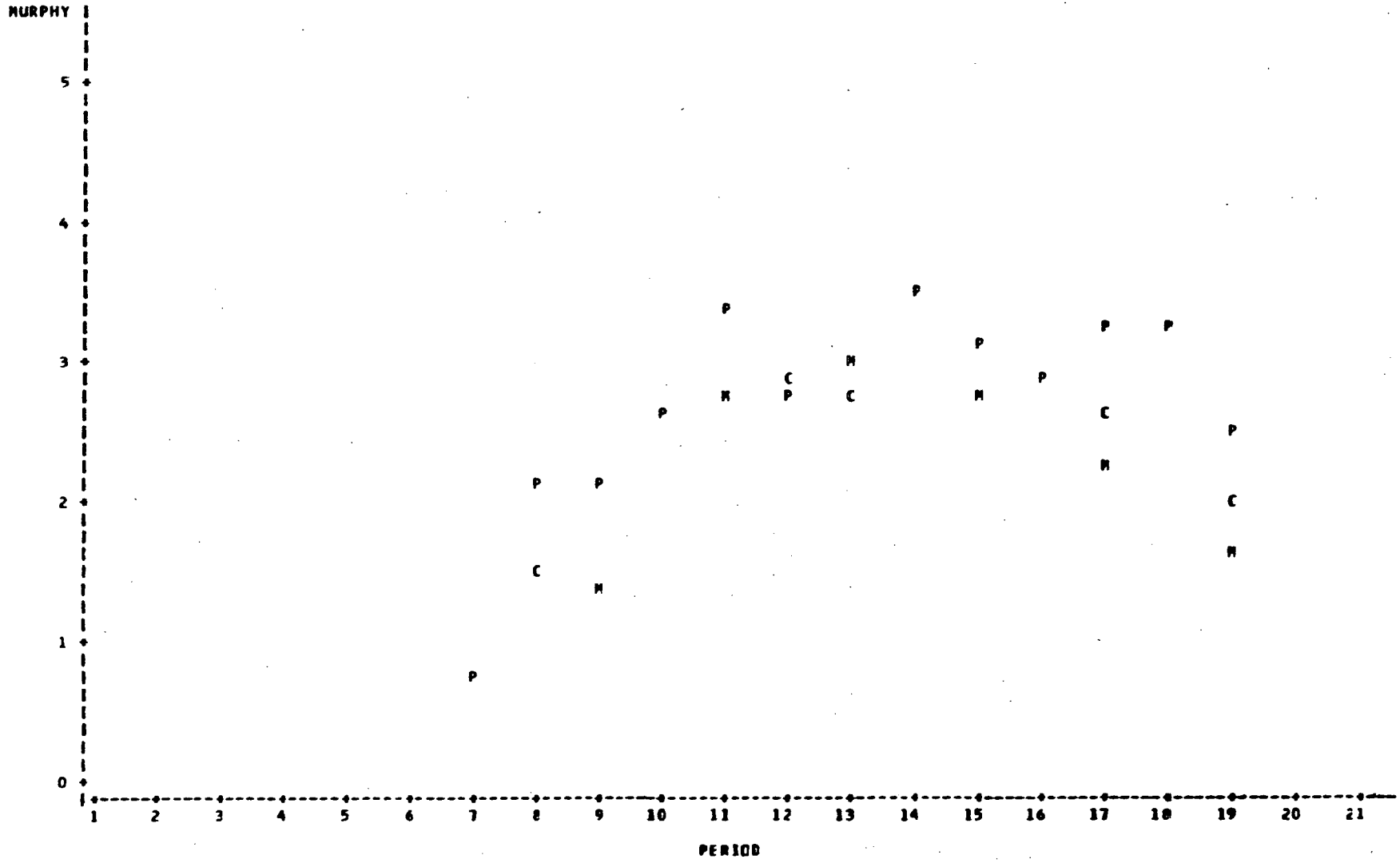
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 GEAR=1M CONICAL PUSH NET .79MM TAXON=POLYODONTIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CONER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKNTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975
GEAR=1M CONICAL PUSH NET .79MM TAXON=SCIAENIDAE

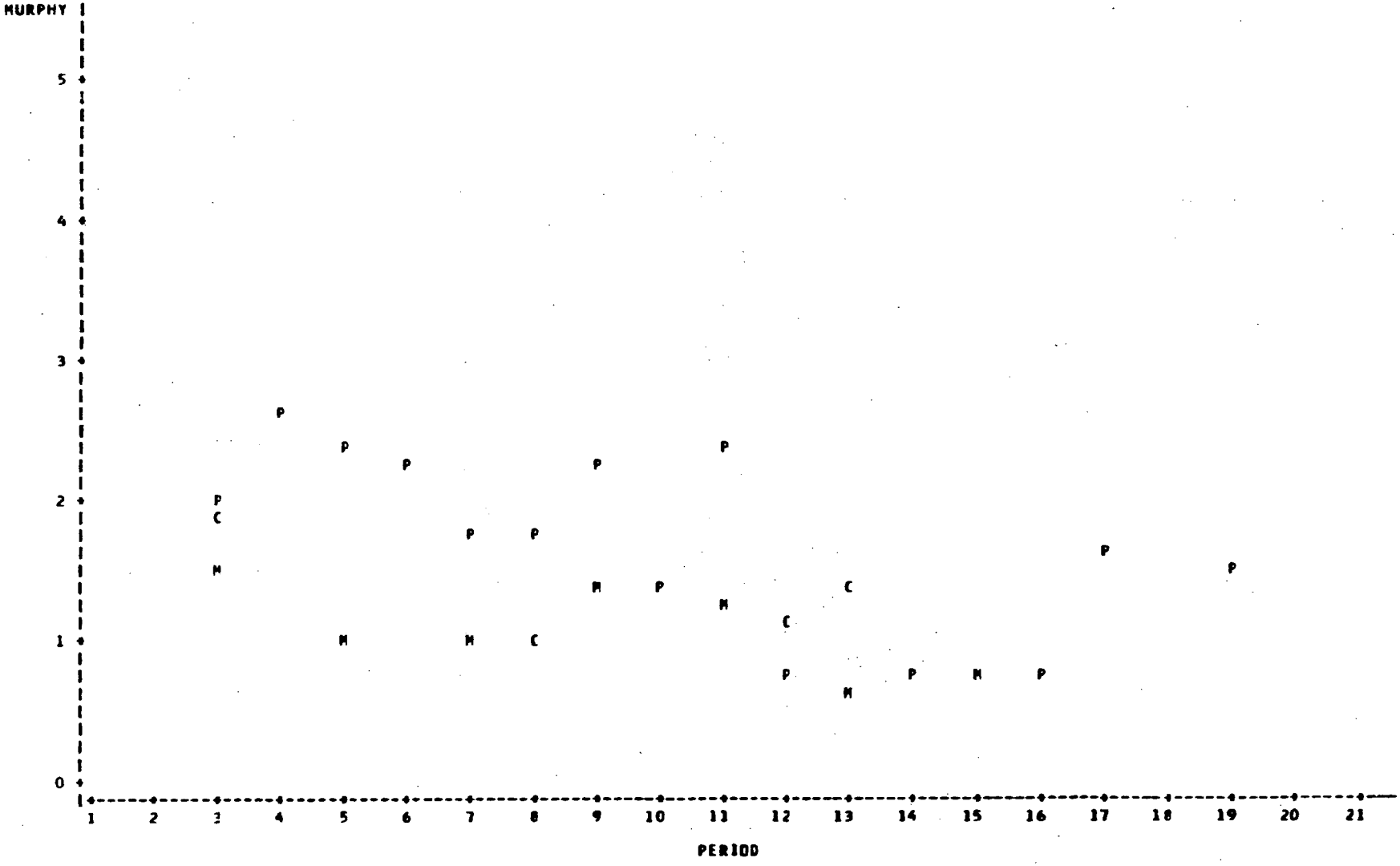
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT THREE TRANSECTS AT BELLEFONTE NUCLEAR SITE 1975 9:43 MONDAY, APRIL 11, 1977 70

GEAR=1M CONICAL PUSH NET .79MM TAXON=UNIDENTIFIED FISH

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



APPENDIX C

Plots of log density (number/1000 m^3) of taxa of fish larvae and eggs vs. sample period, Guntersville Reservoir, Alabama, 1976.

Each plot represents the density of one taxon as obtained by one type of sampling gear, as identified in the plot legend. The ordinate is in log units, i.e., $1 = 10^1$, $2 = 10^2$, etc.

Transects:

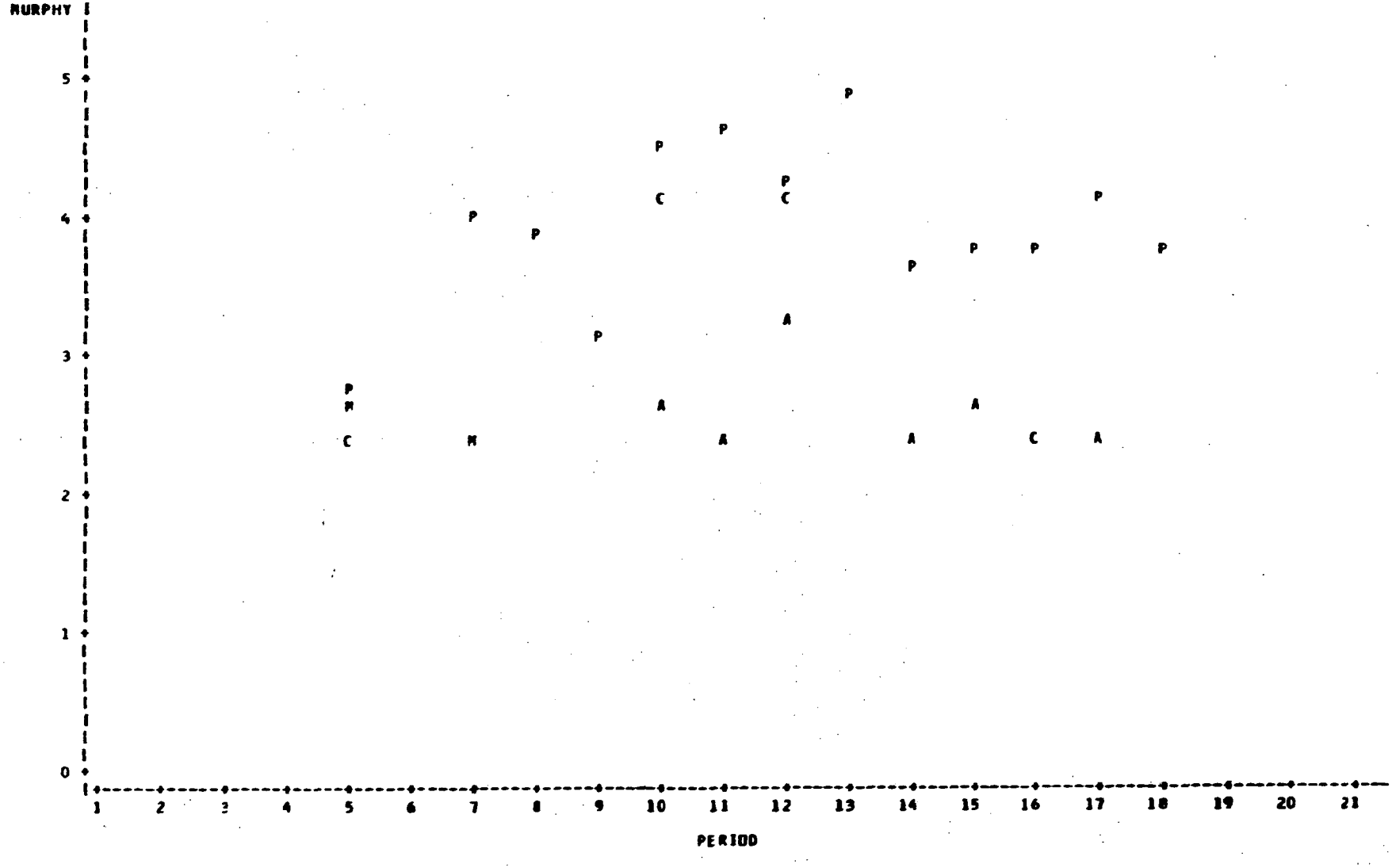
BCKWTR = TRM 393-The backwater area at the plant site
PLANT = TRM 392-The plant transect
COMER = TRM 385
MURPHY = TRM 369

Plots composed of a single observation have been omitted.

LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 8

GEAR=FISH PUMP 360GPM .5MM TAXON=SCIAENID EGGS

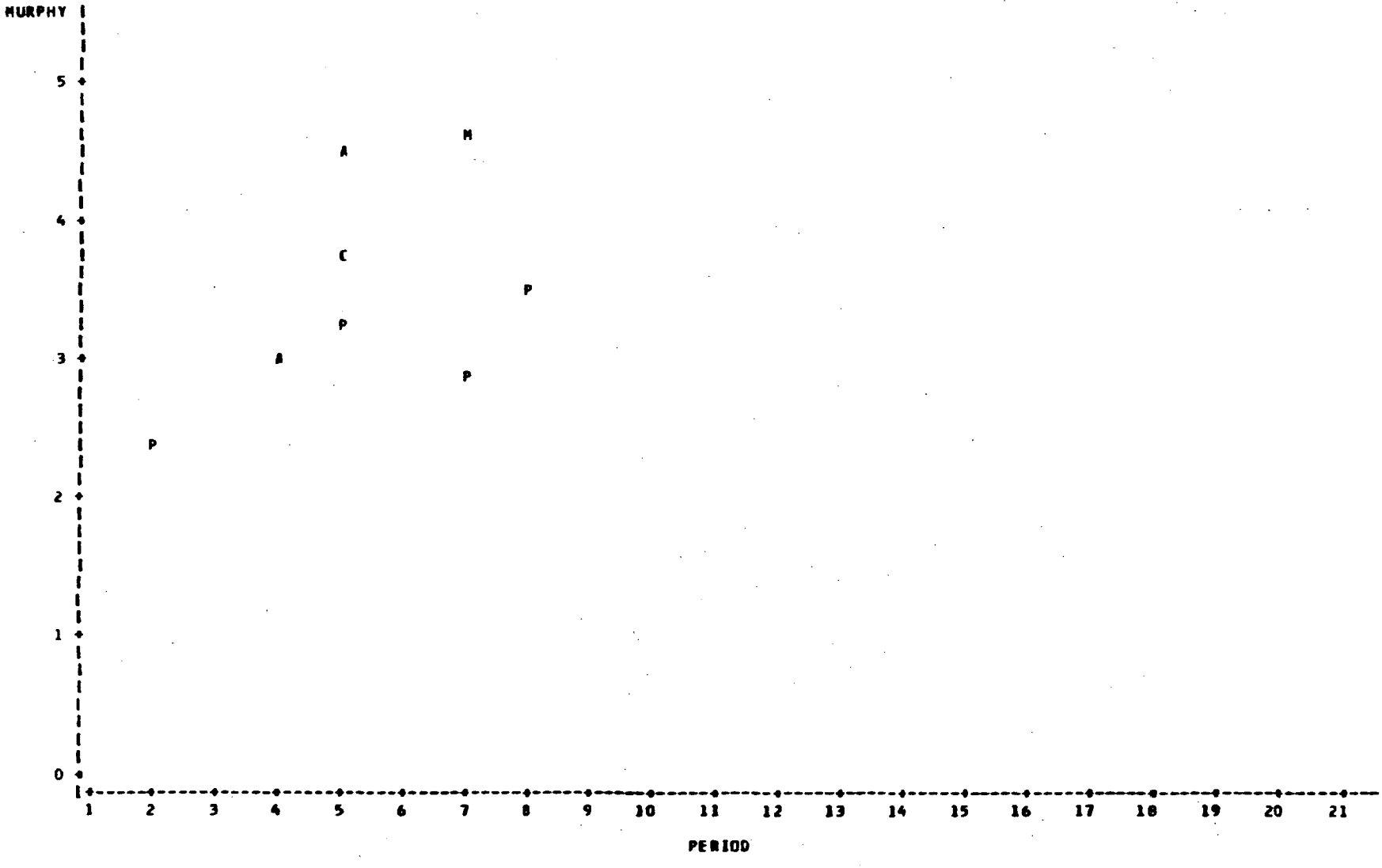
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFORTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 11

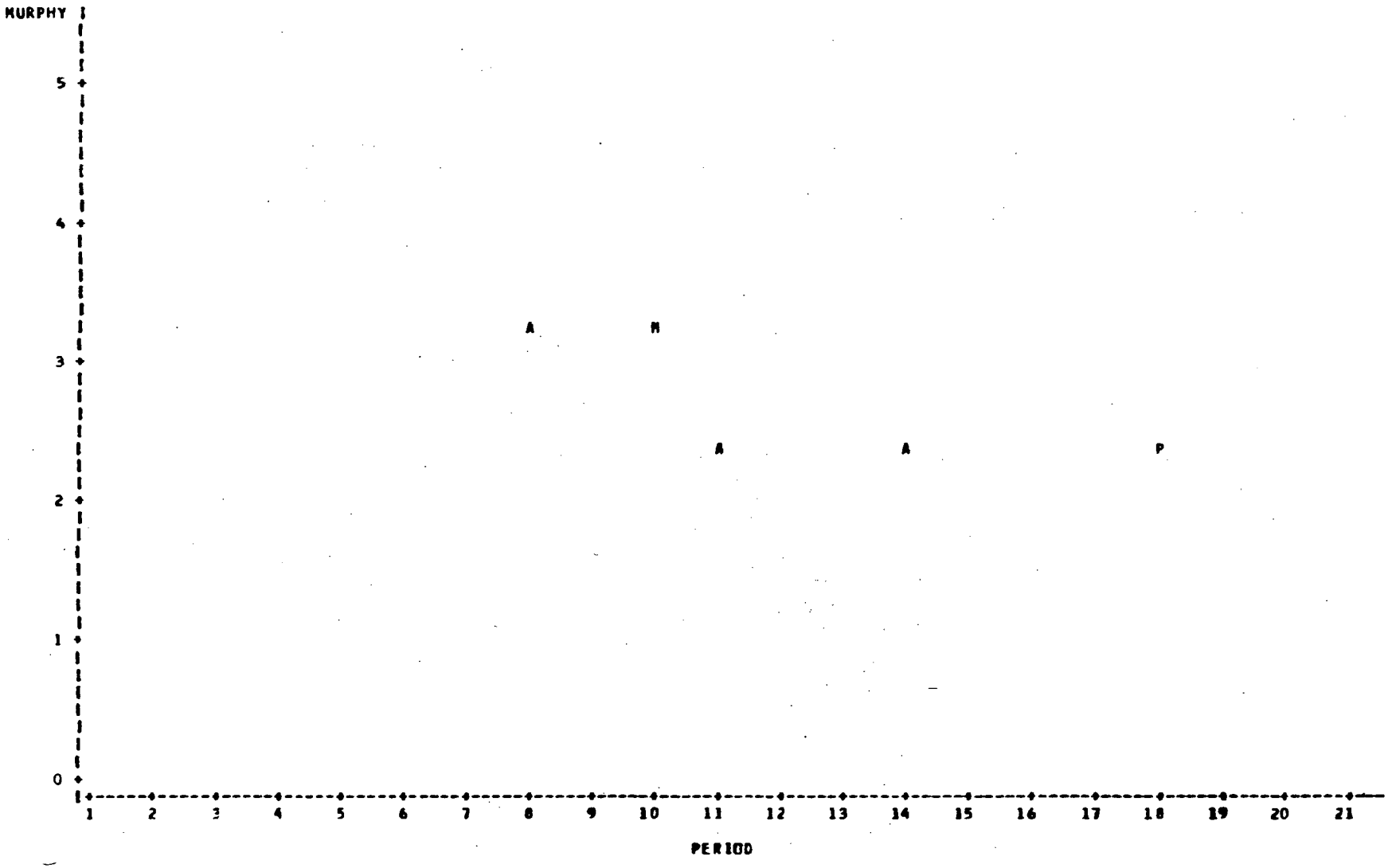
GEAR=FISH PUMP 360GPM .5MM TAXON=UNIDENTIFIED FISH EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



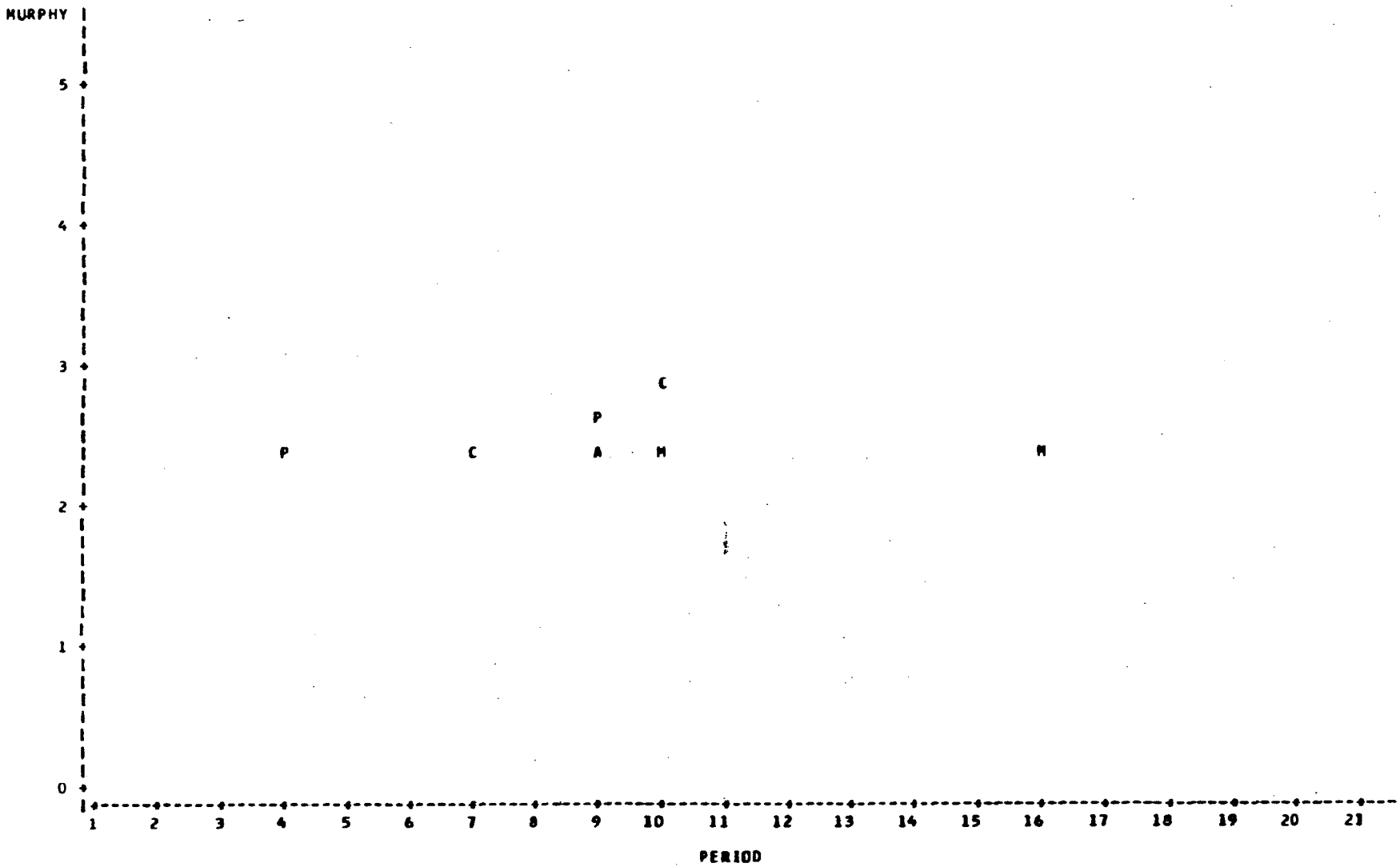
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR 18:52 FRIDAY, APRIL 8, 1977 1
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976
GEAR=FISH PUMP 360GPM .5MM TAXON=ATHERINIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR 18:52 FRIDAY, APRIL 8, 1977 2
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976
GEAR=FISH PUMP 360GPM .5MM TAXON=CATOSTOMIDAE

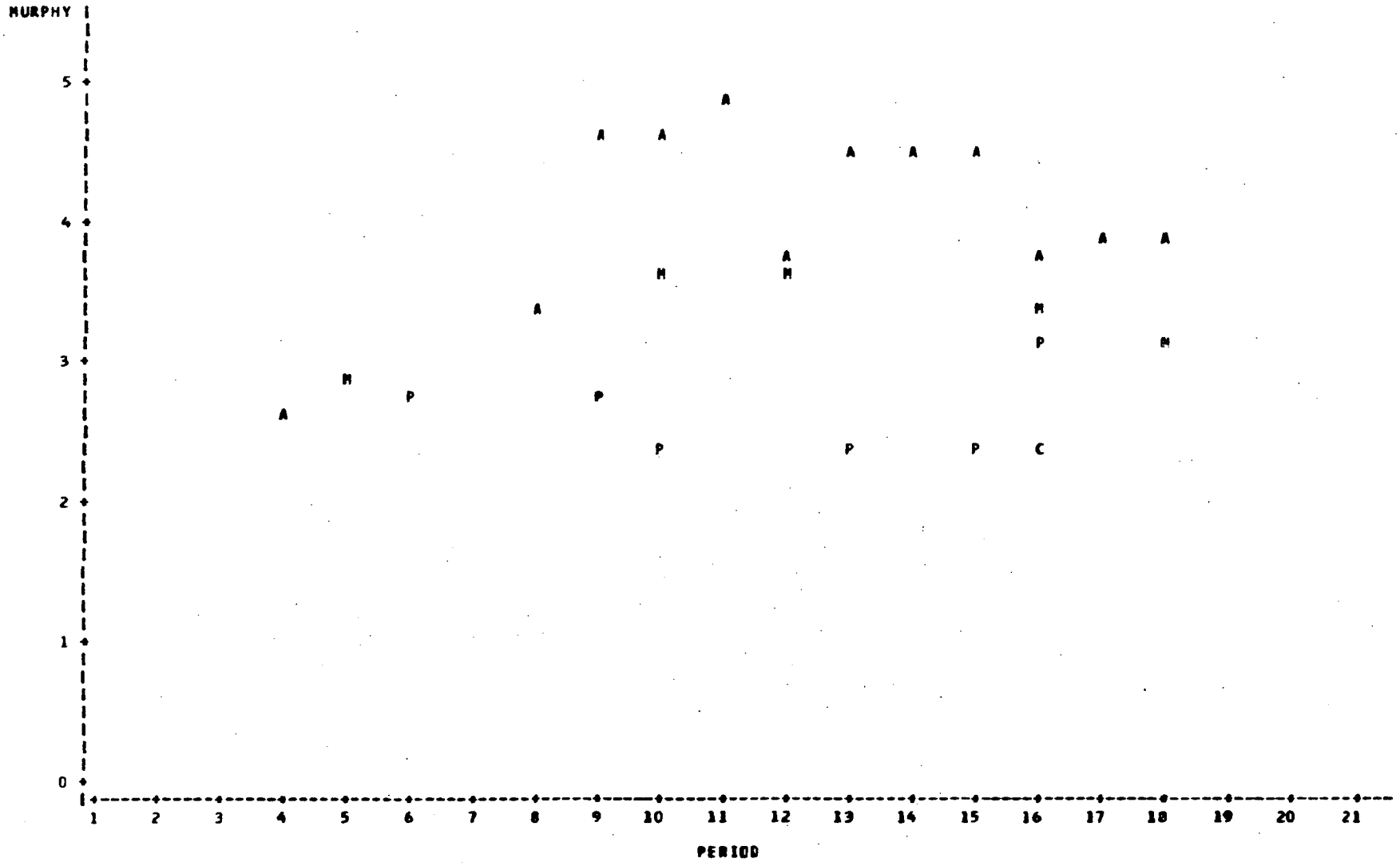
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/100C0-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 3

GEAR=FISH PUMP 360GPM .5MM TAXON=CENTRARCHIDAE

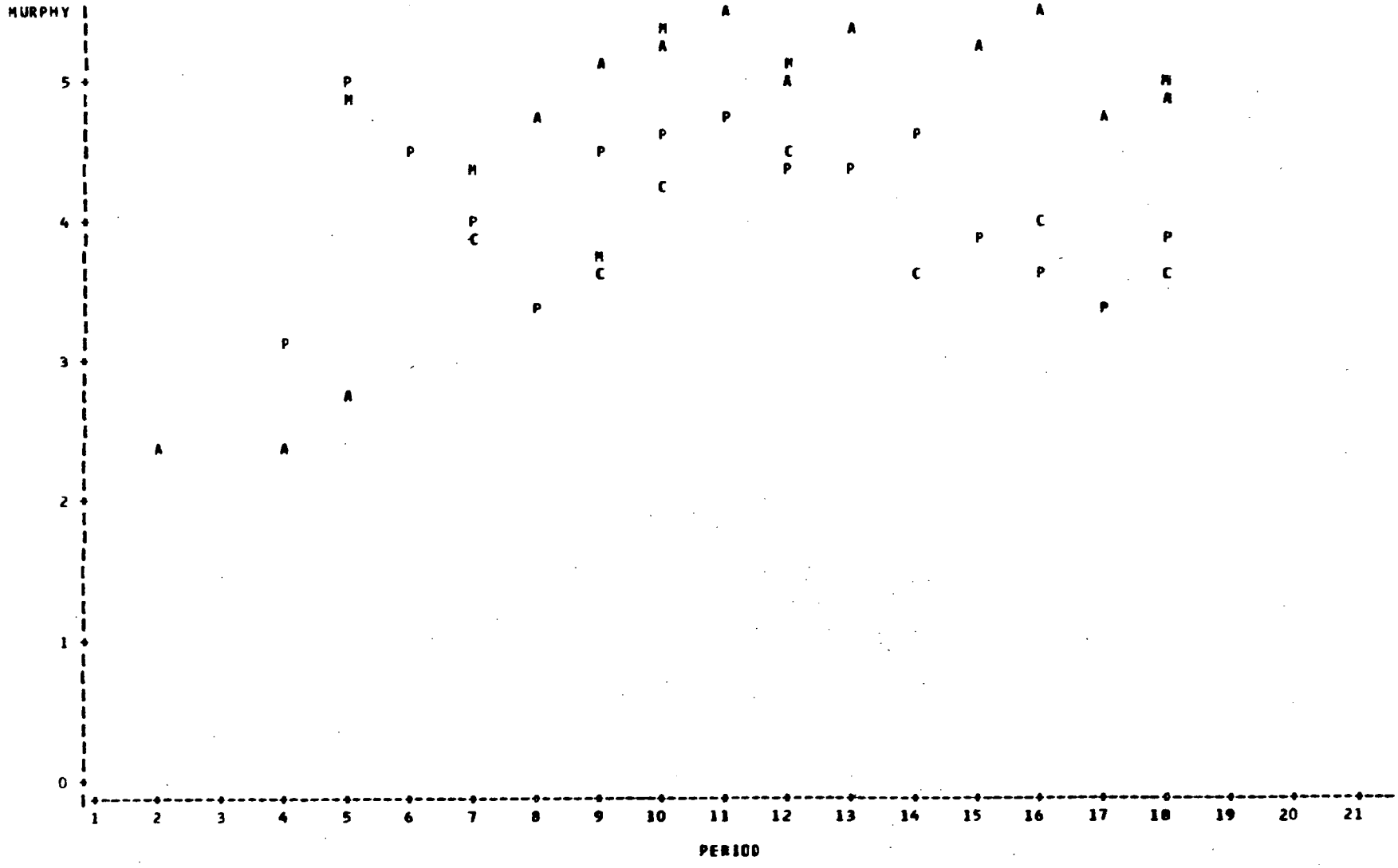
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 4

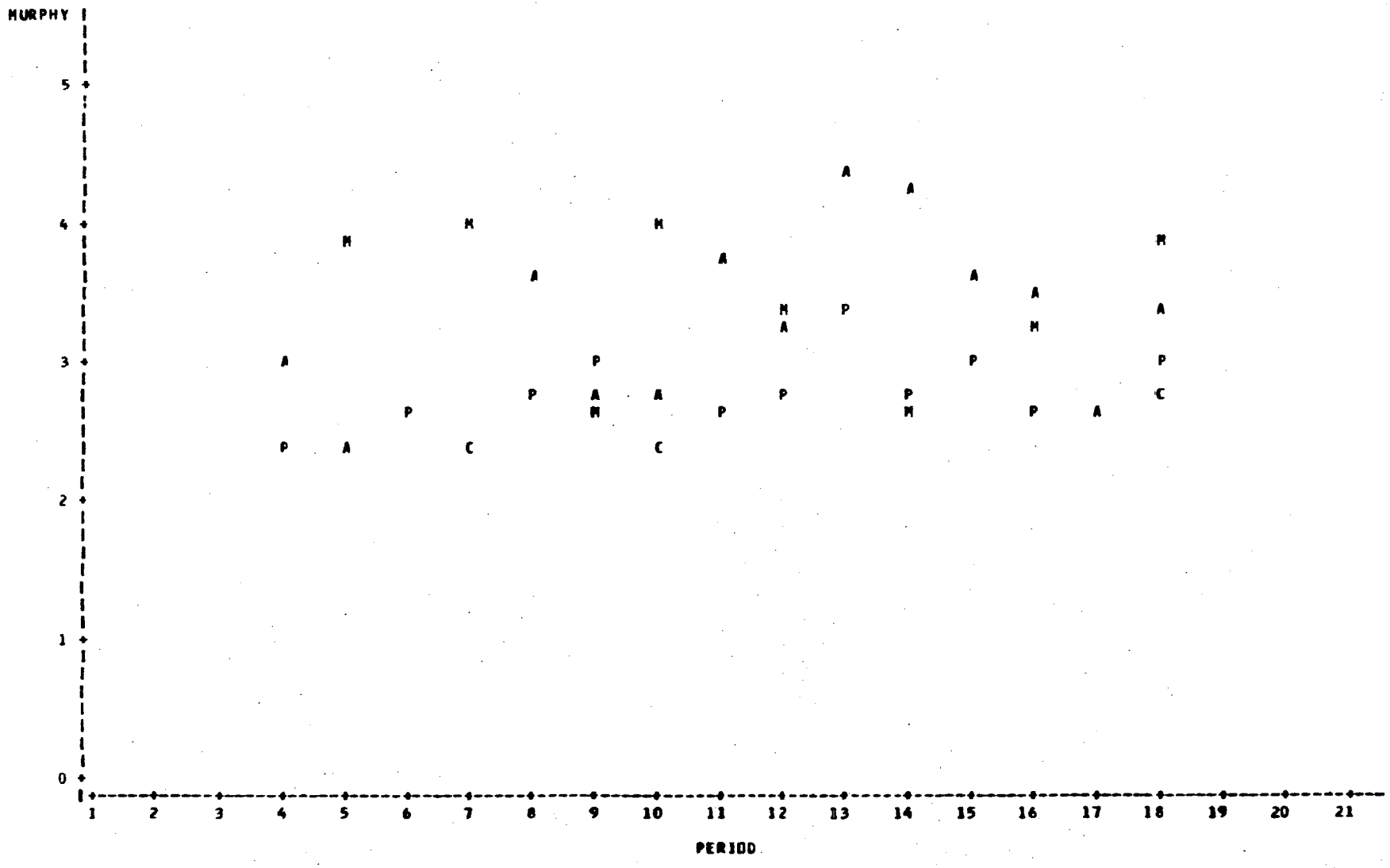
GEAR=FISH PUMP 360GPM .5MM TAXON=CLUPEIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CORNER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 GEAR=FISH PUMP 3606PP .5MM TAXON=CYPRINIDAE

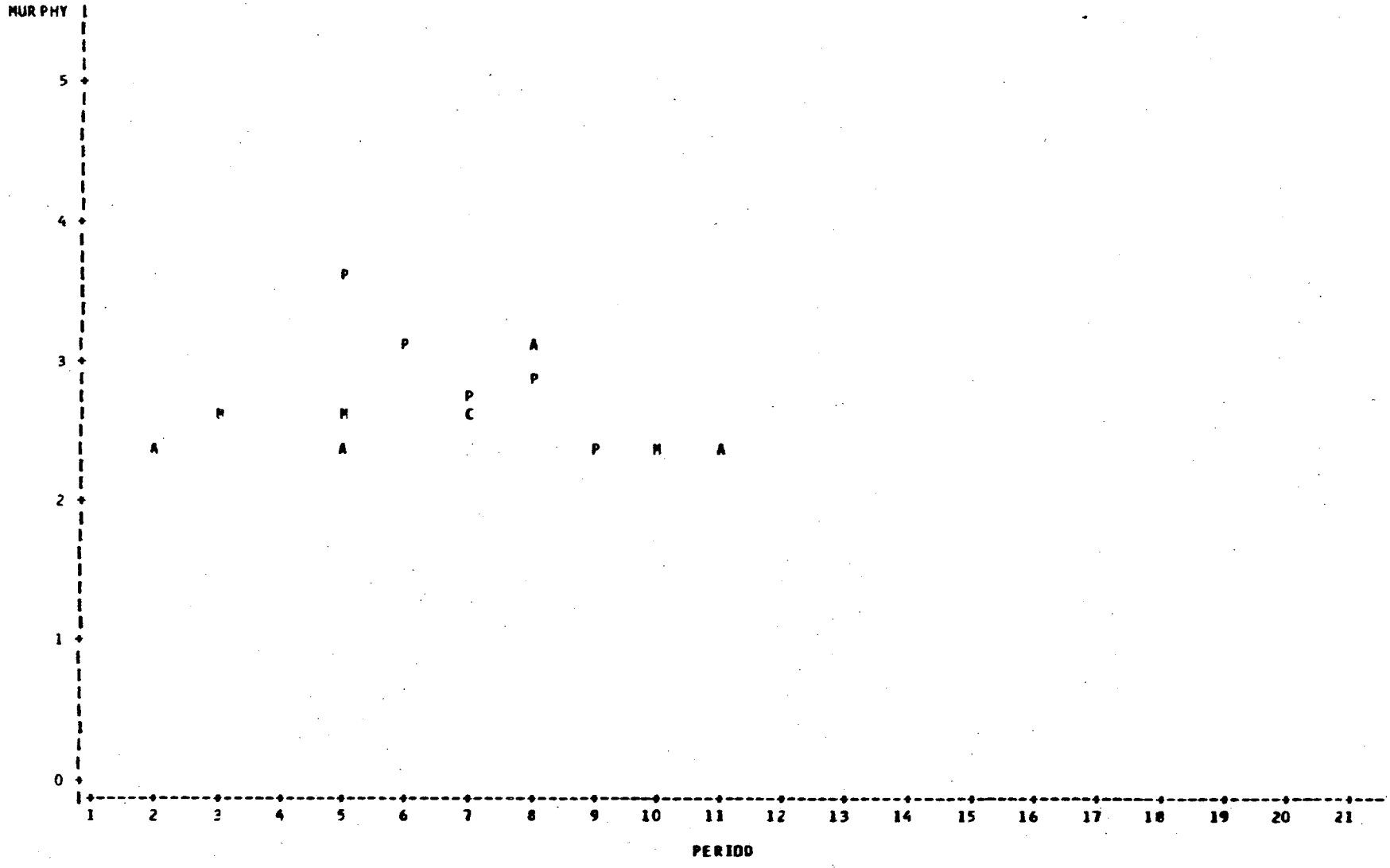
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BANKTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 6

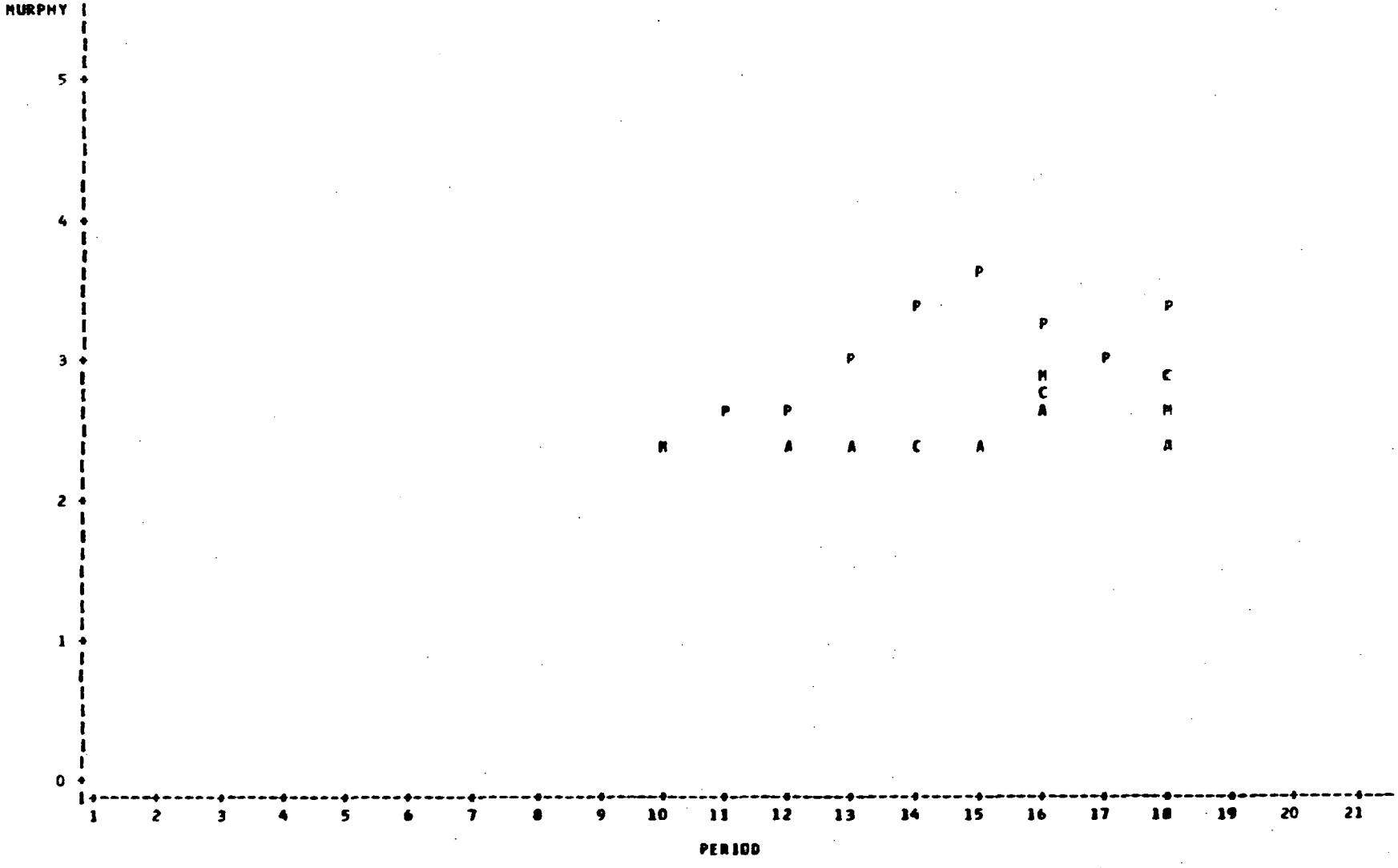
GEAR=FISH PUMP 360GPM .5MM TAXON=PERCICHTHYIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 GEAR=FISH PUMP 3606PM .5MM TAXON=SCIAENIDAE

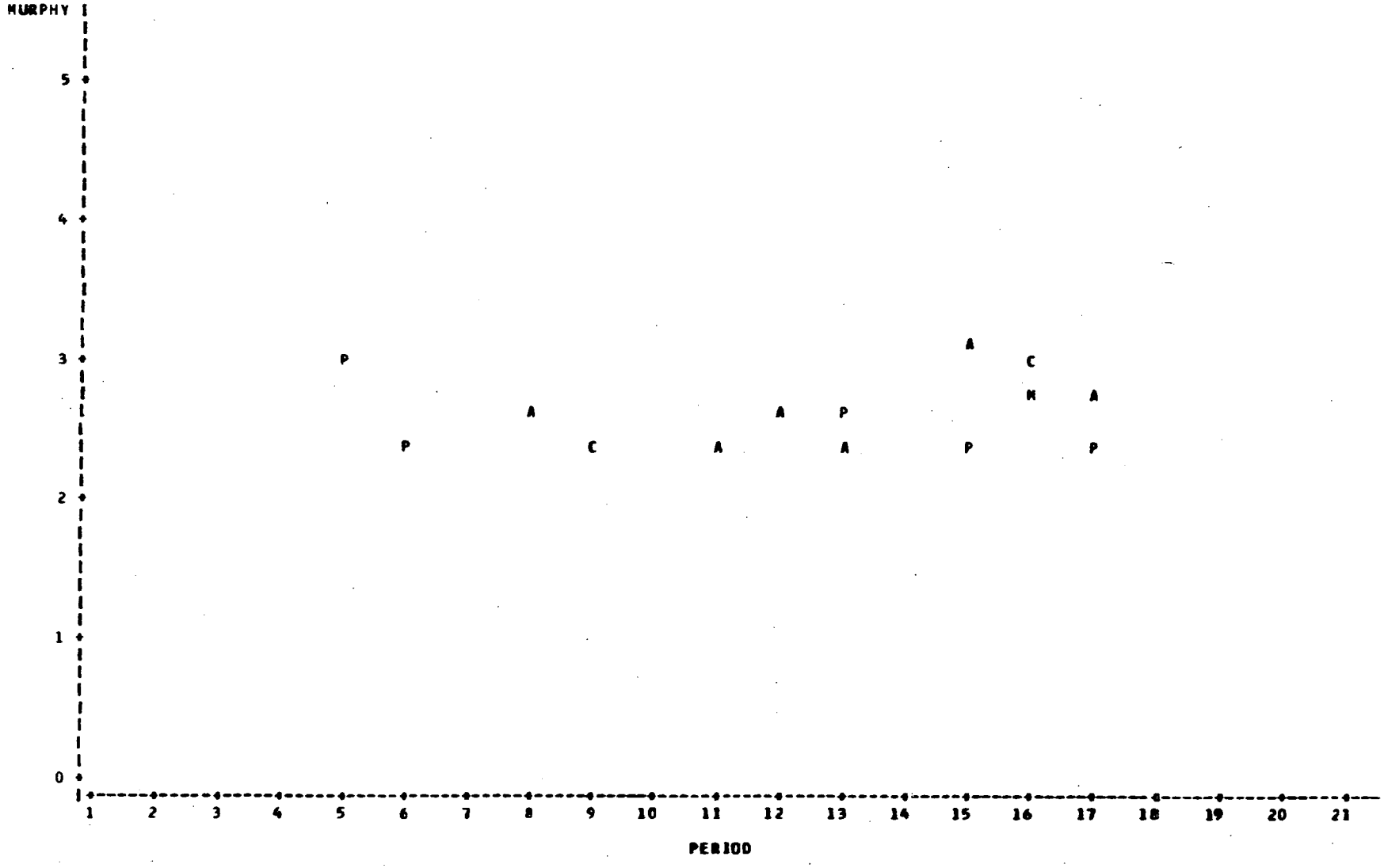
PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 10

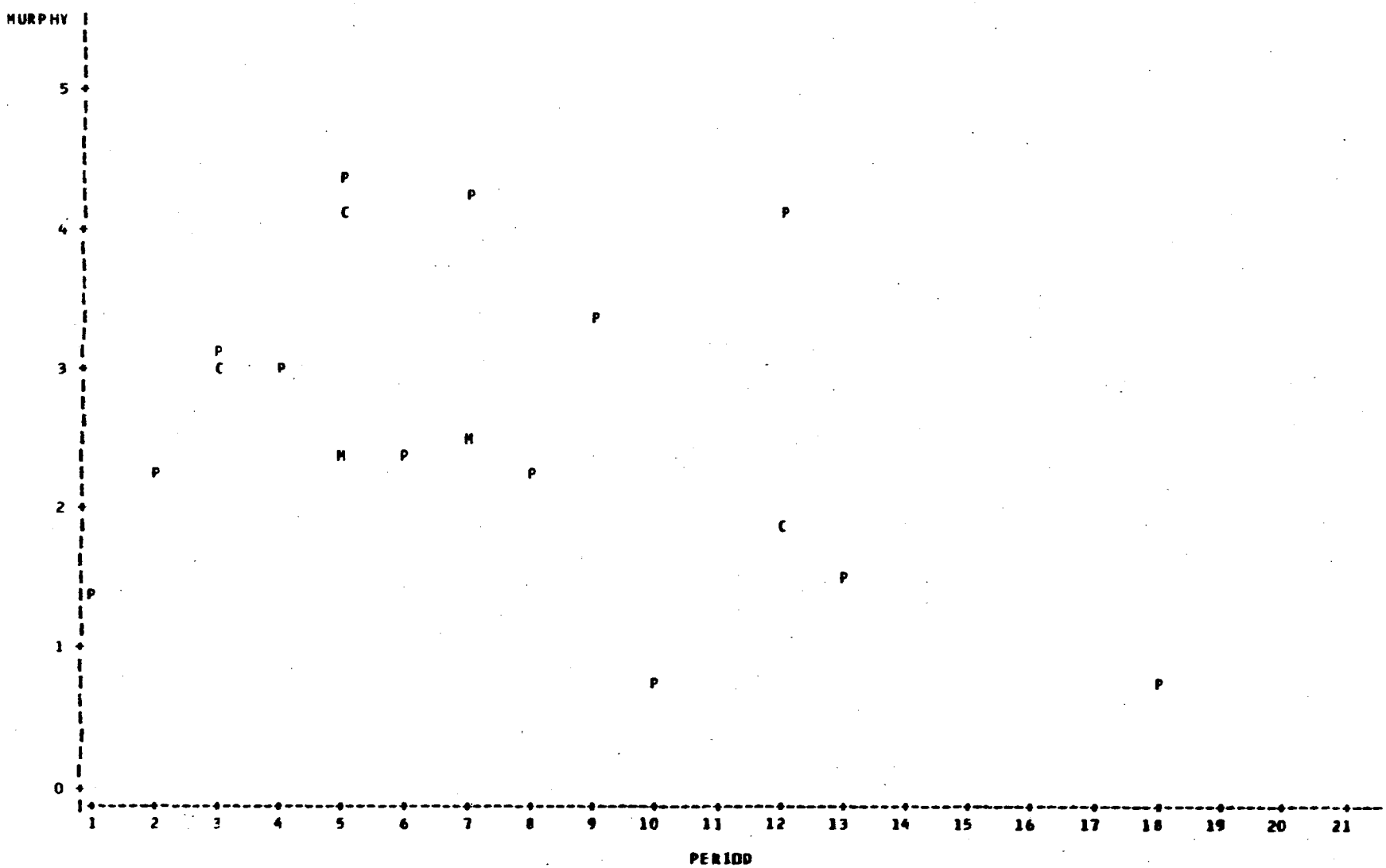
GEAR=FISH PUMP 360GPM .5MM TAXON=UNIDENTIFIED FISH

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CORNER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



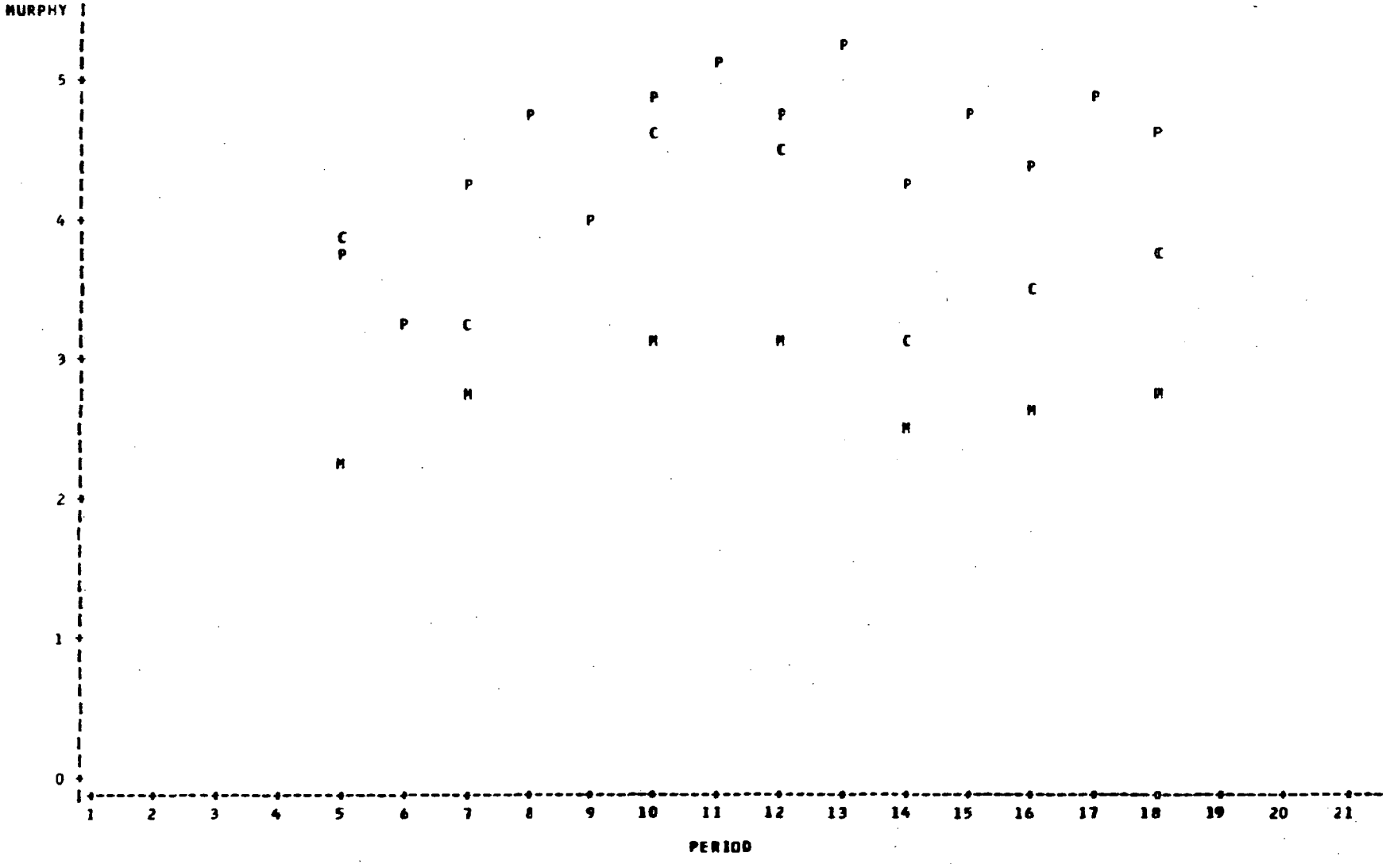
LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR 18:52 FRIDAY, APRIL 8, 1977 26
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976
GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=UNIDENTIFIED FISH EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*CORER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKLTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=SCIAENID EGGS

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=ATHERINIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
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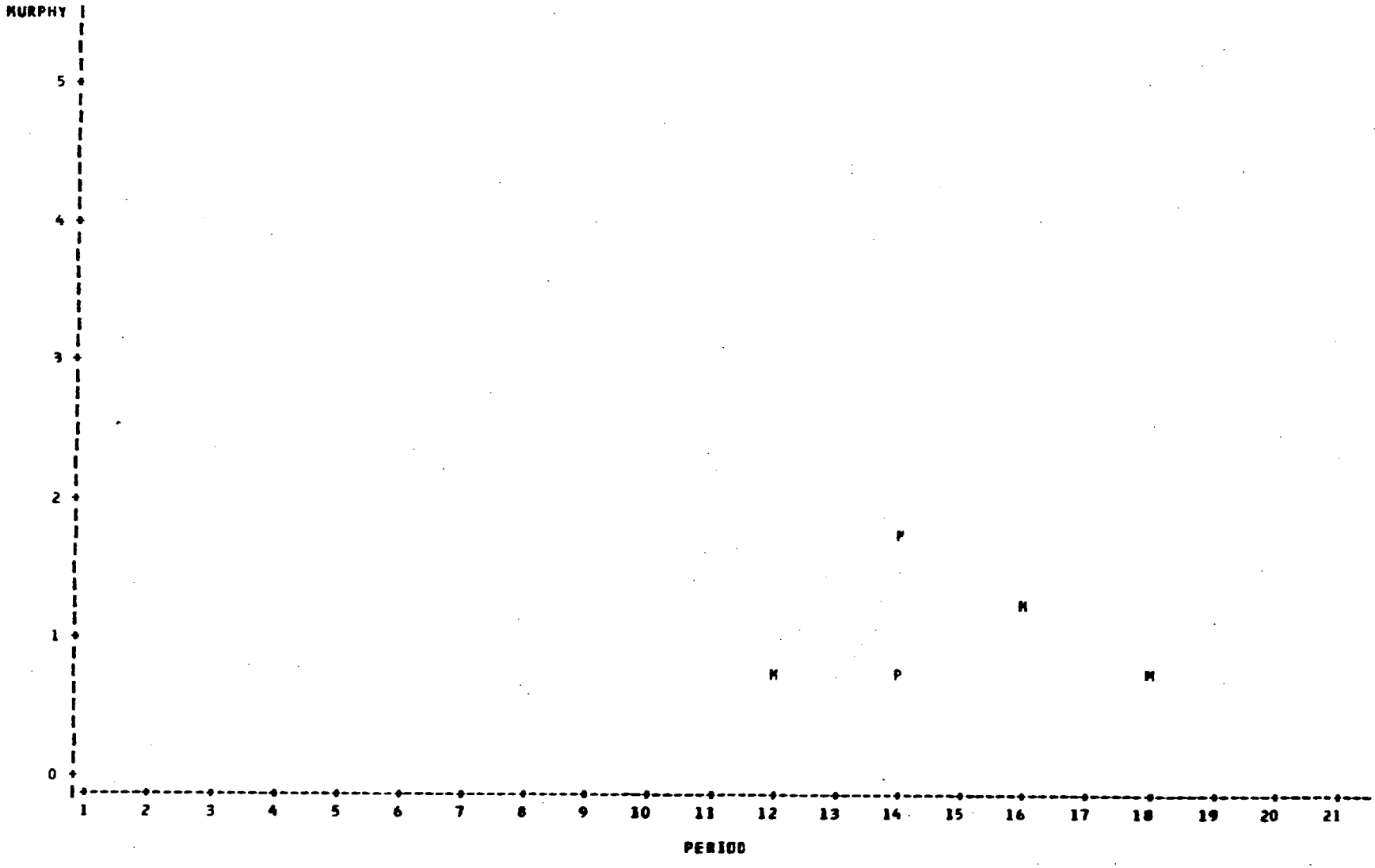
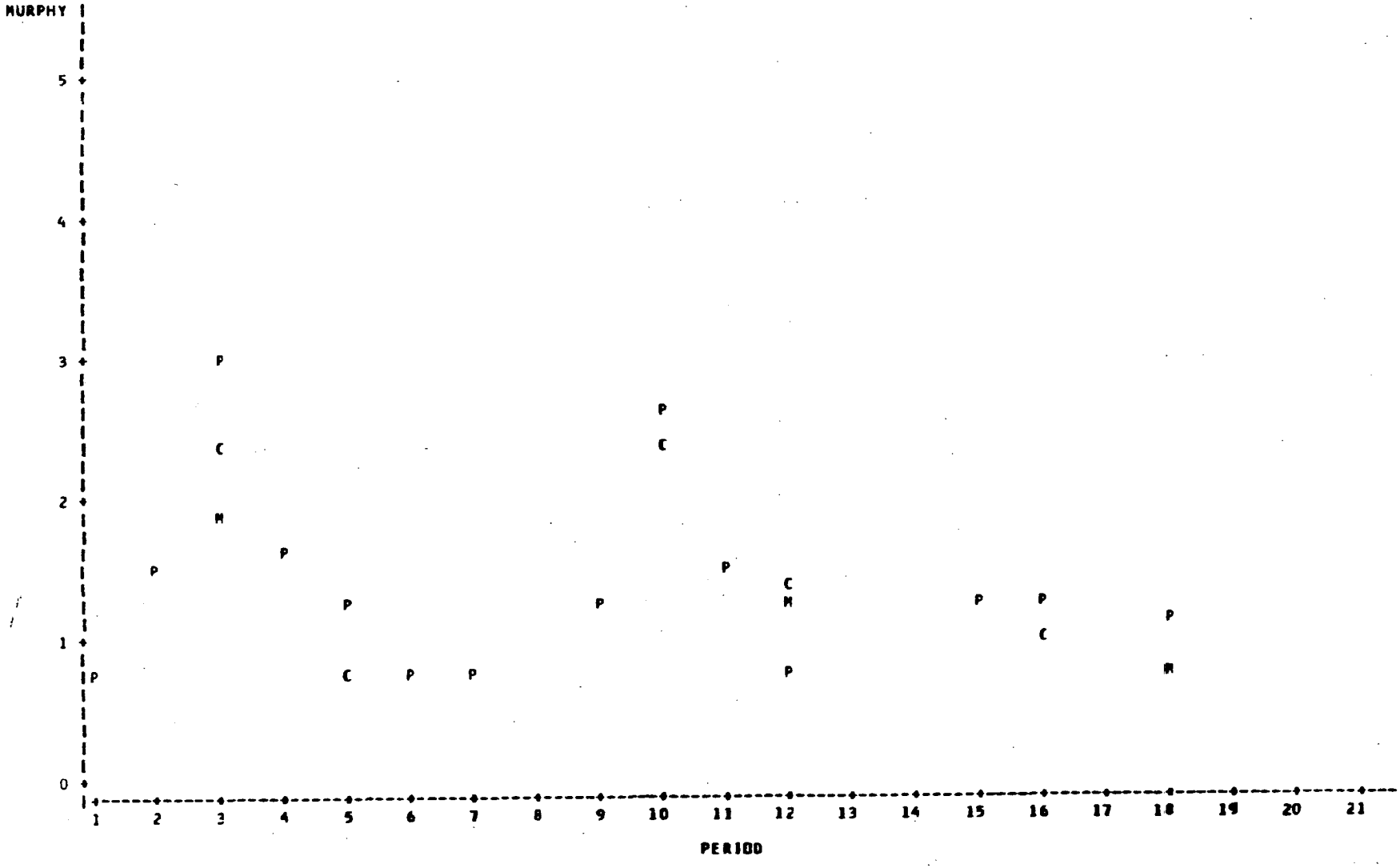


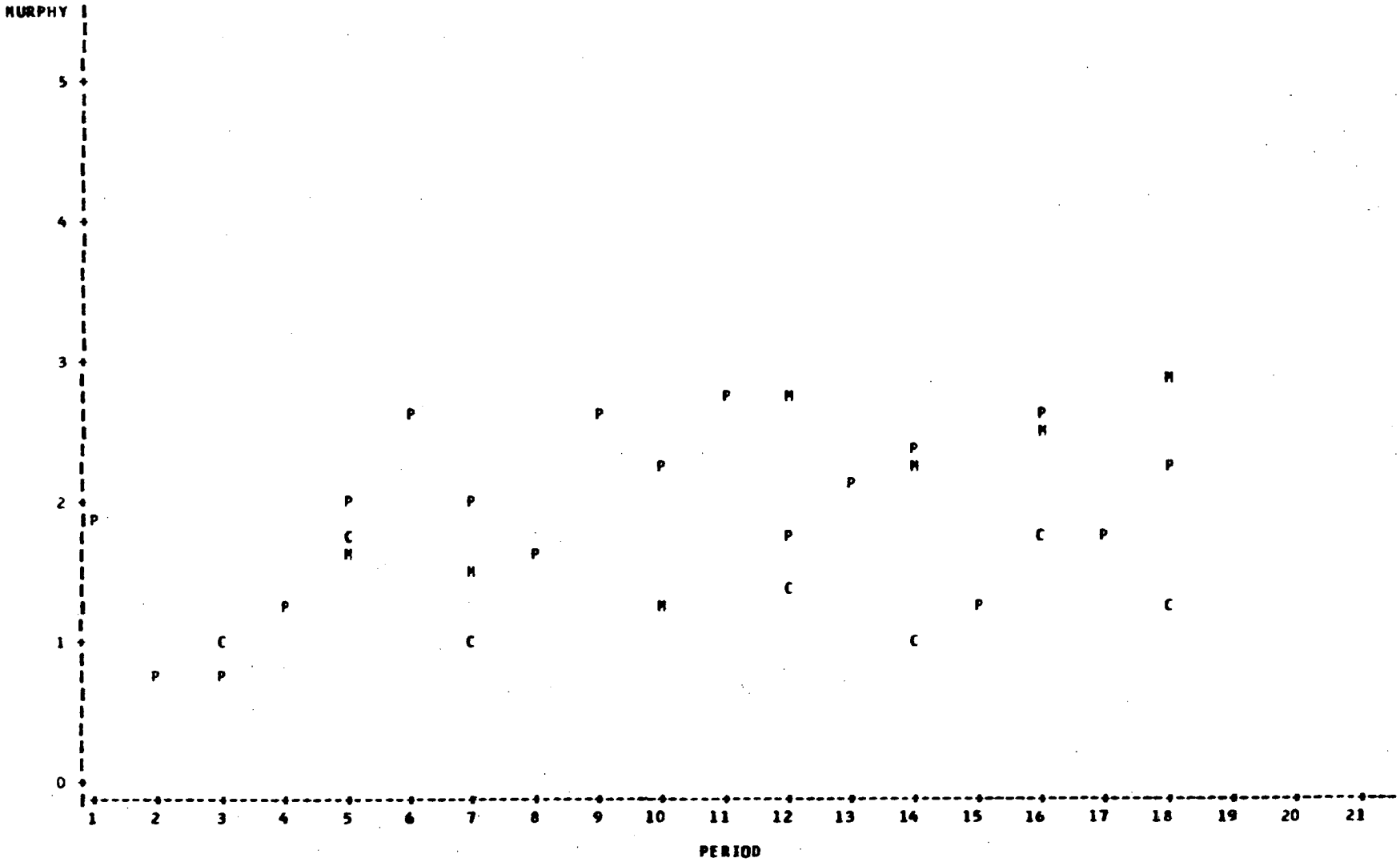
LOG(BASE-10) DENSITIES (#/100-M3) OF LARVAL FISH AND EGGS AT FOUR
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976
GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=CATOSTOMIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLANT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=CENTRARCHIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLART LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=CLUPEIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
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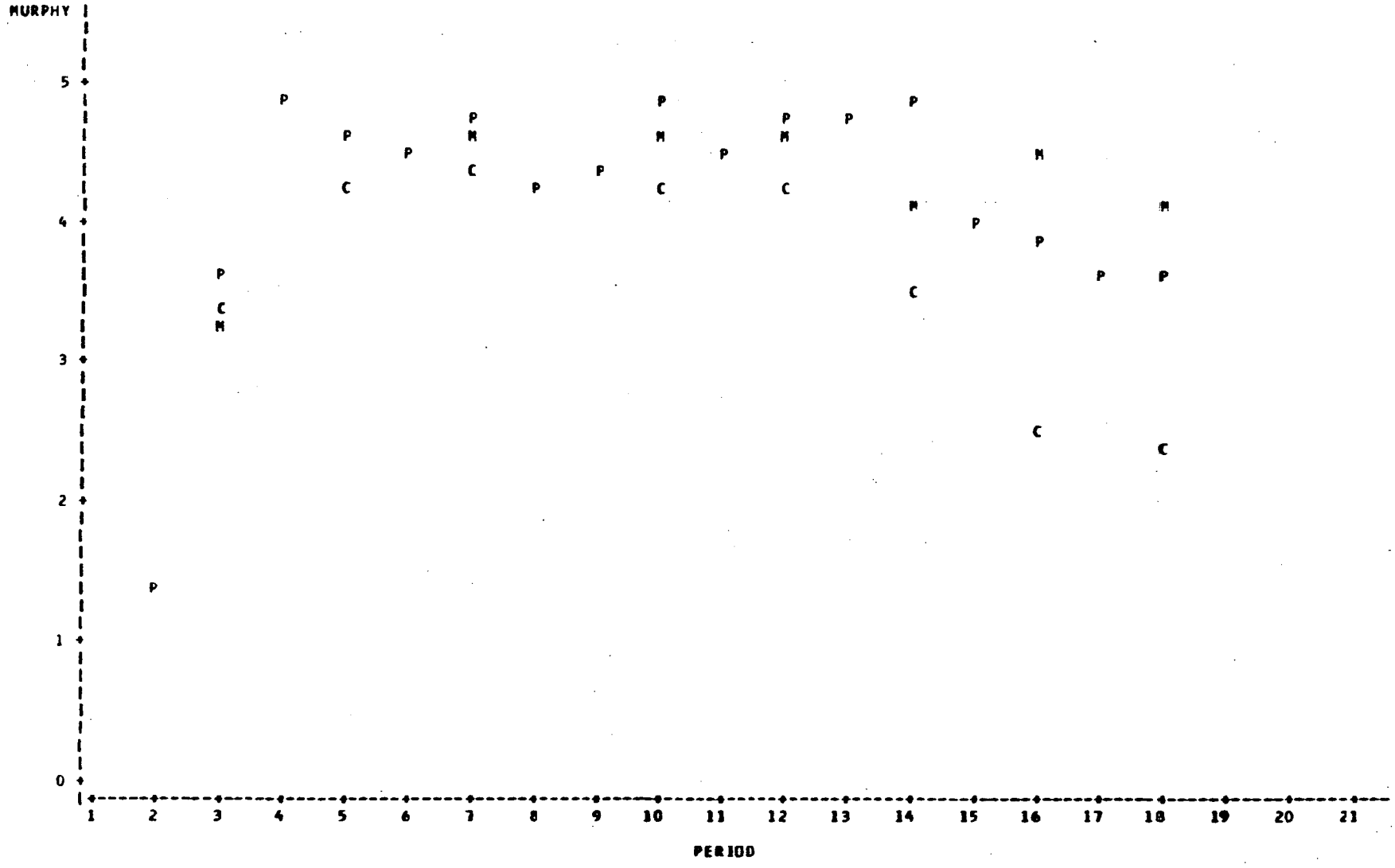

LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=CYPRINIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
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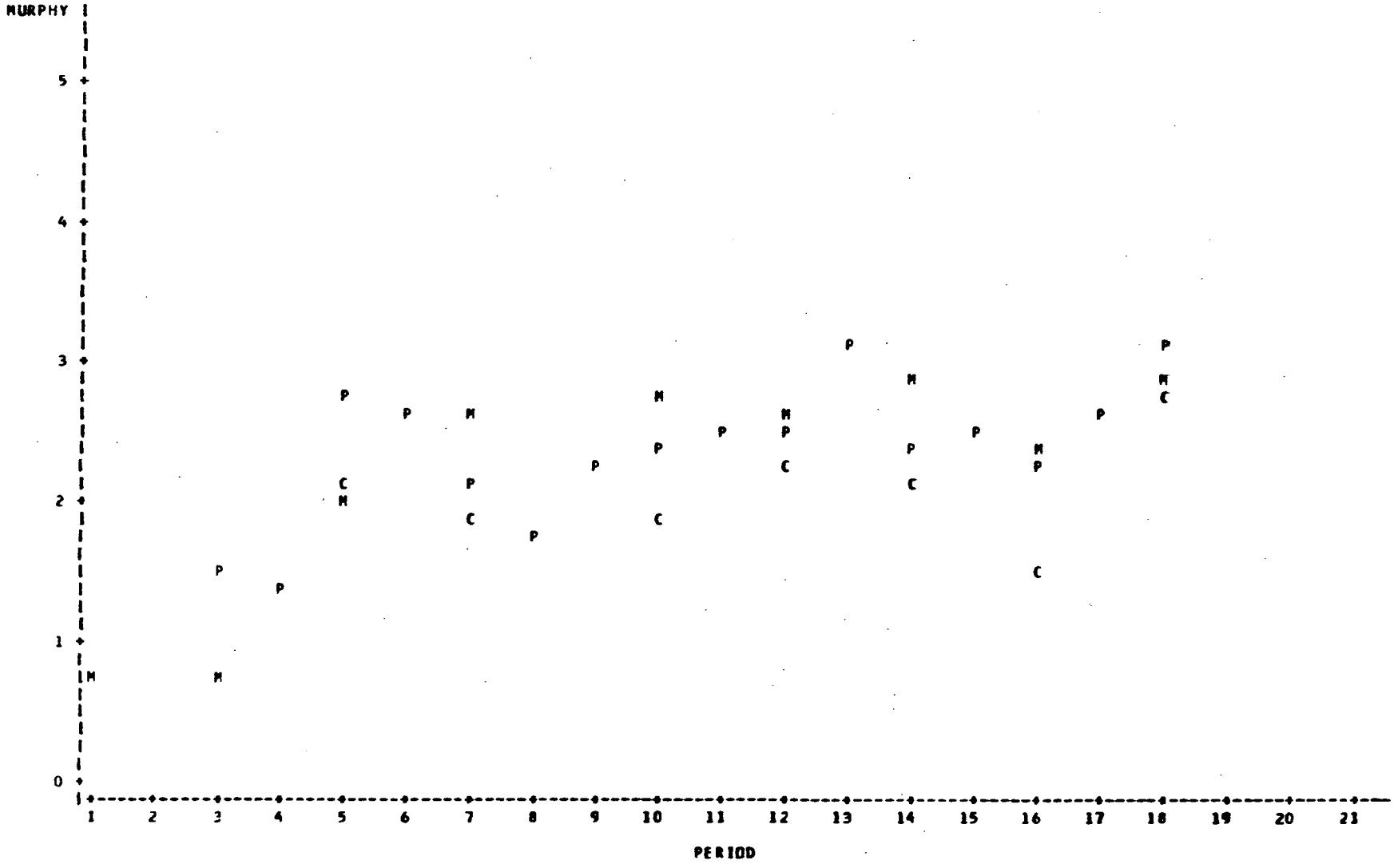
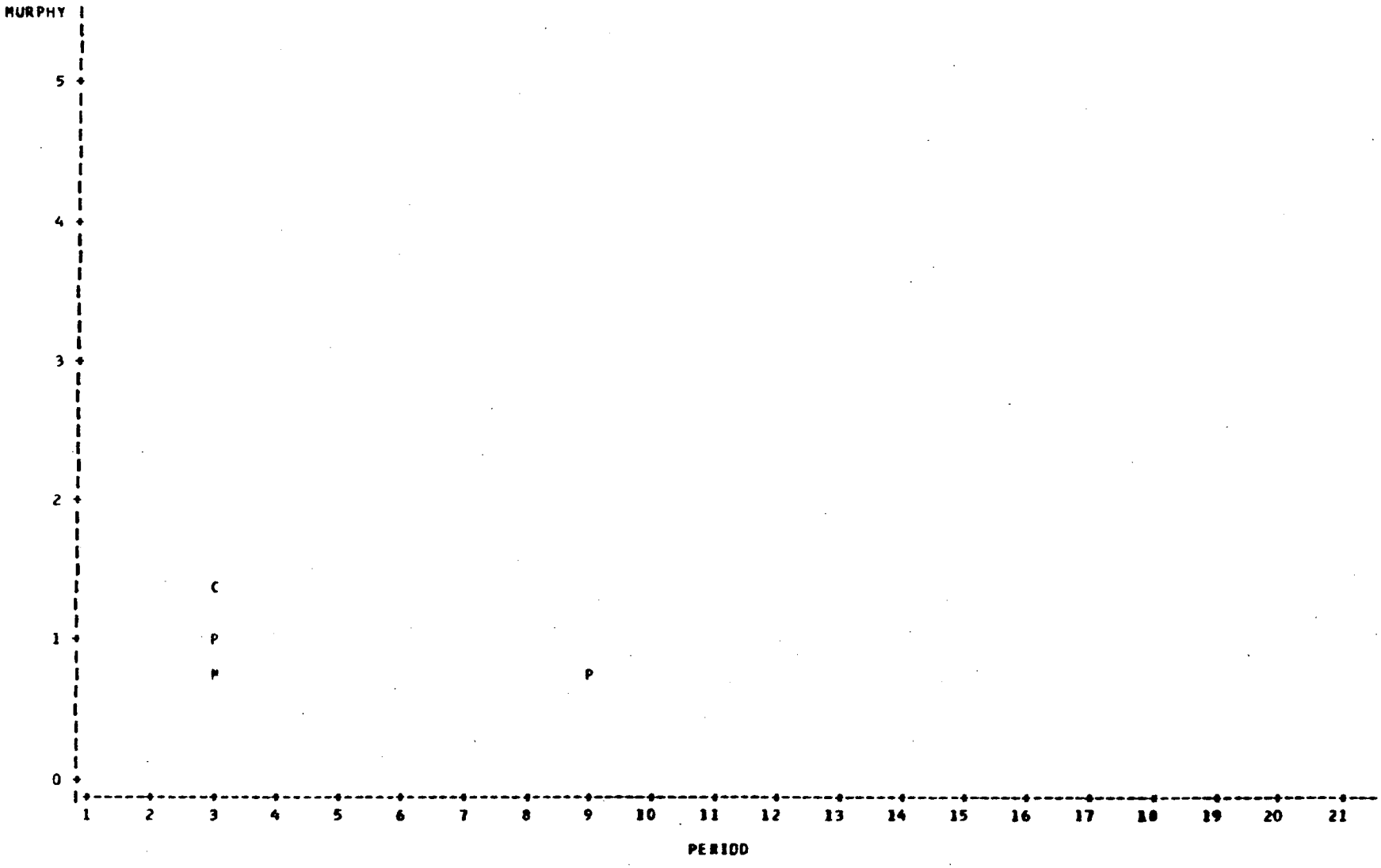


LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 18

GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=MIDDONTIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF PERIOD*PLAAT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF PERIOD*BAKWTR LEGEND: A = 1 OBS , B = 2 OBS , ETC



LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976

GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=ICTALURIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
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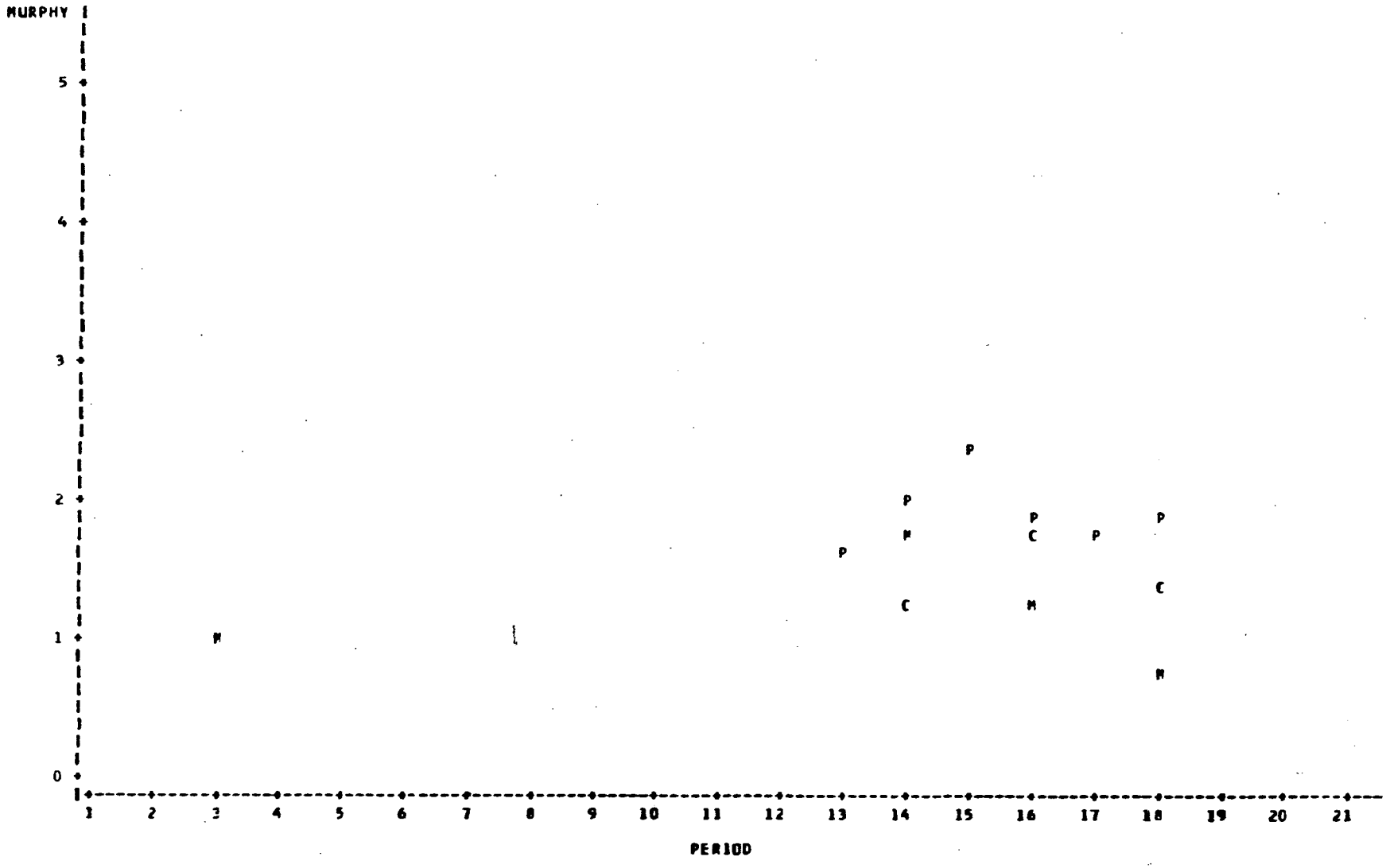

LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 20
GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=PERCICHTHYIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF PERIOD*COMER LEGEND: SYMBOL USED IS CHARACTER C
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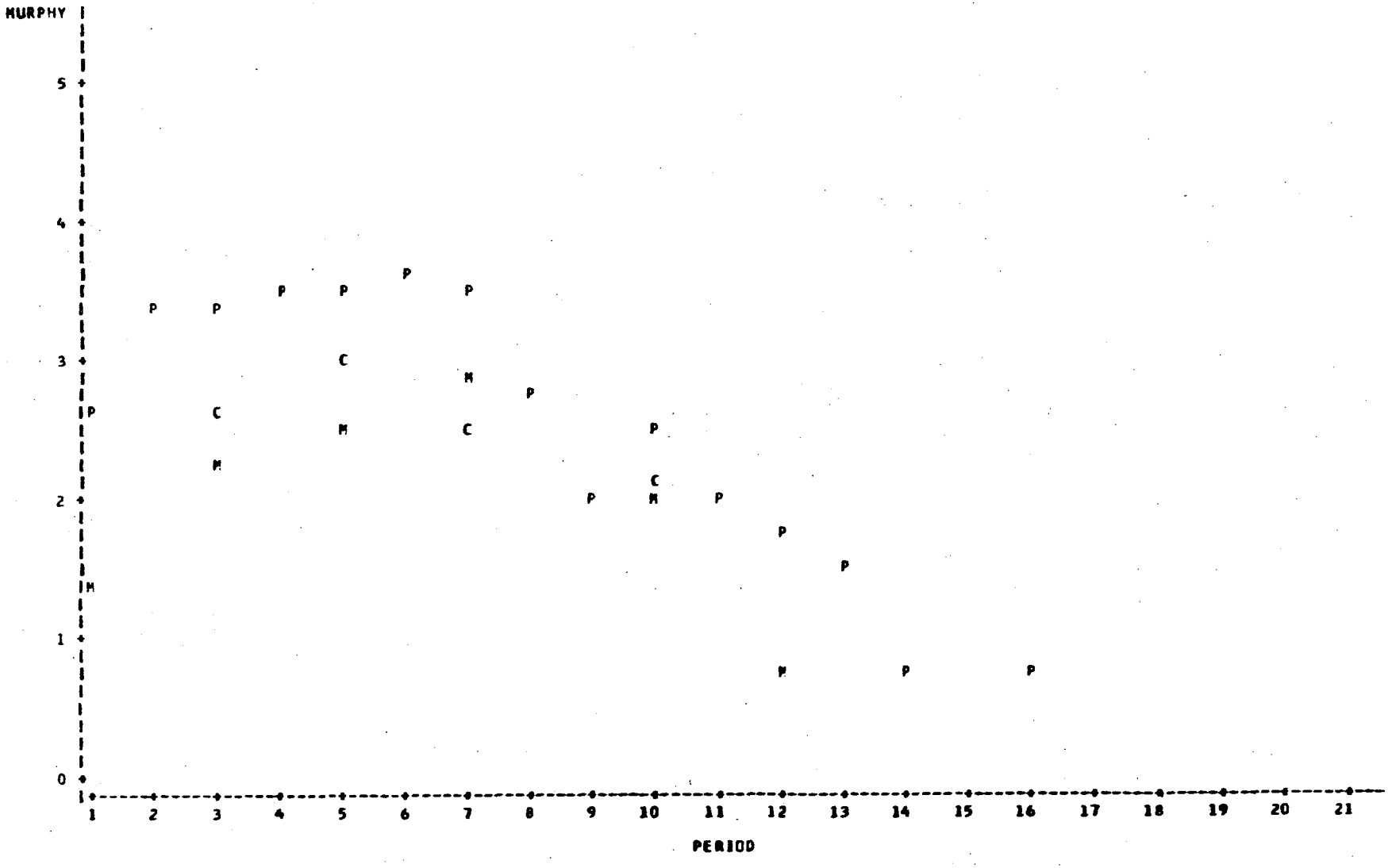

LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=PERCIDAE

PLOT OF PERIOD*MURPHY LEGEND: SYMBOL USED IS CHARACTER M
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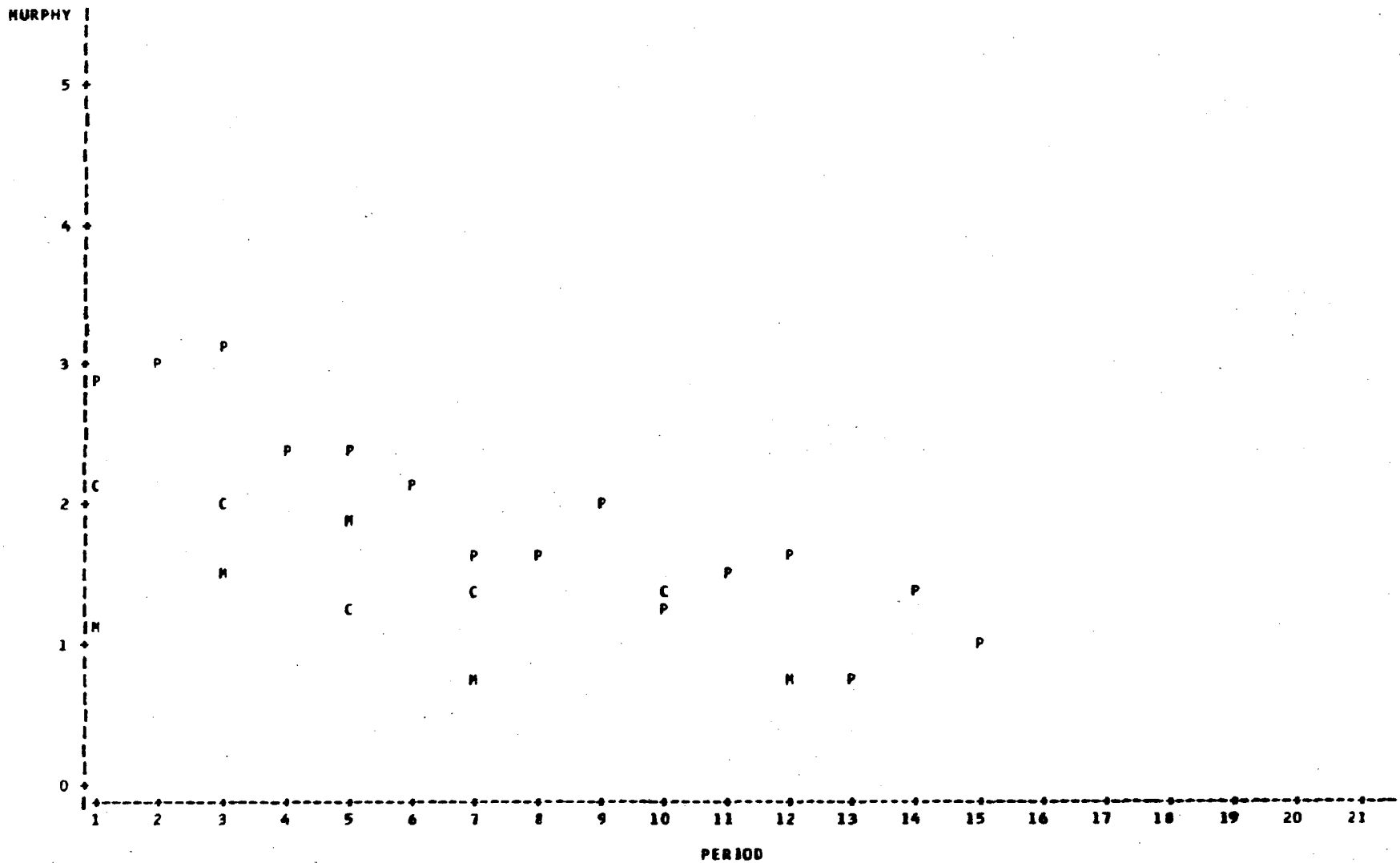

LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976 18:52 FRIDAY, APRIL 8, 1977 24

GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=SCIAENIDAE

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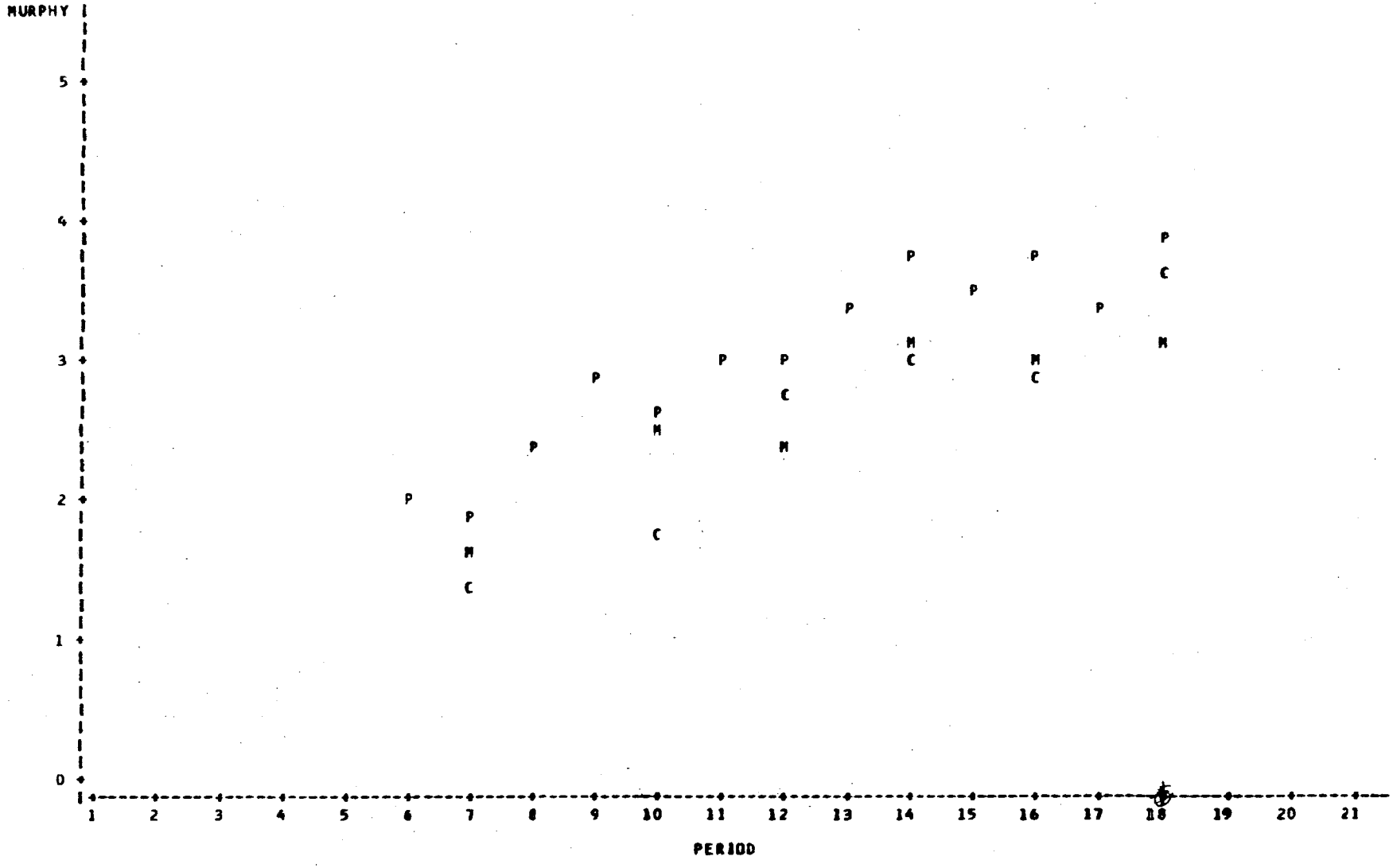

LOG(BASE-10) DENSITIES (#/1000-M3) OF LARVAL FISH AND EGGS AT FOUR
TRANSECTS AT BELLEFONTE NUCLEAR SITE 1976
GEAR=1/2M SQ OBLQ TOW NET .5MM TAXON=UNIDENTIFIED FISH

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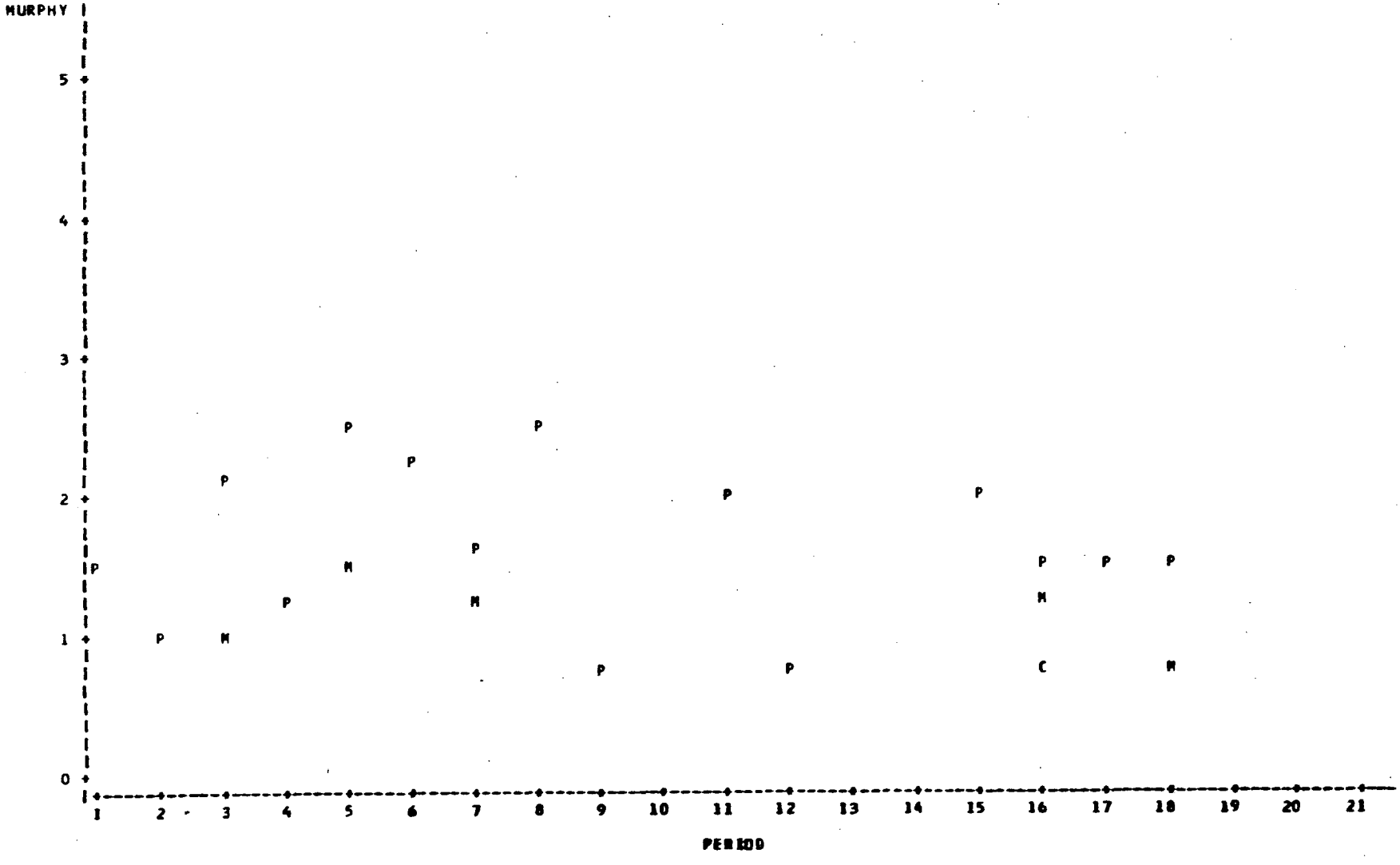

ATTACHMENT 5.3.1.2-2B
TENNESSEE VALLEY AUTHORITY
TVA DATA SERVICES BRANCH
SUMMARY OF TVA LARVAL FISH INVESTIGATIONS
1983

Tennessee Valley Authority
TVA Data Services Branch

Summary of TVA Larval Fish Investigations
(49 pages: Entire document)

1983

SUMMARY OF TVA LARVAL

FISH INVESTIGATIONS

PRODUCED BY

DATA MANAGEMENT SECTION

OF

DATA SERVICES BRANCH

PREFACE

This is a brief summary of larval fish collections made by the Tennessee Valley Authority during the course of its larval fish sampling program (1971 - present). The purpose of this document is to serve as a ready reference to the computerized data base and may be useful in developing proposals, planning studies or casual browsing. However, during the development of the larval fish program, considerable evolution has taken place in experimental design, taxonomy and gear development. In addition, all data within a given summary are lumped together regardless of data quality, station location, depth sampled or gear type used. For these reasons users are cautioned against using the summaries for analytical purposes. If a more detailed analysis is needed, contact Jack Tuberville of Data Services Branch for a more specific analysis.

June 1983

TABLE OF CONTENTS

Site Sampled	Years
Allen Steam Plant	1975
Bellefonte Nuclear Plant	1975-1980
Brown Corners Steam Plant	1978
Browns Ferry Nuclear Plant	1971-1980
Bull Run Steam Plant	1975-1976
Calico Bend Nuclear Site	1978
Chalk Creek Steam Plant	1978
Chickamauga Dam Passage Research Project	1976
Clinch River Breeder Nuclear Site	1975
Coffee Landing Steam Plant	1978
Colbert Steam Plant	1975
Courtland Nuclear Site	1976-1977
Cumberland Steam Plant	1975-1976
Gallatin Steam Plant	1975
Hardin Landing Steam Plant	1978
Hiwassee Drift Research Project	1976
John Sevier Steam Plant	1975-1977
Johnson Bend Nuclear Site	1976
Kingston Steam Plant	1975
Little Bear Creek Research Project	1976-1978
Little Cypress Steam Plant	1978

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TABLE OF CONTENTS (cont)

Site Sampled	Years
Lowe Branch Nuclear Site	1978
Murphy Hill Coal Gassification	1982
New Johnsonville Steam Plant	1975
Normandy Research Project	1976-1978
Old Hickory Research Project	1977-1978
ORNL White Creek Study	1979
Paradise Steam Plant	1975
Phipps Bend Nuclear Site	1975-1976
Raccoon Mountain Pumped Storage	1977-1981
Saltillo Nuclear Site	1975
Sequoyah Nuclear Plant	1973-1977; 1979-1982
Shawnee Steam Plant	1975
Smith Bend Nuclear Site	1978
Town Creek Nuclear Site	1976-1977
Watts Bar Dam Passage Research Project	1976
Watts Bar Nuclear Plant	1976-1979
Watts Bar Steam Plant	1975
Widows Creek Steam Plant	1975
Wolftever Research Project	1976
Yellow Creek Nuclear Plant	1975-1976; 1979-1980

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TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON
EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED
*** AT BELLEFONTE NUCLEAR PLANT, 1975 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	03/26/75	16	1878	12.0	1M CONICAL PUSH NET .79MM	343	98751
2	04/01/75	41	4142	12.5	1/2M CON. STAT. NET .79MM	148	4778
3	04/07/75	66	7393	12.0	1/2MYOYO NET .79MM	24	1016
4	04/15/75	64	6495	13.2	1M YOYO NET .79MM	6	777
5	04/21/75	83	8805	15.1	1.37M SQ VERT. NET .79MM	223	14745
6	04/28/75	60	6145	18.8	FISH PUMP 360GPM .79MM	369	3212
7	05/05/75	83	8245	20.1		----	-----
8	05/13/75	83	7670	21.5		1313	123E3
9	05/19/75	102	9989	22.0			
10	05/28/75	74	6016	22.0			
11	06/02/75	89	7402	23.0			
12	06/09/75	85	7912	23.4			
13	06/17/75	24	2850	25.4			
14	06/23/75	75	6262	26.5			
15	07/01/75	98	8612	27.0			
16	07/06/75	63	5054	26.8			
17	07/14/75	76	6888	27.3			
18	07/21/75	66	4751	26.8			
19	07/28/75	68	6771	27.5			
		----	-----				
		1313	123E3				

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT *** BELLEFONTE NUCLEAR PLANT, 1975 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
___FISH EGGS___																					
UNIDENT FISH EGGS	2998	3.93		+	+	+	+	+	+	+	+	+							+		
CLUPEID EGGS	53	0.07			+	+		+													
ALOSA SP. (EGGS)	1	T														+					
ALOSA CHRYSOCHLORIS (EGGS)	38	0.05									+	+									
CYPRINID EGGS	1	T									+										
CATOSTOMID EGGS	26	0.03		+																	
APLODINOTUS GRUNNIENS (EGGS)	73219	95.92						+	+	+	+	+	+	+	+	+	+	+	+	+	+
TOTAL	76336	100																			
___FISH LARVAE___																					
UNIDENT FISH LARVAE	483	0.87			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+
POLYODON SPATHULA	15	0.03			+	+	+	+													
LEPISOSTEUS SP.	56	0.10									+										
CLUPEIDAE	35552	64.22		+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ALOSA CHRYSOCHLORIS	622	1.12					+	+	+	+	+	+	+	+	+						
DOROSOMA SP.	6571	11.87		+			+	+	+	+	+	+	+	+	+	+	+	+			
DOROSOMA PETENENSE	20	0.04											+	+		+		+	+	+	+
HIODON TERGISUS	35	0.06				+	+		+	+	+										
CYPRINIDAE	1832	3.31			+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
CYPRINUS CARPIO	412	0.74			+				+	+	+	+	+	+	+	+	+	+			
NOTEMIGONUS CRYSOLEUCAS	1	T									+										
CATOSTOMIDAE	3964	7.16		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
MINYTREMA MELANOPS	2	T									+										
ICTALURUS FURCATUS	14	0.03												+			+	+	+		
ICTALURUS PUNCTATUS	170	0.31											+	+	+	+	+	+	+	+	+
PYLODICTIS OLIVARIS	1	T																	+		
GAMBUSIA AFFINIS	2	T																+		+	
MORONE SP.	308	0.56				+	+	+	+	+	+	+	+	+							+
CENTRARCHIDAE	23	0.04								+	+		+								
MIXED SUNFISHES	14	0.03							+			+									
LEPOMIS SP.	628	1.13							+	+	+	+	+	+	+	+	+	+	+	+	+
LEPOMIS MACROCHIRUS	18	0.03															+		+		
MICROPTERUS SP.	5	0.01											+								+
POMOXIS SP.	22	0.04			+		+	+	+	+		+					+				
PERCIDAE	11	0.02			+					+	+	+									
UNIDENT DARTER (NOT P. CAPRODES	6	0.01									+		+								
PERCINA CAPRODES	696	1.26	+	+	+	+	+	+	+	+	+	+	+	+							
STIZOSTEDION SP.	1	T										+									
STIZOSTEDION CANADENSE	48	0.09		+	+	+	+														
APLODINOTUS GRUNNIENS	3822	6.90							+	+	+	+	+	+	+	+	+	+	+	+	+
LABIDESTHES SICCULUS	2	T																			+
TOTAL	55356	100																			

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1975 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	483	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POLYODON SPATHULA	.	.	.	.	.	.	.	2	3	9	1	.	.	.	.	.	.	.
LEPISOSTEUS SP.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	54	.
CLUPEIDAE	4	.	57	1800	7378	5128	4706	4584	3322	2568	1678	1766	1132	764	404	258	2	.
ALOSA CHRYSOCHLORIS	.	.	232	279	110	1	.	.	.	.	.	.	.	.	.	.	.	.
DOROSOMA SP.	41	.	18	2683	3747	81	1	1	.	.	.	.	.	.	.	.	.	.
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	20	.
HIODON TERGISUS	.	.	.	.	.	.	.	.	1	10	15	4	1	2	.	2	.	.
CYPRINIDAE	.	6	77	42	481	832	191	89	55	27	13	4	2	.	3	4	5	.
CYPRINUS CARPIO	.	.	.	.	12	126	244	27	2	.	1	.	.	.	.	.	.	.
NOTEMIGONUS CRYSOLEUCAS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
CATOSTOMIDAE	.	.	.	.	1	120	1457	2309	84	4	1	.	.	1	.	1	.	.
MINYTREMA MELANOPS	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	13	.	.
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	1	.	.	.	3	3	13	142	8	.
PYLODICTIS OLIVARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
GAMBUSIA AFFINIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
MORONE SP.	.	.	45	215	33	3	5	3	2	1	.	.	.	1	.	.	.	.
CENTRARCHIDAE	.	.	.	1	10	6	4	1	.	.	.	.	.	.	.	1	.	.
MIXED SUNFISHES	.	.	.	.	7	7	.	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	3	1	110	240	134	46	30	12	1	2	5	5	2	5	32	.
LEPOMIS MACROCHIRUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10	8	.
MICROPTERUS SP.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	2	1	.
POMOXIS SP.	.	.	.	1	19	1	.	.	.	.	.	.	.	.	.	.	1	.
PERCIDAE	1	.	.	.	.	3	5	1	1	.	.	.	.	.	.	.	.	.
UNIDENT DARTER (NOT P. C	.	.	.	.	.	.	.	6	.	.	.	.	.	.	.	.	.	.
PERCINA CAPRODES	.	.	.	1	.	26	201	347	114	3	1	.	2	.	.	.	.	.
STIZOSTEDION SP.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
STIZOSTEDION CANADENSE	.	.	.	.	.	18	28	1	1	.	.	.	.	.	.	.	.	.
APLODINOTUS GRUNNIENS	.	.	164	143	1206	1035	666	355	174	48	20	6	4	.	.	.	.	.
LABIDESTHES SICCULUS	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE I. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON
EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED
*** AT BELLEFONTE NUCLEAR PLANT, 1976 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	03/22/76	48	5721	13.4	1/2M SQ OBLQ TOW NET .5MM	483	86351
2	03/29/76	32	4099	14.9	FISH PUMP 360GPM .5MM	220	1056
3	04/05/76	48	5923	15.3			
4	04/12/76	32	4100	17.1		703	87407
5	04/19/76	48	5826	19.9			
6	04/26/76	26	4253	19.0			
7	05/03/76	42	5805	19.2			
8	05/10/76	32	4145	19.6			
9	05/17/76	38	4001	20.0			
10	05/24/76	48	5731	21.1			
11	06/01/76	32	4026	22.9			
12	06/07/76	46	5764	22.5			
13	06/14/76	32	4022	24.9			
14	06/21/76	43	5165	24.1			
15	06/28/76	32	3915	25.1			
16	07/06/76	46	5583	23.6			
17	07/12/76	32	3823	25.9			
18	07/19/76	46	5504	26.2			
		703	87407				

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1976 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
FISH EGGS																				
UNIDENT FISH EGGS	20045	11.38	+	+	+	+	+	+	+	+	+	+		+	+		+			+
CATOSTOMID EGGS	1	T											+							
APLODINOTUS GRUNNIENS (EGGS)	156103	88.62					+	+	+	+	+	+	+	+	+	+	+	+	+	+
TOTAL	176149	100																		
FISH LARVAE																				
UNIDENT FISH LARVAE	311	0.16	+	+	+	+	+	+	+	+	+		+	+	+		+	+	+	+
POLYODON SPATHULA	2	T			+															
CLUPEIDAE	178911	90.63		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
DOROSOMA SP.	1	T															+			
DOROSOMA CEPEDIANUM	1	T															+			
DOROSOMA PETENENSE	344	0.17														+	+	+	+	+
HIODON TERGISUS	8	T			+						+									
CYPRINIDAE	2071	1.05				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PIMEPHALES GR	6	T							+			+				+				
ATHERINOIDES GR	67	0.03							+			+				+	+			
CYPRINUS CARPIO	197	0.10				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
NOTEMIGONUS CRYSOLEUCAS	25	0.01					+	+	+							+		+		
NOTROPIS SP.	9	T			+		+													
NOTROPIS ATHERINOIDES	68	0.03	+		+		+	+			+	+		+			+			+
NOTROPIS VOLUCELLUS	27	0.01	+				+		+		+	+			+	+		+		+
CATOSTOMIDAE	403	0.20	+	+	+	+	+	+	+		+	+	+	+			+	+		+
ICTIOBINAE	6	T										+								
MINYTREMA MELANOPS	2	T									+									
ICTALURIDAE	1	T																+		
ICTALURUS SP.	1	T															+			
ICTALURUS FURCATUS	20	0.01													+	+	+		+	
ICTALURUS PUNCTATUS	105	0.05			+										+	+	+	+	+	+
PYLODICTIS OLIVARIS	1	T																		+
MORONE SP.	164	0.08								+	+		+	+	+			+		
MORONE MISSISSIPPIENSIS	1	T						+												
MORONE (NOT SAXATILIS)	4321	2.19	+	+	+	+	+	+	+		+	+	+			+				
CENTRARCHIDAE	7	T								+							+		+	+
LEPOMIS OR POMOXIS	47	0.02						+	+	+	+		+							
LEPOMIS SP.	2140	1.08						+	+	+	+	+	+	+	+	+	+	+	+	+
LEPOMIS MACROCHIRUS	4	T													+			+		+
LEPOMIS MICROLOPHUS	1	T									+									
MICROPTERUS (NOT DOLOMIEUI)	12	0.01				+					+	+		+				+		
POMOXIS SP.	168	0.09	+	+	+	+	+	+	+	+	+	+	+	+	+			+		
POMOXIS ANNULARIS	3	T											+							
PERCIDAE	4	T			+										+					
UNIDENT PERCID (NOT STIZOSTEDIO	809	0.41	+	+	+	+	+	+	+	+	+	+	+	+		+	+			
STIZOSTEDION SP.	75	0.04	+	+	+	+	+													
APLODINOTUS GRUNNIENS	7022	3.56						+	+	+	+	+	+	+	+	+	+	+	+	+
LABIDESTHES SICCULUS	37	0.02								+		+	+	+		+		+		+
TOTAL	197402	100																		

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TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT *** BELLEFONTE NUCLEAR PLANT, 1976 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1976 ***

TAXON	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
		SIZE CLASS GROUPINGS (MM)																
UNIDENT FISH LARVAE	283	.	4	4	11	8	1	.	.	.	.	.	.	.	.	.	.	.
POLYODON SPATHULA	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.
CLUPEIDAE	.	10	2435	31888	74684	23136	14360	10310	6230	5665	2960	2286	2069	1328	745	791	6	.
DOROSOMA SP.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	200	144
HIODON TERGISUS	.	.	.	.	.	.	.	.	1	3	2	.	.	1	1	.	.	.
CYPRINIDAE	.	1	477	257	547	299	130	94	75	97	55	10	7	5	7	6	4	.
PIMEPHALES GR	.	.	.	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.
ATHERINOIDES GR	.	.	.	2	28	17	7	3	5	4	1	.	.	.	.	.	.	.
CYPRINUS CARPIO	.	.	.	.	12	105	75	3	2	.	.	.	.	.	.	.	.	.
NOTEMIGONUS CRYSOLEUCAS	.	.	.	.	8	9	1	2	3	1	.	.	1	.	.	.	.	.
NOTROPIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
NOTROPIS ATHERINOIDES	.	.	.	.	.	.	.	.	.	4	10	2	5	8	7	19	.	13
NOTROPIS VOLUCELLUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	26
CATOSTOMIDAE	.	.	.	1	.	12	242	137	7	2	1	.	.	1	.	.	.	.
ICTIOBINAE	.	.	.	.	.	.	6	.	.	.	.	.	.	.	.	.	.	.
MINYTREMA MELANOPS	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
ICTALURIDAE	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
ICTALURUS SP.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	17	1	.
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	87	11	2
PYLODICTIS OLIVARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
MORONE SP.	.	.	49	86	13	2	2	4	4	3	.	1	.	.	.	.	.	.
MORONE MISSISSIPPIENSIS	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
MORONE (NOT SAXATILIS)	.	1	1018	3189	81	15	8	4	3	2	.	.	.	.	.	.	.	.
CENTRARCHIDAE	.	.	.	1	1	.	1	3	1	.	.	.	.	.	.	.	.	.
LEPOMIS OR POMOXIS	.	.	.	4	16	27	.	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	20	725	844	290	115	62	7	13	8	2	5	8	17	21	2
LEPOMIS MACROCHIRUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
LEPOMIS MICROLOPHUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
MICROPTERUS (NOT DOLOMIE	.	.	.	.	.	.	4	1	1	.	.	.	.	.	.	1	3	2
POMOXIS SP.	.	.	.	10	123	28	5	.	.	.	.	.	.	.	.	.	.	2
POMOXIS ANNULARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
PERCIDAE	.	.	.	.	.	2	1	1	.	.	.	.	.	.	.	.	.	.
UNIDENT PERCID (NOT STIZ	.	.	.	.	.	30	195	454	121	6	2	.	1	.	.	.	.	.
STIZOSTEDION SP.	.	.	.	.	1	47	24	1	1	.	1	.	.	.	.	.	.	.
APLODINOTUS GRUNNIENS	21	90	1475	927	2861	693	498	298	121	29	6	1	2	.	.	.	.	.
LABIDESTHES SICCULUS	.	.	.	1	2	1	1	2	4	3	3	5	2	5	1	4	3	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON
EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED
*** AT BELLEFONTE NUCLEAR PLANT, 1977 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	03/15/77	32	4877	13.3	1/2M SQ OBLQ TOW NET .5MM	398	60746
2	03/29/77	30	3809	14.5		----	-----
3	04/11/77	32	5106	15.7		398	60746
4	04/25/77	32	5094	19.7			
5	05/10/77	34	5324	23.6			
6	05/23/77	34	5250	25.3			
7	06/06/77	34	5526	25.6			
8	06/20/77	34	5513	26.8			
9	07/05/77	34	5262	28.9			
10	07/18/77	34	5187	30.1			
11	08/01/77	34	4568	27.4			
12	08/15/77	34	5231	28.6			
		----	-----				
		398	60746				

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TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1977 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12
FISH EGGS														
UNIDENT FISH EGGS	8	0.02	+			+								
APLODINOTUS GRUNNIENS (EGGS)	42671	99.98				+	+	+	+	+	+	+	+	+
TOTAL	42679	100												
FISH LARVAE														
UNIDENT FISH LARVAE	38	0.01					+	+	+				+	
POLYODON SPATHULA	11	T			+	+								
LEPISOSTEUS SP.	1	T						+						
CLUPEIDAE	338198	93.13			+	+	+	+	+	+	+	+	+	+
ALOSA CHRYSOCHLORIS	2	T					+							
DOROSOMA CEPEDIANUM	8	T							+					
HIODON TERGISUS	30	0.01			+	+	+	+						
CYPRINIDAE	290	0.08				+	+	+	+	+				
PIMEPHALES GR	56	0.02						+	+	+	+	+		+
ATHERINOIDES GR	1784	0.49					+	+	+	+	+	+	+	+
VOLUCELLUS-BUCHANANI GR	4	T			+				+	+		+		
CYPRINUS CARPIO	44	0.01			+		+	+	+	+				
NOTEMIGONUS CRYSOLEUCAS	15	T					+	+	+					
NOTROPIS ATHERINOIDES	8	T						+				+		
CATOSTOMIDAE	5	T					+		+					
ICTIOBINAE	1425	0.39		+	+	+	+	+						
MINYTREMA MELANOPS	1	T					+							
ICTALURUS FURCATUS	6	T							+		+			
ICTALURUS NATALIS	1	T						+						
ICTALURUS PUNCTATUS	81	0.02							+	+	+	+		
MORONE SP.	384	0.11			+	+	+	+	+	+				
MORONE (NOT SAXATILIS)	621	0.17		+	+	+	+	+	+					
LEPOMIS OR POMOXIS	486	0.13			+	+	+	+						
LEPOMIS SP.	12126	3.34	+	+		+	+	+	+	+	+	+	+	+
MICROPTERUS (NOT DOLOMIEUI)	1	T						+						
POMOXIS SP.	64	0.02			+	+	+	+	+					
UNIDENT PERCID (NOT STIZOSTEDIO	238	0.07	+	+	+	+	+	+	+					
STIZOSTEDION SP.	29	0.01		+	+	+								
APLODINOTUS GRUNNIENS	7169	1.97				+	+	+	+	+	+	+	+	+
LABIDESTHES SICCULUS	32	0.01						+	+	+				
TOTAL	363768	100												

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1977 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	.	.	2	1	13	18	1	2	1	.	.	.	.	.	.	.	.	.
POLYODON SPATHULA	.	.	.	.	.	.	.	.	2	7	1	.	1	.	.	.	.	.
LEPISOSTEUS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
CLUPEIDAE	1	.	213	9910	123016	58454	29426	30930	22949	22559	15373	9891	6444	4350	2367	2208	.	2
ALOSA CHRYSOCHLORIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.
HIODON TERGISUS	.	.	.	.	.	1	.	.	.	8	3	1	5	6	1	1	4	.
CYPRINIDAE	.	.	6	26	89	136	15	13	2	1	2	.	.	.	.	.	.	.
PIMEPHALES GR	.	.	.	5	21	17	10	1	1	.	1	.	.	.	.	.	.	.
ATHERINOIDES GR	.	.	83	272	651	474	162	55	28	19	16	5	9	1	.	2	6	1
VOLUCELLUS-BUCHANANI GR	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	3
CYPRINUS CARPIO	.	.	.	.	2	7	25	9	.	1	.	.	.	.	.	.	.	.
NOTEMIGONUS CRYSOLEUCAS	.	.	.	.	2	.	.	.	.	5	1	.	2	.	.	4	1	.
NOTROPIS ATHERINOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	5	.	1
CATOSTOMIDAE	.	.	.	.	.	.	1	2	.	1	1	.	.	.	.	.	.	.
ICTIOBINAE	.	.	.	.	1	117	794	242	256	14	.	.	.	.	.	.	.	.
MINYTREMA MELANOPS	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.
ICTALURUS NATALIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	62	17	.
MORONE SP.	.	.	.	.	2	219	78	36	11	15	10	6	3	.	1	.	2	1
MORONE (NOT SAXATILIS)	.	.	14	305	272	30	.	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS OR POMOXIS	.	.	2	13	325	142	4	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	3	1167	6693	2359	983	537	150	68	7	26	3	5	30	64	31
MICROPTERUS (NOT DOLOMIE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
POMOXIS SP.	.	.	.	.	.	33	18	5	4	1	.	.	.	1	.	1	.	1
UNIDENT PERCID (NOT STIZ	.	.	.	.	.	5	57	114	41	14	2	2	1	.	1	1	.	.
STIZOSTEDION SP.	.	.	.	.	.	6	11	5	3	.	.	1	2	1	.	.	.	.
APLODINOTUS GRUNNIENS	.	30	485	838	3644	1417	511	168	51	18	5	2	.	1	.	.	.	.
LABIDESTHES SICCULUS	.	.	.	.	1	.	1	1	1	3	7	8	1	5	2	1	1	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED
*** AT BELLEFONTE NUCLEAR PLANT, 1978 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP
1	03/30/78	18	2923	14.1
2	04/13/78	18	2763	17.6
3	04/27/78	18	2701	.
4	05/11/78	18	2687	19.0
5	05/23/78	18	2631	21.5
6	06/08/78	18	2684	24.5
7	06/22/78	18	2695	27.0
8	07/06/78	18	2757	29.4
9	07/20/78	18	2733	28.7
10	08/03/78	18	2787	28.9
11	08/17/78	18	2742	27.6
12	08/29/78	18	2693	27.6
		216	32796	

GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1/2M SQ OBLQ TOW NET .5MM	216	32796
	216	32796

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1978 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12
FISH EGGS														
UNIDENT FISH EGGS	14	0.05			+		+							
APLODINOTUS GRUNNIENS (EGGS)	28379	99.95			+	+	+	+	+	+	+	+	+	+
TOTAL	28393	100												
FISH LARVAE														
UNIDENT FISH LARVAE	49	0.11		+		+	+	+	+	+		+	+	
CLUPEIDAE	36264	79.52		+	+	+	+	+	+	+		+	+	
DOROSOMA CEPEDIANUM	2	T						+						
HIODON TERGISUS	2	T		+			+							
CYPRINIDAE	237	0.52			+	+	+	+	+	+	+	+	+	+
CYPRINUS CARPIO	11	0.02					+	+	+					
NOTEMIGONUS CRYSOLEUCAS	2	T					+	+						
NOTROPIS SP.	2	T						+				+		
NOTROPIS ATHERINOIDES	8	0.02				+						+	+	
CATOSTOMIDAE	377	0.83		+	+	+	+							
MINYTREMA MELANOPS	7	0.02				+								
ICTALURUS FURCATUS	2	T								+				
ICTALURUS PUNCTATUS	104	0.23						+	+	+		+	+	
PYLODICTIS OLIVARIS	1	T								+				
MORONE SP.	42	0.09				+	+	+	+					
MORONE (NOT SAXATILIS)	400	0.88		+	+	+	+	+						
AMBLOPLITES RUPESTRIS	1	T						+						
LEPOMIS SP.	343	0.75			+		+	+	+	+	+	+	+	
MICROPTERUS (NOT DOLOMIEUI)	1	T							+					
POMOXIS SP.	185	0.41		+	+	+	+	+	+					
UNIDENT PERCID (NOT STIZOSTEDIO	63	0.14		+	+	+	+	+						
STIZOSTEDION SP.	2	T		+										
APLODINOTUS GRUNNIENS	7501	16.45			+	+	+	+	+	+	+	+	+	+
TOTAL	45696	100												

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1978 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	.	.	6	26	11	1	4	1	.	.	.	.	.	.	.	.	.	.
CLUPEIDAE	.	.	186	5043	12712	12659	3124	1079	419	365	255	97	125	79	82	39	.	.
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
HIODON TERGISUS	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.
CYPRINIDAE	.	.	4	82	98	44	4	1	2	2	.	.	.	.	.	.	.	.
CYPRINUS CARPIO	.	.	.	.	.	3	3	4	1	.	.	.	.	.	.	.	.	.
NOTEMIGONUS CRYSOLEUCAS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
NOTROPIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
NOTROPIS ATHERINOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8
CATOSTOMIDAE	.	.	.	.	.	4	161	179	28	4	1	.	.	.	.	.	.	.
MINYTREMA MELANOPS	.	.	.	.	.	.	.	.	.	.	1	6	.	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	62	40	1
PYLODICTIS OLIVARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
MORONE SP.	.	.	.	.	.	1	20	5	7	2	3	3	.	.	.	1	.	.
MORONE (NOT SAXATILIS)	.	.	69	261	49	21	.	.	.	.	.	.	.	.	.	.	.	.
AMBLOPLITES RUPESTRIS	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	1	73	91	41	11	5	2	5	.	2	3	11	58	32	8
MICROPTERUS (NOT DOLOMIE	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
POMOXIS SP.	.	.	.	2	76	56	16	7	9	6	3	.	.	2	.	2	6	.
UNIDENT PERCID (NOT STIZ	.	.	.	.	.	2	19	30	9	3	.	.	.	.	.	.	.	.
STIZOSTEDION SP.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.
APLODINOTUS GRUNNIENS	1E3	5	379	1925	3316	515	130	87	56	24	4	2	.	.	.	.	.	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED *** AT BELLEFONTE NUCLEAR PLANT, 1979 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	03/14/79	18	2720	11.2	172M SQ OBLQ TOW NET .5MM	234	33299
2	03/28/79	18	2670	12.8		---	-----
3	04/11/79	18	2532	14.6		234	33299
4	04/25/79	18	2554	21.0			
5	05/09/79	18	2480	23.5			
6	05/23/79	18	2466	23.0			
7	06/06/79	18	2492	24.5			
8	06/20/79	18	2423	26.2			
9	07/05/79	18	2474	26.5			
10	07/18/79	18	2552	28.0			
11	07/31/79	18	2689	25.5			
12	08/14/79	18	2623	26.8			
13	08/28/79	18	2624	27.1			
		---	-----				
		234	33299				

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1979 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12	13
FISH EGGS															
UNIDENT FISH EGGS	2334	4.34		+	+	+	+	+	+	+	+	+	+	+	+
CYPRINID EGGS	107	0.20					+	+	+	+		+			
APLODINOTUS GRUNNIENS (EGGS)	51282	95.46					+	+	+	+	+	+	+	+	+
TOTAL	53723	100													
FISH LARVAE															
UNIDENT FISH LARVAE	44	0.13			+	+	+	+	+			+	+		
POLYODON SPATHULA	2	0.01				+									
CLUPEIDAE	24839	71.50			+	+	+	+	+	+	+	+	+	+	+
DOROSOMA PETENENSE	9	0.03										+	+	+	
HIODON TERGISUS	18	0.05				+	+		+						
CYPRINIDAE	383	1.10				+	+	+	+	+	+	+	+	+	+
CAMPOSTOMA ANOMALUM	1	T								+					
CYPRINUS CARPIO	25	0.07				+		+	+	+			+		
HYBOPSIS AMBLOPS	1	T										+			
NOTROPIS ATHERINOIDES	2	0.01									+	+			
NOTROPIS VOLUCELLUS	1	T												+	
CATOSTOMIDAE	3286	9.46		+	+	+	+		+	+	+	+			
ICTALURUS FURCATUS	2	0.01								+					
ICTALURUS PUNCTATUS	77	0.22							+	+	+	+	+	+	
MORONE SP.	6	0.02						+		+		+			
MORONE (NOT SAXATILIS)	1022	2.94		+	+	+	+	+	+	+					
LEPOMIS SP.	48	0.14		+		+		+	+	+	+	+	+	+	
LEPOMIS MACROCHIRUS	1	T			+										
MICROPTERUS (NOT DOLOMIEUI)	1	T					+								
POMOXIS SP.	80	0.23				+	+	+	+	+					
PERCIDAE	1	T				+									
UNIDENT DARTER	233	0.67			+	+	+	+	+	+					
STIZOSTEDION CANADENSE	58	0.17		+	+	+									
APLODINOTUS GRUNNIENS	4600	13.24					+	+	+	+	+	+	+	+	+
TOTAL	34740	100													

T = LESS THAN 0.01 PERCENT COMPOSITION

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1979 ***

TAXON	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
	SIZE CLASS GROUPINGS (MM)																	
UNIDENT FISH LARVAE	9	.	6	17	6	3	2	.	1	.	.	.	.	.	.	.	.	.
POLYODON SPATHULA	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.
CLUPEIDAE	.	.	475	2865	1491	6933	2268	1228	419	141	97	1	6	1	4	9	.	.
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
HIODON TERGISUS	.	.	.	.	.	.	.	.	.	3	9	5	.	1	.	.	.	.
CYPRINIDAE	.	.	59	102	119	94	9	.	.	.	.	.	.	.	.	.	.	.
CAMPOSTOMA ANOMALUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
CYPRINUS CARPIO	.	.	.	.	3	5	13	1	3	.	.	.	.	.	.	.	.	.
HYBOPSIS AMBLOPS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
NOTROPIS ATHERINOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.
NOTROPIS VOLUCELLUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
CATOSTOMIDAE	.	.	.	.	2	113	1056	2037	78	.	.	.	.	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	73	3	.
MORONE SP.	.	.	.	.	.	.	3	1	1	.	1	.	.	.	.	.	.	.
MORONE (NOT SAXATILIS)	.	.	258	600	133	31	.	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	1	14	22	3	3	1	.	.	.	.	.	.	.	3	1
LEPOMIS MACROCHIRUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
MICROPTERUS (NOT DOLOMIE	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
POMOXIS SP.	.	.	.	14	42	19	1	1	.	.	.	.	.	.	.	.	.	3
PERCIDAE	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
UNIDENT DARTER	.	.	.	.	.	7	87	111	25	3	.	.	.	.	.	.	.	.
STIZOSTEDION CANADENSE	.	.	.	.	.	8	46	3	1	.	.	.	.	.	.	.	.	.
APLODINOTUS GRUNNIENS	.	5	1323	359	2445	279	111	22	22	15	10	5	1	1	.	.	.	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED
*** AT BELLEFONTE NUCLEAR PLANT, 1980 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	03/18/80	18	2670	10.4	1/2M SQ OBLQ TOW NET .5MM	206	29594
2	04/02/80	18	2563	13.6		---	-----
3	04/17/80	18	2592	15.3		206	29594
4	04/30/80	18	2575	16.9			
5	05/13/80	18	2552	16.3			
6	05/28/80	18	2624	.	DRVIN EGG & larvae Occ.		
7	06/11/80	18	2598	24.5			
8	06/25/80	18	2543	.			
9	07/08/80	18	2520	28.5			
10	07/22/80	8	1138	29.1			
11	08/06/80	18	2642	29.1			
12	08/20/80	18	2575	29.6			
		---	-----				
		206	29594				

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1980 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12
FISH EGGS														
UNIDENT FISH EGGS	922	1.44	+	+	+	+	+	+	+					
CYPRINID EGGS	2	T							+					
APLODINOTUS GRUNNIENS (EGGS)	63157	98.56			+	+	+	+	+	+	+	+	+	
TOTAL	64081	100												
FISH LARVAE														
UNIDENT FISH LARVAE	22	0.06			+	+		+		+		+		
POLYODON SPATHULA	4	0.01		+	+									
CLUPEIDAE	23139	64.93		+	+	+	+	+	+	+				
DOROSOMA SP.	1	T								+				
DOROSOMA CEPEDIANUM	2	0.01							+	+				
DOROSOMA PETENENSE	32	0.09							+	+	+		+	+
HIODON TERGISUS	81	0.23		+	+	+	+							
CYPRINIDAE	265	0.74			+	+	+	+	+	+	+	+	+	
CYPRINUS CARPIO	24	0.07					+	+	+	+				
NOTROPIS SP.	2	0.01							+			+		
NOTROPIS VOLUCELLUS	2	0.01												+
PIMEPHALES SP.	1	T											+	
CATOSTOMIDAE	1	T				+								
ICTIOBINAE	1418	3.98	+	+	+	+	+			+				
ICTALURUS FURCATUS	1	T							+					
ICTALURUS PUNCTATUS	74	0.21							+	+	+		+	+
PYLODICTIS OLIVARIS	2	0.01									+			
MORONE SP.	38	0.11					+	+	+	+				
MORONE (NOT SAXATILIS)	2253	6.32	+	+	+	+	+	+	+					
LEPOMIS SP.	181	0.51					+	+	+	+	+		+	+
LEPOMIS MACROCHIRUS	7	0.02								+	+		+	+
LEPOMIS MICROLOPHUS	1	T											+	
MICROPTERUS SALMOIDES	1	T							+					
POMOXIS SP.	68	0.19			+	+	+	+	+					
POMOXIS NIGROMACULATUS	2	0.01							+					
PERCIDAE	1	T				+								
UNIDENT DARTER	185	0.52		+	+	+	+	+	+					
PERCA FLAVESCENS	2	0.01			+									
STIZOSTEDION CANADENSE	77	0.22		+	+	+								
APLODINOTUS GRUNNIENS	7751	21.75				+	+	+	+	+	+	+	+	+
TOTAL	35638	100												

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** BELLEFONTE NUCLEAR PLANT, 1980 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	22	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POLYODON SPATHULA	.	.	.	.	.	.	.	.	.	3	1	.	.	.	.	.	.	.
CLUPEIDAE	.	.	1133	8072	10239	1960	506	502	298	170	120	44	37	25	8	23	.	.
DOROSOMA SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	21
HIODON TERGISUS	.	.	.	.	.	.	.	1	9	16	39	13	3	.	.	.	.	.
CYPRINIDAE	.	.	66	57	114	27	.	.	.	1	.	.	.	.	.	.	.	.
CYPRINUS CARPIO	1	.	.	.	3	4	13	3	.	.	.	.	.	.	.	.	.	.
NOTROPIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
NOTROPIS VOLUCELLUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
PIMEPHALES SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
CATOSTOMIDAE	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
ICTIOBINAE	1	.	.	.	2	50	549	779	36	1	.	.	.	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	61	7	4
PYLODICTIS OLIVARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
MORONE SP.	.	.	.	.	.	.	5	10	8	8	3	1	1	.	.	.	2	.
MORONE (NOT SAXATILIS)	.	.	1659	491	76	27	.	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	2	29	70	7	1	3	1	2	3	3	3	8	28	21	.
LEPOMIS MACROCHIRUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	6
LEPOMIS MICROLOPHUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
MICROPTERUS SALMOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
POMOXIS SP.	.	.	.	6	49	10	3	.	.	.	.	.	.	.	.	.	.	.
POMOXIS NIGROMACULATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
PERCIDAE	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
UNIDENT DARTER	.	.	.	.	.	28	95	56	5	1	.	.	.	.	.	.	.	.
PERCA FLAVESCENS	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.
STIZOSTEDION CANADENSE	.	.	.	.	2	39	28	4	3	.	.	1	.	.	.	.	.	.
APLODINOTUS GRUNNIENS	4	.	650	1488	4935	360	151	98	43	11	7	2	2	.	.	.	.	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED
*** AT CLINCH RIVER BREEDER, 1975 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	04/03/75	19	2924	9.5	1M CONICAL PUSH NET .79MM	120	17541
2	04/17/75	19	3156	13.0	1M YOYO NET .79MM	36	6132
3	05/01/75	21	1950	16.0	1.37M SQ VERT. NET .79MM	21	654
4	05/16/75	22	2345	16.8	FISH PUMP 360GPM .79MM	35	226
5	05/28/75	22	2512	17.5		---	-----
6	06/12/75	22	2518	17.1		212	24553
7	06/24/75	22	2430	18.6			
8	07/08/75	22	2643	18.1			
9	07/22/75	22	2574	18.1			
10	08/05/75	22	2582	18.9			
		---	-----				
		212	24553				

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** CLINCH RIVER BREEDER, 1975 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10
FISH EGGS												
APLODINOTUS GRUNNIENS (EGGS)	58	100						+	+	+	+	
TOTAL	58	100										
FISH LARVAE												
CLUPEIDAE	1426	90.42				+	+	+	+	+	+	+
DOROSOMA SP.	2	0.13			+						+	
DOROSOMA PETENENSE	2	0.13								+		+
CYPRINIDAE	4	0.25				+	+			+		
CYPRINUS CARPIO	11	0.70				+	+	+	+			
CATOSTOMIDAE	41	2.60			+	+						
LEPOMIS SP.	86	5.45					+	+		+	+	+
POMOXIS SP.	1	0.06							+			
POMOXIS ANNULARIS	1	0.06							+			
UNIDENT DARTER (NOT P. CAPRODES	1	0.06				+						
STIZOSTEDION CANADENSE	2	0.13		+								
TOTAL	1577	100										

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** CLINCH RIVER BREEDER, 1975 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
CLUPEIDAE	.	.	.	.	4	35	24	148	225	273	232	153	86	71	59	56	.	.
DOROSOMA SP.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
CYPRINIDAE	.	.	.	.	.	2	2	.	.	.	.	.	.	.	.	.	.	.
CYPRINUS CARPIO	.	.	.	.	.	5	5	1	.	.	.	.	.	.	.	.	.	.
CATOSTOMIDAE	.	.	.	.	.	.	4	27	9	.	.	.	.	2	.	.	.	.
LEPOMIS SP.	.	.	.	.	4	42	7	4	6	7	3	6	3	2	2	.	.	.
POMOXIS SP.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
POMOXIS ANNULARIS	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
UNIDENT DARTER (NOT P. C	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
STIZOSTEDION CANADENSE	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE I. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED
*** AT MURPHY HILL COAL GAS SITE, 1982 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	03/23/82	8	1123	13.5	1/2M SQ OBLQ TOW NET .5MM	96	12972
2	04/06/82	8	1088	13.6		---	-----
3	04/21/82	8	1122	16.7		96	12972
4	05/05/82	8	1077	18.9			
5	05/19/82	8	1092	20.9			
6	06/02/82	8	1046	25.3			
7	06/16/82	8	1042	.			
8	06/30/82	8	1051	.			
9	07/13/82	8	1073	.			
10	07/27/82	8	1050	.			
11	08/09/82	8	1073	.			
12	08/23/82	8	1133	.			
		---	-----				
		96	12972				

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** MURPHY HILL COAL GAS SITE, 1982 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12
FISH EGGS														
UNIDENT FISH EGGS	175	76.75			+	+	+	+						+
APLODINOTUS GRUNNIENS (EGGS)	53	23.25			+	+	+	+	+	+				+
TOTAL	228	100												
FISH LARVAE														
UNIDENT FISH LARVAE	35	0.03			+		+	+	+	+				
CLUPEIDAE	93289	68.91	+	+	+	+	+	+	+	+	+	+	+	+
DOROSOMA SP.	3	T						+						
DOROSOMA CEPEDIANUM	261	0.19						+	+					
DOROSOMA PETENENSE	60	0.04						+	+	+			+	+
CYPRINIDAE	270	0.20				+	+	+	+	+		+	+	
CYPRINUS CARPIO	5	T					+	+						
NOTROPIS SP.	3	T							+				+	
ICTIOBINAE	23	0.02		+	+	+								
MORONE SP.	379	0.28			+	+	+	+						
MORONE (NOT SAXATILIS)	1272	0.94		+	+	+	+							
LEPOMIS SP.	39128	28.90					+	+	+	+	+	+	+	+
POMOXIS SP.	376	0.28			+	+	+	+	+					
UNIDENT DARTER	17	0.01	+	+	+									
PERCA FLAVESCENS	5	T	+	+	+									
APLODINOTUS GRUNNIENS	245	0.18					+	+	+	+	+			+
TOTAL	135371	100												

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** MURPHY HILL COAL GAS SITE, 1982 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	35	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CLUPEIDAE	.	.	2	1550	5855	6995	8321	9932	12118	10640	8838	7262	4684	3724	4795	8570	.	.
DOROSOMA SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	261	.
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	32	28
CYPRINIDAE	.	.	.	5	38	48	57	56	43	20	2	1	.	.	.	.	.	.
CYPRINUS CARPIO	.	.	.	.	.	3	2	.	.	.	.	.	.	.	.	.	.	.
NOTROPIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.
ICTIOBINAE	.	.	.	.	.	.	12	10	1	.	.	.	.	.	.	.	.	.
MORONE SP.	.	.	.	.	.	.	2[illegible]9	112	34	11	5	5	1	.	1	.	1	.
MORONE (NOT SAXATILIS)	.	.	43	538	381	311	.	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	6	8822	10429	4675	5564	8498	1086	95	8	.	.	1	8	5	.
POMOXIS SP.	.	.	.	15	101	174	60	16	7	3	.	.	.	.	.	.	.	.
UNIDENT DARTER	.	.	.	.	.	.	3	.	4	5	1	3	.	1	.	.	.	.
PERCA FLAVESCENS	.	.	.	.	.	.	2	2	1	.	.	.	.	.	.	.	.	.
APLODINOTUS GRUNNIENS	.	.	1	64	155	21	4	.	.	.	.	.	.	.	.	.	.	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED
*** AT PHIPPS BEND NUCLEAR PLANT, 1975 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP
1	04/08/75	25	4521	11.2
2	04/23/75	25	3838	14.6
3	05/08/75	25	3788	12.3
4	05/21/75	24	2596	19.3
5	06/05/75	25	3540	19.6
6	06/17/75	25	1924	18.1
7	07/09/75	24	2432	20.9
8	07/24/75	24	2140	19.2
9	07/31/75	28	1780	21.8
10	08/06/75	28	1453	21.9
11	08/14/75	28	1108	21.4
12	08/21/75	26	1746	21.0
		307	30777	

GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1/2M CON. STAT. NET .79MM	297	30704
FISH PUMP 360GPM .79MM	10	73
	307	30777

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** FHIPPS BEND NUCLEAR PLANT, 1975 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12
FISH EGGS														
UNIDENT FISH EGGS	545	100				+	+	+	+	+		+		
TOTAL	545	100												
FISH LARVAE														
UNIDENT FISH LARVAE	1	0.33								+				
CYPRINIDAE	28	9.24						+				+		
CYPRINUS CARPIO	4	1.32			+			+						
CATOSTOMIDAE	261	86.14		+	+	+	+	+	+					
ICTALURUS SP.	1	0.33							+					
ICTALURUS FURCATUS	1	0.33								+				
ICTALURUS NEBULOSUS	1	0.33											+	
UNIDENT DARTER (NOT P. CAPRODES	6	1.98			+	+	+							
TOTAL	303	100												

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** PHIPPS BEND NUCLEAR PLANT, 1975 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
CYPRINIDAE	.	.	.	.	1	.	5	.	3	4	6	2	4	2	1	.	.	.
CYPRINUS CARPIO	.	.	.	.	.	3	1	.	.	.	.	.	.	.	.	.	.	.
CATOSTOMIDAE	.	.	.	8	40	64	50	50	3	2	3	.	.	.	1	.	.	.
ICTALURUS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
ICTALURUS NEBULOSUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
UNIDENT DARTER (NOT P. C	.	.	.	.	.	2	2	1	1	.	.	.	.	.	.	.	.	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED *** AT PHIPPS BEND NUCLEAR PLANT, 1976 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP
1	03/16/76	10	720	11.0
2	03/23/76	26	1707	13.7
3	03/30/76	35	1641	12.8
4	04/06/76	30	7341	16.3
5	04/13/76	30	1564	17.7
6	04/21/76	35	1447	23.7
7	04/28/76	38	2027	18.8
8	05/05/76	35	3374	21.4
9	05/12/76	35	1262	22.9
10	05/19/76	34	1269	20.1
11	05/26/76	35	4504	22.7
12	06/03/76	5	74	22.4
13	06/07/76	28	1734	21.1
14	06/16/76	39	2191	22.2
15	06/24/76	34	7647	22.1
16	06/30/76	29	11251	20.9
17	07/08/76	37	1552	23.1
18	07/14/76	34	3740	21.7
19	07/21/76	35	6752	22.7
20	07/28/76	24	1596	21.5
21	08/04/76	38	1724	24.7
22	08/09/76	39	2884	24.2
23	08/18/76	37	2001	21.5
24	08/26/76	7	V	22.9
25	09/01/76	8	334	21.9
		727	70335	

GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
UNDEFINED SAMPLING GEAR	6	0
1/2M SQ OBLQ TOW NET .5MM	330	43573
1/2M SQ STAT. NET .5MM	75	7572
FISH PUMP 360GPM .5MM	200	1067
EPIBENTHIC SLED	87	18125
SEINE	24	0
DIP NET	5	0
	727	70335

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** PHIPPS BEND NUCLEAR PLANT, 1976 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
___FISH EGGS___																											
UNIDENT FISH EGGS	298	99.33	+	+	+	+	+	+	+				+	+	+	+	+	+	+	+							
CYPRINID EGGS	1	0.33																				+					
CYPRINUS CARPIO (EGGS)	1	0.33						+																			
TOTAL	300	100																									
___FISH LARVAE___																											
UNIDENT FISH LARVAE	9	0.23											+													+	
CLUPEIDAE	12	0.31				+						+			+	+		+			+						
DOROSOMA CEPEDIANUM	30	0.77														+		+	+	+		+	+			+	
DOROSOMA PETENENSE	2	0.05																+									
CYPRINIDAE	853	21.85			+				+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PIMEPHALES SP	8	0.20																						+			
CAMPOSTOMA ANOMALUM	20	0.51				+			+			+					+		+				+				
CYPRINUS CARPIO	616	15.78						+	+	+	+	+	+	+	+	+	+	+	+	+	+						
NOTROPIS SP.	25	0.64										+					+							+		+	
NOTROPIS GALACTURUS	14	0.36																		+		+				+	
NOTROPIS RUBELLUS	8	0.20																				+					
NOTROPIS SPILOPTERUS	6	0.15															+	+		+		+					
NOTROPIS CHRYSOCEPHALUS	91	2.33															+	+	+			+					
PIMEPHALES SP.	1	0.03																					+				
PIMEPHALES NOTATUS	15	0.38										+					+	+	+			+				+	
CATOSTOMIDAE	679	17.40					+	+	+	+	+	+	+		+	+	+	+	+	+	+		+	+			
CATOSTOMINAE	13	0.33											+														
ICTIOBINAE	816	20.91											+														
CATOSTOMUS COMMERSONI	1	0.03																+									
MOXOSTOMA SP.	1	0.03																								+	
ICTALURUS SP.	7	0.18														+		+			+						
ICTALURUS NATALIS	77	1.97										+	+	+	+	+	+		+	+	+		+	+		+	
ICTALURUS PUNCTATUS	23	0.59															+	+	+		+						
UNIDENT BULLHEAD	74	1.90											+	+	+	+	+	+	+	+	+		+				
GAMBUSIA AFFINIS	403	10.33										+				+	+	+	+	+	+	+	+	+		+	+
CENTRARCHIDAE	1	0.03														+											
AMBLOPLITES RUPESTRIS	4	0.10																	+		+		+			+	
LEPOMIS SP.	56	1.43										+		+		+		+	+	+	+	+	+	+		+	
LEPOMIS MACROCHIRUS	1	0.03																				+					
MICROPTERUS DOLOMIEUI	3	0.08																+	+								
POMOXIS SP.	6	0.15																+			+		+				
UNIDENT DARTER (NOT P. CAPRODES	3	0.08					+		+																		
UNIDENT PERCID (NOT STIZOSTEDIO	9	0.23							+			+				+						+	+				
ETHEOSTOMA BLENNIOIDES	1	0.03											+														
ETHEOSTOMA RUFILINEATUM	1	0.03									+																
ETHEOSTOMA SIMOTERUM	4	0.10																			+			+			
LABIDESTHES SICCULUS	10	0.26																				+		+			
TOTAL	3903	100																									

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** PHIPPS BEND NUCLEAR PLANT, 1976 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	7	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.
CLUPEIDAE	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	5	9	.
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24	6
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
CYPRINIDAE	.	.	.	1	31	53	25	27	55	61	57	49	32	30	33	186	207	5
PIMEPHALES GR	.	.	.	.	3	5	.	.	.	.	.	.	.	.	.	.	.	.
CAMPOSTOMA ANOMALUM	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	4	7	7
CYPRINUS CARPIO	1	.	.	.	90	298	180	5	7	7	.	3	4	3	.	2	11	5
NOTROPIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	6	18
NOTROPIS GALACTURUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14
NOTROPIS RUBELLUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	4
NOTROPIS SPILOPTERUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6
NOTROPIS CHRYSOCEPHALUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	91
PIMEPHALES SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
PIMEPHALES NOTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	13
CATOSTOMIDAE	.	.	.	.	30	316	162	88	8	.	1	.	1	11	13	27	19	2
CATOSTOMINAE	.	.	.	.	.	.	4	5	3	1	.	.	.	.	.	.	.	.
ICTIOBINAE	.	.	.	.	36	611	167	.	.	.	.	.	.	.	.	.	2	.
CATOSTOMUS COMMERSONI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
MOXOSTOMA SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
ICTALURUS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	4	.
ICTALURUS NATALIS	.	.	.	.	.	.	.	.	.	.	.	.	.	11	16	22	22	6
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	14	8	.
UNIDENT BULLHEAD	1	.	.	.	.	.	.	.	.	.	.	3	11	20	19	14	6	.
GAMBUSIA AFFINIS	.	.	.	.	.	.	2	8	11	20	17	17	22	23	13	65	169	36
CENTRARCHIDAE	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
AMBLOPLITES RUPESTRIS	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	1	1
LEPOMIS SP.	.	.	.	.	4	11	13	5	3	3	1	2	1	1	1	4	6	1
LEPOMIS MACROCHIRUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
MICROPTERUS DOLOMIEUI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
POMOXIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	2	2
UNIDENT DARTER (NOT P. C	.	.	.	.	.	.	1	1	.	.	.	.	.	1	.	.	.	.
UNIDENT PERCID (NOT STIZ	.	.	.	.	.	.	.	1	2	2	2	1	.	.	.	1	.	.
ETHEOSTOMA BLENNIOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
ETHEOSTOMA RUFILINEATUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
ETHEOSTOMA SIMOTERUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3
LABIDESTHES SICCULUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	9

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED *** AT YELLOW CREEK NUCLEAR PLANT, 1975 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	04/01/75	20	1346	12.2	1/2M CON. PUSH NET .79MM	258	31319
2	04/14/75	56	5628	13.5	1.37M SQ VERT. NET .79MM	93	9305
3	04/29/75	41	4854	19.3	FISH PUMP 360GPM .79MM	24	185
4	05/12/75	46	5794	22.3		----	-----
5	06/02/75	54	6238	25.5		375	40509
6	06/16/75	48	5513	26.8			
7	06/30/75	54	6296	28.6			
8	07/14/75	54	5439	27.7			
		----	-----				
		375	40509				

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

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TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1975 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8
FISH EGGS										
UNIDENT FISH EGGS	2	0.90			+			+		
APLODINOTUS GRUNNIENS (EGGS)	221	99.10			+	+	+	+	+	+
TOTAL	223	100								
FISH LARVAE										
UNIDENT FISH LARVAE	101	0.12		+	+	+	+	+	+	+
CLUPEIDAE	57313	70.82		+	+	+	+	+	+	+
ALOSA CHRYSOCHLORIS	25	0.03			+	+	+	+		
DOROSOMA SP.	75	0.09			+	+	+	+	+	+
DOROSOMA CEPEDIANUM	426	0.53					+	+	+	+
DOROSOMA PETENENSE	1757	2.17					+	+	+	+
HIODON TERGISUS	25	0.03		+	+	+	+			
CYPRINIDAE	15623	19.30			+	+	+	+	+	+
CAMPOSTOMA ANOMALUM	1	T				+				
CYPRINUS CARPIO	200	0.25			+	+	+	+		
NOTEMIGONUS CRYSOLEUCAS	1	T					+			
NOTROPIS ATHERINOIDES	1	T					+			
CATOSTOMIDAE	541	0.67		+	+	+	+			
MINYTREMA MELANOPS	10	0.01			+	+				
ICTALURUS FURCATUS	3	T						+		
ICTALURUS PUNCTATUS	90	0.10					+	+	+	+
PYLODICTIS OLIVARIS	2	T							+	
FUNDULUS SP.	1	T				+				
MORONE SP.	304	0.38	+	+	+	+	+			
CENTRARCHIDAE	40	0.05			+	+	+	+	+	
LEPOMIS OR POMOXIS	20	0.02					+			
LEPOMIS SP.	766	0.95		+		+	+	+	+	+
MICROPTERUS SP.	6	0.01				+	+			+
POMOXIS SP.	364	0.45			+	+	+		+	
POMOXIS ANNULARIS	2179	2.69				+	+	+	+	+
PERCIDAE	4	T		+	+	+				
UNIDENT DARTER (NOT P. CAPRODES	5	0.01			+		+	+		
UNIDENT PERCID (NOT STIZOSTEDIO	26	0.03			+			+		
PERCINA CAPRODES	144	0.18	+	+	+	+	+			
STIZOSTEDION SP.	1	T		+						
STIZOSTEDION CANADENSE	29	0.04		+	+	+	+			
SCIAENIDAE	1	T							+	
APLODINOTUS GRUNNIENS	945	1.04				+	+	+	+	+
LABIDESTHES SICCULUS	12	0.01					+	+	+	
TOTAL	80931	100								

T = LESS THAN 0.01 PERCENT COMPOSITION

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1975 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	95	.	.	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.
CLUPEIDAE	.	.	6	98	914	1891	3641	3196	4398	5592	5967	6179	5781	4808	3969	10555	430	.
ALOSA CHRYSOCHLORIS	.	.	1	7	1	6	.	.	.	.	.	.	.	.	.	.	10	.
DOROSOMA SP.	.	.	2	33	27	4	.	.	.	.	.	.	.	.	.	.	9	.
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	426	.
DOROSOMA PETENENSE	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	7	1748	.
HIODON TERGISUS	.	.	.	.	.	.	.	.	.	.	.	3	14	6	1	.	1	.
CYPRINIDAE	.	.	.	6	1376	4128	2629	2192	1514	858	477	287	433	397	314	702	310	.
CAMPOSTOMA ANOMALUM	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
CYPRINUS CARPIO	.	.	.	.	2	23	76	76	16	4	2	1	.	.	.	.	.	.
NOTEMIGONUS CRYSOLEUCAS	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
NOTROPIS ATHERINOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
CATOSTOMIDAE	.	.	.	.	.	8	72	366	58	5	2	10	17	2	.	1	.	.
MINYTREMA MELANOPS	.	.	.	.	.	.	.	.	.	1	2	6	1	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	57	20	.
PYLODICTIS OLIVARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.
FUNDULUS SP.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
MORONE SP.	.	.	1	111	169	39	6	9	5	11	3	3	1	1	.	3	2	.
CENTRARCHIDAE	.	.	.	.	4	3	72	10	.	1	.	.	.	.	.	.	.	.
LEPOMIS OR POMOXIS	.	.	.	4	3	10	3	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	1	60	121	152	66	16	23	63	103	92	21	8	8	2	.
MICROPTERUS SP.	.	.	.	.	.	.	1	2	.	.	.	1	.	.	.	1	1	.
POMOXIS SP.	.	.	.	72	138	81	4	2	2	2	1	.	.	.	.	.	2	.
POMOXIS ANNULARIS	.	.	.	.	3	8	119	270	348	339	199	122	121	86	95	305	173	.
PERCIDAE	.	.	.	.	.	2	.	.	1	.	.	1	.	.	.	.	.	.
UNIDENT DARTER (NOT P. C	.	.	.	.	.	.	1	1	.	1	.	.	.	.	.	1	1	.
UNIDENT PERCID (NOT STIZ	.	.	.	.	.	.	.	3	7	9	2	4	1	.	.	.	.	.
PERCINA CAPRODES	.	.	1	.	.	1	9	44	37	22	6	4	3	4	7	6	.	.
STIZOSTEDION SP.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.
STIZOSTEDION CANADENSE	.	.	.	.	.	.	.	4	6	4	4	4	4	2	.	1	.	.
SCIAENIDAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
APLODINOTUS GRUNNIENS	.	.	1	6	95	83	151	151	159	59	44	32	17	18	19	25	5	.
LABIDESTHES SICCULUS	.	.	.	1	2	.	.	.	1	.	.	1	.	1	.	.	6	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED *** AT YELLOW CREEK NUCLEAR PLANT, 1976 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP
1	03/25/76	43	6388	13.9
2	04/01/76	42	6284	14.3
3	04/08/76	39	5814	16.8
4	04/15/76	41	5646	19.6
5	04/22/76	41	5735	19.9
6	04/29/76	41	5953	18.2
7	05/06/76	41	5970	18.0
8	05/13/76	41	5962	19.5
9	05/20/76	40	5598	19.5
10	05/27/76	41	5461	20.3
11	06/03/76	41	5743	21.6
12	06/10/76	41	5729	25.5
13	06/17/76	39	5087	24.6
14	06/24/76	41	5767	25.0
15	07/01/76	41	5497	27.0
16	07/08/76	41	5465	26.5
17	07/15/76	41	5602	27.4
18	07/22/76	41	5563	27.7
		736	10353	

GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1/2M SS DBLO TOW NET .5MM	583	10363
FISH PUMP 350GPM .5MM	153	734
	736	10363

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TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1976 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
___FISH EGGS___																				
UNIDENT FISH EGGS	206	21.53		+	+		+	+	+	+	+	+	+	+	+	+			+	+
APLODINOTUS GRUNNIENS (EGGS)	751	78.47				+	+	+	+	+	+	+	+	+	+	+	+	+	+	
TOTAL	957	100																		
___FISH LARVAE___																				
UNIDENT FISH LARVAE	420	0.10	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
CLUPEIDAE	344500	83.77		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ALOSA CHRYSOCHLORIS	82	0.02								+	+		+	+	+	+	+	+		
DOROSOMA SP.	481	0.12								+	+	+	+	+	+	+	+	+	+	
DOROSOMA CEPEDIANUM	1297	0.32	+	+	+				+	+	+	+	+	+	+	+	+	+	+	+
DOROSOMA PETENENSE	9073	2.21	+		+				+	+	+	+	+	+	+	+	+	+	+	+
HIODONTIDAE	1	T									+									
HIODON ALOSOIDES	1	T					+													
CYPRINIDAE	8305	2.02		+			+	+	+	+	+	+	+	+	+	+	+	+	+	+
PIMEPHALES GR	185	0.04										+	+		+	+	+	+		
ATHERINOIDES GR	386	0.09										+	+	+	+		+	+		
NOTUCELLUS-BUCHANANI GR	69	0.02										+		+	+	+	+	+	+	+
CAMPOSTOMA ANOMALUM	1	T		+																
CYPRINUS CARPIO	314	0.08			+	+	+	+	+	+	+	+	+	+	+	+		+		
NOTEMIGONUS CRYSOLEUCAS	1	T							+											
NOTROPIS SP.	2	T															+	+		
NOTROPIS ATHERINOIDES	57	0.01	+	+	+	+	+	+	+			+			+	+		+	+	+
NOTROPIS BLENNIUS	1	T																		+
NOTROPIS BUCHANANI	53	0.01	+	+	+	+	+	+	+		+	+	+							
NOTROPIS SPILOPTERUS	1	T									+									
NOTROPIS VOLUCELLUS	2	T	+									+								
CATOSTOMIDAE	186	0.05		+	+	+	+	+	+	+	+		+						+	+
MINYTREMA MELANOPS	4	T					+	+	+											
ICTALURUS FURCATUS	151	0.04	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+
ICTALURUS PUNCTATUS	114	0.03	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PYLODICTIS OLIVARIS	4	T															+	+	+	
MORONE SP.	286	0.07								+	+	+		+		+				
MORONE CHRYSOPS	7	T										+	+	+						
MORONE MISSISSIPPIENSIS	3	T														+				
MORONE (NOT SAXATILIS)	4768	1.15	+	+	+	+	+	+	+			+	+		+	+				
CENTRARCHIDAE	10	T					+		+											
LEPOMIS OR POMOXIS	265	0.06								+	+	+	+	+		+	+			
LEPOMIS SP.	5235	1.27	+					+		+	+	+	+	+	+	+	+	+	+	+
LEPOMIS MACROCHIRUS	2	T					+		+											
MICROPTERUS SP.	7	T					+		+	+	+									
MICROPTERUS DOLOMIEUI	2	T						+												
MICROPTERUS SALMOIDES	1	T												+						
MICROPTERUS (NOT DOLOMIEUI)	4	T							+				+							
POMOXIS SP.	30720	7.47	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
POMOXIS ANNULARIS	58	0.01	+	+		+								+		+	+	+	+	+
POMOXIS NIGROMACULATUS	1	T		+																
UNIDENT DARTER (NOT P. CAPRODES	9	T					+		+		+			+				+	+	
UNIDENT PERCID (NOT STIZOSTEDIO	387	0.09	+	+	+	+	+	+	+	+	+	+	+	+	+	+				

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TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1976 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PERCINA CAPRODES	1	T										+								
STIZOSTEDION SP.	12	T			+	+	+	+												
APLODINOTUS GRUNNIENS	3771	0.92			+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
LABIDESTHES SICCULUS	11	T												+	+		+		+	+
TOTAL	411252	100																		

T = LESS THAN 0.01 PERCENT COMPOSITION

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1976 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	419	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CLUPEIDAE	163	.	217	3057	19343	19984	23975	29766	45725	39752	32774	31103	24804	19162	14576	26533	234	.
ALOSA CHRYSOCHLORIS	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	68	13
DORDSOMA SP.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	467	13
DORDSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1237	60
DORDSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6963	2109
HIODONTIDAE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
HIODON ALOSOIDES	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
CYPRINIDAE	.	.	2	29	2804	3526	1005	526	171	100	61	44	13	9	4	8	2	.
PIMEPHALES SP	.	.	.	.	5	100	55	9	3	1	.	2	2	.	1	3	3	.
ATHERINOIDES SP	.	.	.	1	69	118	56	55	32	8	6	5	7	3	3	11	12	.
VOLUCELLUS-BUCHANANI SP	.	.	.	.	1	3	3	.	3	10	8	9	4	3	9	12	4	.
CAMPOSTOMA ANOMALUM	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
CYPRINUS CARPIO	.	.	.	.	8	43	185	50	11	6	1	1	4	1	3	1	.	.
NOTEMIGONUS CRYSOLEUCAS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
NOTROPIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
NOTROPIS ATHERINOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	51
NOTROPIS BLENNIUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
NOTROPIS BUCHANANI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	53
NOTROPIS SPILOPTERUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
NOTROPIS VOLUCELLUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
CATOSTOMIDAE	.	.	.	.	1	1	31	127	5	1	10	8	1	.	.	.	.	.
MINYTREMA MELANOPS	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	1	148
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	47	10	54
PYLODICTIS OLIVARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	.
MORONE SP.	.	.	.	35	22	6	24	24	22	18	31	33	13	10	17	22	9	.
MORONE CHRYSOPS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	2
MORONE MISSISSIPPIENSIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
MORONE (NOT SAXATILIS)	.	1	20	1454	1316	840	406	246	195	83	37	37	25	27	29	47	5	.
CENTRARCHIDAE	9	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS OR POMOXIS	3	.	.	145	96	12	2	1	2	.	1	1	1	.	1	.	.	.
LEPOMIS SP.	.	.	.	42	797	2372	1272	401	127	76	62	37	26	13	4	4	1	1
LEPOMIS MACROCHIRUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
MICROPTERUS SP.	.	.	.	.	.	2	1	1	1	1	.	.	.	.	.	1	.	.
MICROPTERUS DOLOMIEUI	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.
MICROPTERUS SALMOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
MICROPTERUS (NOT DOLOMIE	.	.	.	.	.	.	.	.	.	.	1	.	1	.	1	.	1	.
POMOXIS SP.	.	.	1	2466	6572	5668	4054	3103	2295	1506	980	687	610	539	470	972	734	53
POMOXIS ANNULARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	11	14	30
POMOXIS NIGROMACULATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
UNIDENT DARTER (NOT P. C	.	.	.	.	1	1	.	1	1	1	.	.	2	.	.	.	2	.
UNIDENT PERCID (NOT STIZ	1	.	.	2	4	13	26	84	56	40	26	25	16	17	21	39	7	.
PERCINA CAPRODES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
STIZOSTEDION SP.	.	.	.	.	.	.	.	1	2	4	1	.	.	.	3	1	.	.
APLODINOTUS GRUNNIENS	1	3	43	1362	1234	415	223	128	90	75	40	21	14	13	8	23	13	4

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1976 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
LABIDESTHES SICCULUS	.	.	.	.	1	.	1	.	.	.	1	.	1	1	.	1	3	2

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED *** AT YELLOW CREEK NUCLEAR PLANT, 1979 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	03/21/79	26	3668	.	1/2M SQ OBLQ TOW NET .5MM	312	44135
2	04/04/79	26	3643	15.6		---	-----
3	04/19/79	26	3783	18.0		312	44135
4	05/03/79	26	3751	22.5			
5	05/16/79	26	3538	22.2			
6	05/30/79	26	3723	23.0			
7	06/13/79	26	3753	26.1			
8	06/26/79	26	3477	26.4			
9	07/11/79	26	3649	26.3			
10	07/25/79	26	3621	27.9			
11	08/08/79	26	3763	30.0			
12	08/22/79	26	3763	29.4			
		---	-----				
		312	44135				

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1979 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12
___FISH EGGS___														
UNIDENT FISH EGGS	18	6.43					+	+	+	+	+	+		
APLODINOTUS GRUNNIENS (EGGS)	262	93.57				+	+	+	+	+	+	+		
TOTAL	280	100												
___FISH LARVAE___														
UNIDENT FISH LARVAE	842	0.92			+	+	+		+		+			
PETROMYZONTIDAE	2	T		+							+			
CLUPEIDAE	44866	49.01			+	+	+	+	+	+	+	+	+	
ALOSA CHRYSOCHLORIS	35	0.04						+	+	+	+			
DOROSOMA SP.	177	0.19						+	+	+	+			
DOROSOMA CEPEDIANUM	1726	1.89	+	+	+		+	+	+	+	+	+	+	
DOROSOMA PETENENSE	7578	8.28	+				+	+	+	+	+	+	+	+
HIODON TERGISUS	2	T				+	+							
CYPRINIDAE	253	0.28		+		+	+	+	+	+	+	+		+
VOLUCELLUS=BUCHANANI GR	2	T	+											
CYPRINUS CARPIO	161	0.18			+	+	+	+	+					
NOTROPIS SP.	37	0.04		+					+	+	+	+	+	
NOTROPIS ATHERINOIDES	11	0.01						+		+	+			
NOTROPIS VOLUCELLUS	1	T		+										
PIMEPHALES SP.	2	T								+				
CATOSTOMIDAE	9	0.01			+	+	+							
ICTIOBUS SP.	1	T					+							
MINYTREMA MELANOPS	3	T				+								
ICTALURUS FURCATUS	22	0.02	+								+	+	+	
ICTALURUS PUNCTATUS	53	0.06	+	+	+				+	+	+	+	+	
MORONE SP.	336	0.37		+	+	+	+	+						
MORONE CHRYSOPS	1	T								+				
MORONE MISSISSIPPIENSIS	2	T	+											
MORONE (NOT SAXATILIS)	871	0.95		+	+	+	+	+						
LEPOMIS OR POMOXIS	61	0.07					+		+					
LEPOMIS SP.	3329	3.64		+			+	+	+	+	+	+	+	+
LEPOMIS MACROCHIRUS	1	T									+			
POMOXIS SP.	30433	33.24		+	+	+	+	+	+	+	+	+		
POMOXIS ANNULARIS	142	0.16	+		+				+	+	+	+	+	
POMOXIS NIGROMACULATUS	2	T							+	+				
UNIDENT DARTER (NOT P. CAPRODES	1	T			+									
UNIDENT PERCID (NOT STIZOSTEDIO	75	0.08		+	+	+								
UNIDENT DARTER	53	0.06				+	+	+	+	+				
PERCINA SP.	1	T					+							
PERCINA CAPRODES	1	T					+							
STIZOSTEDION CANADENSE	3	T				+								
APLODINOTUS GRUNNIENS	450	0.49	+	+	+	+	+	+	+	+	+	+		
LABIDESTHES SICCULUS	2	T							+					
TOTAL	91547	100												

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1979 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12
___FISH EGGS___														
UNIDENT FISH EGGS	18	6.43					+	+	+	+	+	+		
APLODINOTUS GRUNNIENS (EGGS)	262	93.57				+	+	+	+	+	+	+		
TOTAL	280	100												
___FISH LARVAE___														
UNIDENT FISH LARVAE	842	0.92			+	+	+		+		+			
PETROMYZONTIDAE	2	T		+							+			
CLUPEIDAE	44866	49.01			+	+	+	+	+	+	+	+	+	
ALOSA CHRYSOCHLORIS	35	0.04						+	+	+	+			
DOROSOMA SP.	177	0.19						+	+	+	+			
DOROSOMA CEPEDIANUM	1726	1.89	+	+	+		+	+	+	+	+	+	+	
DOROSOMA PETENENSE	7578	8.28	+				+	+	+	+	+	+	+	+
HIODON TERGISUS	2	T				+	+							
CYPRINIDAE	253	0.28		+		+	+	+	+	+	+	+		+
VOLUCELLUS-BUCHANANI GR	2	T	+											
CYPRINUS CARPIO	161	0.18			+	+	+	+	+					
NOTROPIS SP.	37	0.04		+					+	+	+	+	+	
NOTROPIS ATHERINOIDES	11	0.01						+		+	+			
NOTROPIS VOLUCELLUS	1	T		+										
PIMEPHALES SP.	2	T								+				
CATOSTOMIDAE	9	0.01			+	+	+							
ICTIOBUS SP.	1	T					+							
MINYTREMA MELANOPS	3	T				+								
ICTALURUS FURCATUS	22	0.02	+								+	+	+	
ICTALURUS PUNCTATUS	53	0.06	+	+	+				+	+	+	+	+	
MORONE SP.	336	0.37		+	+	+	+	+						
MORONE CHRYSOPS	1	T								+				
MORONE MISSISSIPPIENSIS	2	T	+											
MORONE (NOT SAXATILIS)	871	0.95		+	+	+	+	+						
LEPOMIS OR POMOXIS	61	0.07					+		+					
LEPOMIS SP.	3329	3.64		+			+	+	+	+	+	+	+	+
LEPOMIS MACROCHIRUS	1	T									+			
POMOXIS SP.	30433	33.24		+	+	+	+	+	+	+	+	+		
POMOXIS ANNULARIS	142	0.16	+		+				+	+	+	+	+	
POMOXIS NIGROMACULATUS	2	T							+	+				
UNIDENT DARTER (NOT P. CAPRODES	1	T			+									
UNIDENT PERCID (NOT STIZOSTEDIO	75	0.08		+	+	+								
UNIDENT DARTER	53	0.06				+	+	+	+	+				
PERCINA SP.	1	T					+							
PERCINA CAPRODES	1	T					+							
STIZOSTEDION CANADENSE	3	T				+								
APLODINOTUS GRUNNIENS	450	0.49	+	+	+	+	+	+	+	+	+	+		
LABIDESTHES SICCULUS	2	T							+					
TOTAL	91547	100												

T = LESS THAN 0.01 PERCENT COMPOSITION

JUN 1983

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1979 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	826	.	.	4	5	2	5	.	.	.	.	.	.	.	.	.	.	.
PETROMYZONTIDAE	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1
CLUPEIDAE	163	.	.	596	1902	2885	2989	3611	3745	4099	3042	3312	3448	3583	2691	7911	3	.
ALOSA CHRYSOCHLORIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	31	4
DOROSOMA SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	171	6
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1502	224
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5498	2078
HIODON TERGISUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
CYPRINIDAE	.	.	.	.	18	63	35	33	22	14	6	11	10	5	4	18	10	.
VOLUCELLUS-BUCHANANI GR	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
CYPRINUS CARPIO	.	.	.	.	.	9	53	59	.	.	.	.	.	.	.	.	.	.
NOTROPIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	6	22	6
NOTROPIS ATHERINOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	3	.
NOTROPIS VOLUCELLUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
PIMEPHALES SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
CATOSTOMIDAE	.	.	.	.	.	.	.	1	3	.	3	2	.	.	.	.	.	.
ICTIOBUS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
MINYTREMA MELANOPS	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	22
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4	17	2	29
MORONE SP.	.	.	.	1	1	.	115	48	25	24	20	35	27	18	9	7	1	1
MORONE CHRYSOPS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
MORONE MISSISSIPPIENSIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
MORONE (NOT SAXATILIS)	.	.	13	395	243	219	1	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS OR POMOXIS	2	.	.	4	28	10	5	8	2	2	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	30	683	570	513	631	216	284	151	113	45	38	21	27	4	2
LEPOMIS MACROCHIRUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
POMOXIS SP.	.	.	.	6388	9762	2192	2127	1850	1495	1345	1074	951	543	619	475	1183	412	17
POMOXIS ANNULARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	74	68
POMOXIS NIGROMACULATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
UNIDENT DARTER (NOT P. C	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
UNIDENT PERCID (NOT STIZ	.	.	.	.	.	.	1	11	22	17	13	7	3	.	1	.	.	.
UNIDENT DARTER	.	.	.	.	.	3	4	1	5	8	8	6	3	2	2	10	1	.
PERCINA SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
PERCINA CAPRODES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
STIZOSTEDION CANADENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.
APLODINOTUS GRUNNIENS	.	.	3	12	166	95	65	36	39	24	2	1	2	1	1	4	1	8
LABIDESTHES SICCULUS	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983

TABLE 1. PHYSICAL DATA ASSOCIATED WITH SAMPLES TAKEN ON EACH SAMPLING PERIOD AND WITH EACH GEAR TYPE USED *** AT YELLOW CREEK NUCLEAR PLANT, 1980 ***

PERIOD	DATE	NUMBER SAMPLES	VOLUME FILTERED (M3)	MEAN TEMP	GEAR TYPE	NUMBER SAMPLES	VOLUME FILTERED (M3)
1	03/25/80	26	3952	11.1	1/2M SQ OBLQ TOW NET .5MM	312	44705
2	04/09/80	26	3888	15.3		---	-----
3	04/22/80	26	3723	20.0		312	44705
4	05/06/80	26	3689	19.5			
5	05/20/80	26	3703	16.6			
6	06/02/80	26	3770	23.8			
7	06/17/80	26	3640	27.3			
8	06/30/80	26	3619	28.8			
9	07/16/80	26	3716	.			
10	07/30/80	26	3657	32.0			
11	08/11/80	26	3697	31.3			
12	08/27/80	26	3649	29.9			
		---	-----				
		312	44705				

V = SAMPLES WERE COLLECTED WITHOUT MEASURED VOLUMES

JUN 1983

TABLE 2. SPECIES LIST, TOTALS COLLECTED, AND OCCURRENCE SPANS OF FISH EGGS AND LARVAE COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1980 ***

TAXON	TOTAL COLLECTED	PERCENT COMPOSITION	SAMPLING PERIODS 1	2	3	4	5	6	7	8	9	10	11	12
___FISH EGGS___														
UNIDENT FISH EGGS	25	7.62				+		+	+	+				
APLODINOTUS GRUNNIENS (EGGS)	303	92.38				+	+	+	+	+		+	+	+
TOTAL	328	100												
___FISH LARVAE___														
UNIDENT FISH LARVAE	63	0.04					+	+	+	+				
PETROMYZONTIDAE	1	T								+				
CLUPEIDAE	112650	70.84			+	+	+	+	+	+	+	+	+	+
ALOSA CHRYSOCHLORIS	49	0.03					+	+	+	+				
DOROSOMA SP.	65	0.04					+	+	+	+				
DOROSOMA CEPEDIANUM	1269	0.80					+	+	+	+	+	+		
DOROSOMA PETENENSE	9146	5.75					+	+	+	+	+	+		+
CYPRINIDAE	131	0.08				+	+	+	+	+	+	+	+	+
CYPRINUS CARPIO	25	0.02				+	+	+						
NOTROPIS SP.	11	0.01							+	+	+			
NOTROPIS ATHERINOIDES	1	T								+				
NOTROPIS BUCHANANI	1	T												+
PIMEPHALES SP.	3	T										+		+
PIMEPHALES VIGILAX	1	T												+
CATOSTOMINAE	2	T					+							
ICTIOBINAE	2	T					+							
ICTALURUS FURCATUS	1	T								+				
ICTALURUS PUNCTATUS	24	0.02						+	+	+	+	+		+
MORONE SP.	720	0.45				+	+	+						
MORONE (NOT SAXATILIS)	1727	1.09		+	+	+	+	+	+					
CENTRARCHIDAE	2	T						+						
LEPOMIS SP.	6622	4.16	+				+	+	+	+	+	+	+	+
LEPOMIS MACROCHIRUS	1	T		+										
MICROPTERUS DOLOMIEUI	1	T					+							
POMOXIS SP.	24937	15.68			+	+	+	+	+	+				
POMOXIS ANNULARIS	6	T							+	+	+	+		
PERCIDAE	2	T							+					
UNIDENT DARTER	139	0.08		+	+	+	+	+	+					
PERCINA CAPRODES	1	T					+							
STIZOSTEDION CANADENSE	8	0.01		+	+	+								
APLODINOTUS GRUNNIENS	1416	0.89			+	+	+	+	+	+				
LABIDESTHES SICCULUS	13	0.01							+	+	+	+		
TOTAL	159331	100												

T = LESS THAN 0.01 PERCENT COMPOSITION

TABLE 3. DISTRIBUTION OF LARVAL FISHES BY SIZE GROUP COLLECTED AT
*** YELLOW CREEK NUCLEAR PLANT, 1980 ***

TAXON	SIZE CLASS GROUPINGS (MM)																	
	NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-19	20-30	>30
UNIDENT FISH LARVAE	63	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PETROMYZONTIDAE	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
CLUPEIDAE	.	.	4	2917	6725	5300	8619	9577	10305	15476	15367	10608	7388	5373	4238	10767	1	.
ALOSA CHRYSOCHLORIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	44	5
DOROSOMA SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	65	.
DOROSOMA CEPEDIANUM	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1198	71
DOROSOMA PETENENSE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7406	1740
CYPRINIDAE	.	.	.	1	29	39	17	9	7	8	9	4	1	3	.	2	2	.
CYPRINUS CARPIO	.	.	.	.	.	14	11	.	.	.	.	.	.	.	.	.	.	.
NOTROPIS SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	5	2
NOTROPIS ATHERINOIDES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
NOTROPIS BUCHANANI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
PIMEPHALES SP.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.
PIMEPHALES VIGILAX	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
CATOSTOMINAE	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
ICTIOBINAE	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.
ICTALURUS FURCATUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
ICTALURUS PUNCTATUS	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	19	2	1
MORONE SP.	.	.	.	.	.	.	307	171	57	46	56	39	22	8	5	6	3	.
MORONE (NOT SAXATILIS)	.	.	280	521	391	535	.	.	.	.	.	.	.	.	.	.	.	.
CENTRARCHIDAE	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
LEPOMIS SP.	.	.	.	60	1476	1298	1017	1307	643	282	183	160	109	39	19	23	2	2
LEPOMIS MACROCHIRUS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
MICROPTERUS DOLOMIEUI	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
POMOXIS SP.	.	.	.	2422	7787	3986	4870	2209	1368	825	477	340	219	133	95	159	38	6
POMOXIS ANNULARIS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	1
PERCIDAE	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.
UNIDENT DARTER	.	.	.	.	2	2	13	25	20	26	16	5	11	3	2	5	.	.
PERCINA CAPRODES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
STIZOSTEDION CANADENSE	.	.	.	.	.	.	.	3	2	1	1	1	.	.	.	.	.	.
APLODINOTUS GRUNNIENS	.	.	234	201	543	222	97	38	17	15	2	10	8	10	5	11	.	2
LABIDESTHES SICCULUS	.	.	.	.	.	.	.	.	1	2	.	1	.	1	.	2	3	3

NOTE: THESE NUMBERS REPRESENT EXPANDED SUBSAMPLE MEASUREMENTS.
NM = NOT MEASURED

JUN 1983