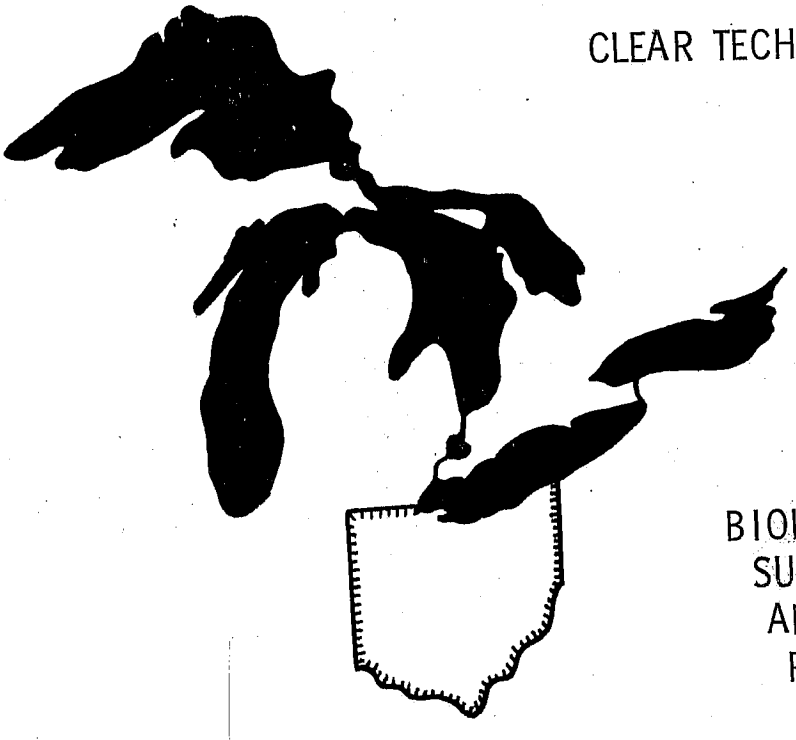

CLEAR TECHNICAL REPORT NO. 122-F

BIOLOGICAL AND WATER QUALITY SURVEY OF THE SCIOTO RIVER AND MUD RUN IN NORTHERN PICKAWAY COUNTY, OHIO

FINAL REPORT

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INTRODUCTION

The following report documents the biological and water quality characteristics of the Scioto River and Mud Run and the immediate environs of these streams, including wetlands assessments, in the vicinity of State Route 762 bridges in Pickaway County, Ohio (PIC-762-9.75). This site, approximately two miles east of Commercial Point, Ohio and three miles west of Duvall, Ohio, has been selected for highway realignment and replacement of the bridges (Figure 1). During the period May through July 1979, a field survey was conducted to obtain the data necessary for this documentation and for an assessment of the potential impacts of highway and bridge construction.

PROCEDURES

Ecosystem Description

The general features of the ecosystem in the vicinity of the site were documented. This included basic geologic information such as bedrock, surface materials, topography, and stream characteristics. The various habitats and biological communities present at the sites were described. A search of the scientific literature was conducted to obtain additional information on the site or nearby areas. This information was integrated with data from the field survey to present a comprehensive report on the biological status of the site.

Aquatic Life

Plankton. Phytoplankton and zooplankton were sampled once from three sites on the Scioto River (one immediately above the proposed construction area, SR-1; one below the area, SR-5; and one in the center, SR-3), and one site on Mud Run, SR-6, in the center of the proposed construction area (Table 1). One tow with a Wisconsin (conical design) plankton net (0.080 mm mesh) was made at each site. Samples were preserved with five per cent formalin and taken to the laboratory for identification. Analysis was accomplished within a Sedgewick Rafter Cell using a compound microscope. Species lists and relative abundances are presented in Tables 3 and 5. Standard texts and taxonomic keys, which are listed in the Reference section of this report, were used to confirm plankton identification. Samples will be maintained until completion of construction.

Rooted Aquatic Plants. A thorough visual search was conducted along the banks of Mud Run and the Scioto River in the vicinity of proposed construction alternatives. Searches were conducted on separate dates in May, June, and July to locate and identify the resident species of vascular aquatic plants. Species lists and relative abundance information are presented. Standard texts and manuals, comparison with known herbarium specimens, and consultation with The Ohio State University Herbarium staff members were used to confirm identifications. Aerial reconnaissance of the study area as well as that reach of the Scioto River between Columbus and Chillicothe was performed on April 15, and July 29, 1979. The purpose of the survey was to delineate the study area and identify similar areas along the river.

Benthic Macroinvertebrates. Grab samples were collected with a six-inch by six-inch Ekman dredge at each of the five stations in the Scioto River listed in Table 1. Due to the course sand and gravel bottom several grabs were collected at each station to supply a reasonable volume of substrate. The replicate grabs were combined at each station as follows: Station 1, five grabs; Station 2, two grabs; Station 3, four grabs; Station 4, four grabs; and Station 5, four grabs. Due to the shallow nature of Mud Run, one sample was collected by forcing a collection jar into the bottom by hand. All samples were sieved through a Standard U.S.

number 40 soil sieve, preserved in ten per cent formalin and returned to the laboratory for sorting, identification and enumeration. Standard texts and manuals (See Reference section) were used to verify identifications. Specimens were identified to the lowest taxon practicable.

Fish. Seines of varying lengths (¼ in. mesh) were used to sample and identify the fish communities of the streams. In addition to the standard fishery techniques described above, a literature survey was conducted in an effort to determine historical composition of the fish communities in the streams. The streams were visually inspected for spawning habitats. Standard texts (see Reference section) were used to confirm identifications.

In addition to identifying the fish and qualitatively defining the communities with population lists, all fish captured were weighed, measured, and enumerated. The species were ranked both by biomass and numerical abundance. The mean length and weight of each species are also presented. A voucher collection of each species will be maintained until completion of construction.

Terrestrial Life

Flora. Trees, shrubs, and herbaceous vegetation were surveyed along the mid-line transects of the three alternative alignments. Transect lines surveyed were restricted to woodlands bordering the Scioto River. Adjoining agricultural land was not surveyed. A visual search throughout the limits of the construction area was also conducted. The results of this survey are presented as a list of species present along with a discussion of the relative abundance of the dominant forms. Identification procedures were the same as those listed for rooted aquatic plants.

Fauna. Amphibians and reptiles in the study area were identified by walking surveys of aquatic and terrestrial habitats, seining, and listening to frog and toad calls. A literature survey was also conducted to determine the status of those species found in the area and to ascertain the presence of any endangered or threatened species. Standard references were used to verify identifications (See Reference section). A reference collection of each species collected will be maintained until completion of construction.

Mammals in the study area were identified by walking surveys of a variety of habitats, roadkills, tracks, and scats. A literature survey was also conducted to determine the status of those species found in the area and to ascertain the presence of any endangered or threatened species. Identifications were verified using standard texts (See Reference section).

Water Quality

One set of water quality determinations for 17 parameters were made at one location on Mud Run (proposed crossing) and two locations on the Scioto River (immediately above and below the zone of proposed

crossings). Time dependent determinations (such as dissolved oxygen and temperature) were made in the field. Water samples were collected for laboratory analysis for the other parameters. All tests used techniques prescribed in Standard Methods for Water Analysis (APHA, 1975) or approved by the United States Environmental Protection Agency. The seasonal extent of stream inundation of the floodplain was determined from monthly observations and USGS gage recordings.

Wetland Assessment

An assessment was made of all wetlands present in the vicinity of the proposed project. This assessment included 1) description of the nature of the wetland, 2) determination of the areal extent of the wetland, 3) inventory of the resident flora and fauna, and 4) evaluation of the wetland quality and benefits to the local ecosystem.

Impact Assessment

The information from the biological and water quality survey along with information from previous studies, were utilized to assess the possible impacts of the proposed project on the ecosystem. Possible adverse effects of the new construction on the area biota will be presented in the final report.

GENERAL DESCRIPTION OF ECOSYSTEM

Geological Setting

Bedrock and Surface Materials. Pickaway County, Ohio is underlain by rocks of Middle Devonian Age, largely marine sediments which have been lithified to shales and limestones. The bedrock is well masked with a thick covering of glacial drift (Stout, 1941) and, therefore, exposures are few. The bedrock underlying the Scioto River in the vicinity of the State Route 762 bridge consists of gray and black shales of the Olentangy and Ohio Shale Formations. At nearby Commercial Point the glaciated Lexington Peneplain is at an elevation of 780 feet and the bedrock lies at an elevation of approximately 740 feet with a glacial till thickness of about 40 feet (Stout, et al., 1943). At the State Route 762 bridge the Scioto River is at an elevation of 665 feet and the banks rise to an elevation of 710 feet.

Stream Characteristics. The Scioto River has a total drainage area of 6,510 square miles. In the vicinity of the State Route 762 bridge the upstream watershed is approximately 2600 square miles. The drainage area of Mud Run is estimated to be less than ten square miles. At the existing bridges, the Scioto River bed has an elevation of about 658 feet and Mud Run stands at an elevation of 684 feet above sea level. Mean discharge rate for the Scioto River at Columbus is 1,369 CFS (57-year record). The extreme high discharge rate was 138,000 CFS on March 25, 1913 and the minimum was 47 CFS on September 6, 1930. At Circleville the Scioto River has a mean discharge rate of 1,442 CFS (two-year record), with a maximum

of 61,500 CFS on February 25, 1975 and a minimum of 290 CFS on February 6, 1977 (USGS, 1977 and 1978). Stream depth and bottom material at the study site are given in Table 1.

Seasonal Water Level Fluctuations. The State Route 762 bridge over the Scioto River lies approximately mid-way between two hydrologic stations operated by the U.S. Geological Survey on the Scioto River:

1) Station No. 03227500 - Franklin County at Columbus STP, 0.4 miles downstream from Frank Road bridge.

2) Station No. 03230700 - Pickaway County at Circleville, 100 feet upstream from U.S. Route 22 bridge.

Neither gaging station can be used to accurately predict the Scioto River level at the Ohio Route 762 bridge, largely because of the position of the gaging stations in relation to tributaries. The Columbus gage is upstream from the mouth of Big Walnut Creek, whereas the Circleville gage is downstream from the mouth of Big Darby Creek. Flow from Big Walnut Creek passes by the Route 762 bridge and should be incorporated into hydrologic calculations for the study site, while Big Darby Creek flow enters the Scioto River below the study site and should not be included. Fortunately, however, the drainage basins of these two tributaries are very similar, each enclosing an area of 557 square miles (Ohio Department of Natural Resources, 1969). Therefore, because of the counter-balancing nature of the two tributaries, it is possible to use the mean of discharges and water levels at the Columbus and Circleville gages as a reasonable approximation of hydrologic conditions at the State Route 762 bridge.

The results of monthly calculations for a two-year period (October 1975 to September 1977) for mean, maximum, and minimum river levels are listed in Table 2 and shown graphically in Figures 2 and 3.

In 1975-76, the highest river stage occurred in February (679.7 ft.), whereas the highest level in 1976-77, came in April (677.1 ft.). Low flow occurred in September for 1975-76 (665.4 ft.) and in December, January, February, August and September for 1976-77 (665.2 ft.). The U.S. Geological Survey (1973 and 1974) has prepared maps showing flood-prone areas of the Scioto River valley (Figure 4). The area of maximum flooding in the vicinity of the State Route 762 bridges is approximately encompassed by the 690 ft. contour line. A water level of this magnitude was predicted by the model described above when the maximum high-water mark for the Columbus gage (707.2 ft., 1/22/59) and for the Circleville gage (671.2 ft., 3/26/13) were averaged (689.2 ft.).

The calculations given in Table 2 and shown on Figures 2 and 3 make it possible to estimate the seasonal inundations of the flood-plain by the Scioto River and the areal extent of potential wetlands. Plates 1 and 2 (in pocket) are detailed contour maps of the Scioto River and Mud Run valleys in the vicinity of the State Route 762 bridges. These maps used in conjuction with the monthly water level calculations permit reasonable

predictions of the areas subject to flooding or standing water during various times of the year. The steep, high banks on the west side of the river preclude extensive inundation except for the valley of Mud Run which is subject to some flooding as far upstream as the State Route 762 bridge. The east side of the river, however, is characterized by a broad, low flood plain that is subject to at least 300 feet of lateral inundation during the early spring months. The water level appears to drop rapidly as the season progresses and the entire river flow is normally contained within the present channel. The inundated condition of the floodplain does not persist long enough into the growing season for the development of extensive wetland vegetation except for a small, slack-water area which flanks the bridge approach on the east side of the river.

Biological Habitats

Aquatic. The biological habitats of the Scioto River and Mud Run at the State Route 762 crossing are significantly different. Mud Run can be characterized as a relatively swift flowing clean-water habitat. It is a classic riffle/pool environment with a relatively high concentration of riffles. Fallen trees, occassionally covering the entire width of the stream, and shrubs provide ample cover for fish and invertebrates. The Scioto River is radically different from the situation described above. Although generally considered a riffle/pool habitat, the portion of the Scioto encountered within the study area is entirely "pool" of uniform depth. When the river is within its banks, little cover is provided along its margins.

Wetlands. Wetland areas occur in an expanded portion of the drainage ditch at the base of the existing bridge and in the slough-like high flow channel downstream from the three proposed highway alignments. Specific attributes of these wetlands are discussed separately.

Terrestrial. Two distinct terrestrial habitats occur within the study area: cultivated cropland and hydric flood-plain forest.

AQUATIC LIFE

Plankton

Phytoplankton. Thirty-three taxa of algae were identified from the three stations on the Scioto River and one station on Mud Run (Table 3). Of these, 31 taxa were observed in Scioto River samples while only 14 taxa were found in Mud Run. Diatoms were the most abundant group, comprising over 75 percent of the algae at each of the four stations. *Melosira granulata* was the most common species of diatom in the Scioto River, while *Nitzschia sigmoidea* was the most numerous species in Mud Run. Green algae was the next most common group, followed by blue-green algae and dinoflagellates. The average total algae population density for the Scioto River was 84.3 cells, colonies, or filaments per liter while Mud Run was only 13.6 per liter.

The environmental significance of the major taxa of algae found in the Scioto River is outlined in Table 4. An inspection of the table reveals that most of the taxa found are common to streams and 19 of them are associated with some degree of eutrophication (nutrient enrichment). Seventeen of the taxa present can cause taste and odor or filter clogging problems, or both. Four genera are indicators of freshwater pollution, while three are indicators of clean water. In general the composition and density of the phytoplankton population in Mud Run indicates a relatively clean water environment with a moderate amount of nutrient enrichment. The Scioto River exhibits an algal density six times greater in numbers than Mud Run, and shows more advanced signs of nutrient enrichment. Neither stream can be considered severely degraded at the study site.

Zooplankton. Thirty taxa of planktonic animals were identified from the three samples collected on the Scioto River and one sample on Mud Run (Table 5). Of these, 29 were found in Scioto River samples and only 11 in Mud Run samples. In the Scioto River samples over 50 percent of the organisms were of one species, the Cladoceran, Bosmina longirostris. This species accounted for less than 25 percent of the zooplankton population in Mud Run. Copepods made up about 35 percent of the population in the Scioto River, and accounted for over 40 percent in Mud Run. Rotifers averaged nearly 15 percent of the population in the Scioto River, but amounted to 27 percent of the zooplankters in Mud Run. Protozoans and other groups were only a minor part of the population found in both streams. The average zooplankton population was 116 organisms per liter in the Scioto River and 7.4 per liter in Mud Run. No taxa associated with severely polluted water were detected, but the population density and composition indicates nutrient enrichment.

Rooted Aquatic Plants

Vascular aquatic plants were essentially absent along the steep bank of the west side of the Scioto River and the heavily shaded portion of Mud Run north of the existing bridge. With the exception of the wetland areas, only grasses (graminoids) occurred in or near the water along the eastern bank of the Scioto River and along both banks of Mud Run under and south of the existing bridge.

Benthic Macroinvertebrates

The fauna as observed at the five stations in the Scioto River and the one station in Mud Run can be considered typical of sand and gravel bottom streams in Ohio. Populations were dominated by chironomids and oligochaetes. Furthermore, those chironomid and oligochaete specimens encountered were the small specimens typical of flowing water and not the large, heavy-bodied specimens found in lakes and ponds.

Populations observed at the five stations in the Scioto River can be considered similar, with the exception of Station 2 (Table 6). Differences observed at Station 2 (existing bridge), increased number of oligochaetes and molluscs, were due to increased quantities of leaf-litter in the slack water behind the bridge support.

The large number of benthic invertebrates observed on Mud Run were accountable both to a more efficient sampling technique and to real differences brought about by increased water quality and clarity (Table 7). The many small stream species of fish encountered in this stream were a good indication that a thriving benthic community probably serves as their food base.

Due to the frequency of flood conditions in these streams, the benthic communities must be accustomed to and capable of rapidly recolonizing following environmental alterations.

Fish

Trautman (1957) lists 87 species of fishes from the Scioto River in or immediately adjacent to Pickaway County (Table 8). Sampling efforts with seines during the present study yielded 20 species from the Scioto River and its tributary Mud Run (Tables 9, 10, 11, and 12). Striped shiners comprised 49.2 percent of the catch by number in the Scioto River, followed by bluntnose minnows (23.8 percent). Most of the catch was taken in the Scioto River itself rather than from the drainage ditch and associated wetland on the existing eastern bridge approach. A small number of bluntnose minnows, green sunfish, and striped shiners were collected from the drainage ditch, and no fishes were found among the emergent plants of the wetland itself. The only truly wetland species, a grass pickerel, was collected during May in the periodically inundated slough along the east bank of the river, but this slough was dry during the June and July sampling periods. All the species collected have been previously reported by Trautman (1957) from this section of the river. This section of the Scioto River is relatively deep and swift flowing, and most of the species collected by seining are typical of larger, deeper streams. Most of the fishes were found associated with gravel bars or rocks and submerged logs near shore. Young-of-the-year bluntnose minnows, golden redhorse, green sunfish, largemouth bass, and orange-spotted sunfish were found in the study area. However, these do not necessarily indicate utilization of the immediate vicinity for spawning by these species, since young-of-the-year may drift downstream from other areas. The grass pickerel may utilize the inundated sloughs for spawning during April and nursery areas thereafter. However, the relatively brief period of spring inundation probably limits the nursery function of the sloughs and may prevent successful spawning and hatching altogether, depending on the yearly duration of inundation. Most of the species collected by seining are probably year round residents of the study area.

No previous collections of fishes have been recorded from Mud Run. However, all the species collected by seining in the present study have been reported from the Pickaway County section of the Scioto River by Trautman (1957). Creek chubs constituted 24.3 percent of the catch by numbers, followed by johnny darters (20.8 percent), stonerollers (19.6 percent), striped shiners (19.2 percent), and bluntnose minnows (19.2 percent). Blacknose dace, southern redbelly dace, johnny darters, and rainbow darters were observed in breeding coloration in Mud Run at the State Route 762 bridge, indicating utilization of this area as a spawning

site by these species. Similarly, an abundance of young-of-the-year creek chubs in the area indicated spawning use by that species. None of the species collected are typically associated with aquatic vegetation. Rather, the area is a typical riffle/pool habitat. The stonerollers and creek chubs formed large schools in the pools, although the small size of the young-of-the-year creek chubs precluded efficient collection by seine. Johnny darters and rainbow darters were found primarily in the shallow riffles. The section of Mud Run at the State Route 762 bridge probably serves as year-round habitat for all the species observed, except the white sucker and southern redbelly dace. These two riffle spawners probably return downstream to deeper areas of Mud Run or to the Scioto River after spawning.

No federal or Ohio endangered, threatened, or rare species were collected by seining during the present study. The paddlefish, slender-head darter, eastern sand darter, spotted darter, and tippecanoe darter are on the Ohio endangered species list and have been reported by Trautman (1957) from the Scioto River in Pickaway County. However, these species have not been reported in the area recently.

TERRESTRIAL LIFE

Flora

Excluding the cropland, the proposed alignments pass through hydric forest along the margins of the Scioto River and Mud Run. Vegetation within the limits of the study area are listed in Table 13. The forest area exists as a 130 to 200 yd. deep fringe on the east side of the Scioto River and a 50 to 75 yd. deep fringe on the west side. It is little more than a stream-side band along Mud Run. The area east of the river is subject to periodic, but not protracted, periods of overflow. The rich alluvial soil along the stream margins provide abundant moisture and growing conditions for a flood-plain plant community with Box elder (Acer negundo), silver maple (Acer saccharium), and hacberry (Celtis orcidentalis) as the predominant trees (listed in order of relative abundance) and a variety of herbaceous vegetation. In May, marsh blue violets (Viola cucullata) and bluebells (Mertensia virginica) were predominant among the herbaceous vegetation. Later, in June and July, stinging nettle (Urtica sp.) and jewelweed (Impatiens sp.) were predominant. In July, giant ragweed (Ambiosia sp.) became quite evident but not in numbers approximating the latter two species. In terms of species composition and relative abundance, vegetation along each of the proposed alignments was very similar.

During the June survey, most of the canopy vegetation was partially defoliated by the speckled green fruit worm (Orthosia hibisci). The caterpillars were present in such numbers that the frass striking the ground was clearly audible.

Fauna

Careful searches resulted in the identification of three species of amphibians and reptiles in the study area (Table 14). The amphibians consisted of the bullfrog (Rana catesbeiana), green frog (Rana clamitans melanota), and American toad (Bufo americanus americanus), all of which were collected by hand and seining, or identified by calls, in both the Scioto River and Mud Run. Most of the American toads collected were young-of-the-year, indicating the use of the area for breeding by this species. The reptiles, consisting of the northern water snake (Natrix sipedon sipedon) and snapping turtle (Chelydra serpentina) were found only at Mud Run. A young-of-the-year snapping turtle was collected, indicating nesting of this species in the area. The northern water snake was not captured, but was observed swimming in Mud Run. All the species identified during the present study are common throughout Ohio and have been previously reported in Pickaway County or central Ohio in general (Walker, 1946; Conant, 1951). These are semiaquatic species found in a variety of wet habitats, including wetlands, but are not strictly endemic to wetlands. No Ohio endangered amphibians and reptiles have been reported from the study area, although the range of the four-toed salamander extends through central Ohio (Conant, 1975). This species is generally a woodland form which breeds in shallow woodland pools and streams and is generally not encountered in bottomlands adjacent to larger streams.

A migratory bird census, a breeding bird census, and a summer resident census were performed. The results of the three bird surveys are listed individually in Tables 15, 16, and 17. The area is used predominantly by passerine birds. Wetland avifauna and waterfowl were not observed. The only exception to the latter generalization is the observation of wood ducks during the breeding bird period.

Nine species of mammals were identified from sightings, tracks, scats, and road kills in the study area (Table 18). These included the shorttail shrew (Blarina brevicauda), raccoon (Procyon lotor), mink (Mustela vison), woodchuck (Marmota caligata), eastern chipmunk (Tamias striatus), eastern gray squirrel (Sciurus carolinensis), meadow jumping mouse (Zapus hudsonius), eastern cottontail (Sylvilagus floridanus), and whitetail deer (Odocoileus virginianus). Each of these species is common in central Ohio, and the mink and raccoon are commonly encountered foraging or hunting in wetlands, ponds, or along watercourses like the Scioto River. No Ohio or federal endangered or threatened mammals have been reported from the study area or from Pickaway County in general.

Ecosystem

The flood-plain ecosystem within the study area is principally hydric forest. This forest ecosystem exists as a fringe of varying depths bordered by stream and cropland. Gordon (1966) indicated that the dominant canopy vegetation in the area at the time of the earliest land surveys was white elm, black ash, and/or white ash, silver maple, and/or red maple. Extremely wet phases contained sycamore and/or cottonwood. The results of this survey indicate the basic canopy components of the early ecosystem persist in some form today.

WATER QUALITY

Table 19 contains the results of water quality determinations for 17 parameters at two stations on the Scioto River (upstream and downstream of the existing State Route 762 bridge, Stations Nos. 1 and 5, respectively) and one station on Mud Run. Additional field measurements taken at Station No. 3 are also reported in Table 19. For comparison, determinations made by the U.S. Geological Survey (1977 and 1978) at an upstream hydrologic station (Columbus, No. 03227500) in 1976 and 1977, and at a downstreamhydrologic station (Circleville, No. 03230700) in 1976 and 1977, are presented in Tables 20 and 21. The results of all nine dates and all four stations are in reasonable agreement indicating a relatively consistant quality of the water in the Scioto River. No previous data on the water quality of Mud Run is available.

The Scioto River from the Greenlawn Avenue Dam (Columbus) to the confluence with Big Darby Creek (ten miles south of State Route 762 bridge) is designated for Secondary Contact Recreation and as a "Limited Warmwater Habitat" by the Ohio Environmental Protection Agency (1978). This particular classification is being challenged by the U.S. Environmental Protection Agency (Federal Register, July 6, 1979), but is still considered valid at this time (Chris Yoder, Ohio EPA, personal communication). The water quality standards for a "Limited Warmwater Habitat" are listed in Table 22. These are waters incapable of meeting criteria necessary for the support of populations of fish and associated vertebrate and invertebrate animals and plants either on a seasonal or year round basis. However, exceptions from "Warmwater Habitat" criteria (Table 22) apply only to specific criterian during specified time and/or flow conditions. During the field survey, none of the parameters tested exceeded the maximum permissible concentrations for a "Warmwater Habitat". However, USGS determination showed that the following parameters reached or exceeded the Ohio EPA limits at least once during the past two years: 1) dissolved oxygen, 2) iron, 3) lead, 4) zinc, and 5) mercury. Ammonia values were at times high, but within the Ohio EPA limits.

In general, the Scioto River shows signs of industrial contamination (metals) and cultural pollution (nutrient enrichment). Phosphorus levels in the Scioto River were approximately ten times greater than the measured concentration in Mud Run. Nitrogen compounds were relatively high for both streams. However, neither stream can be considered severely degraded at the study site.

WETLAND ANALYSIS

Description of Proposed Action and Purpose of Wetland Survey

Proposed Action. The proposed action is the realignment of State Route 762 and the construction of bridge structures on State Route 762 over the Scioto River and Mud Run.

Purpose of Wetlands Survey. Presidential Executive Order 11990, Protection of Wetlands (FR 42 101 : 26961) requires that federal agencies "shall avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds no

practicable alternative to such construction, and the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use."

In carrying out the intent of the Executive Order, the agency is to consider several factors which are pertinent to a proposed action's effect on the quality of the wetland. Public health, safety, and welfare factors include effects on water supply, pollution, flood and storm hazards, and sediment and erosion. Maintenance of natural systems is a factor which includes conservation and long term productivity of existing flora and fauna as well as species and habitat diversity. Other factors in the public interest include recreational, scientific, and cultural uses.

A wetland survey in the area of proposed action was conducted to determine the extent, type, and location of the wetlands within the project region, the significance of the wetlands affected by the proposed action, and the environmental impacts of the proposed action on the wetlands affected.

Wetland Definition and Survey Approach. For the purposes of this survey wetlands are defined (E.O. 11990) as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction."

The U.S. Fish and Wildlife Service (Cowardin, 1977) new interim classification system, Classification of Wetlands and Deep-Water Habitats of the United States, was used to describe the wetland. Data collected consisted of evaluating recreational use, surrounding land use, signs of disturbance and pollution, degradation, physical dimensions, wildlife use, dominant vegetation, and presence of threatened or endangered species. The results are stated below and presented in Table 23.

Birds and other wildlife use are discussed on the basis of existing published or unpublished literature and field experience. A detailed quantitative vegetation survey was not performed. Dominant vegetation and relative abundance of dominant forms were noted.

Evaluation of Wetland Affected by the Proposed Action

The discussion contains the results of the field investigation conducted between May 6 and July 29, 1979. The purpose of the investigation was to collect data to enable a determination of the significance of the wetlands located along the shoreline in the vicinity of the existing structures on State Route 762 over the Scioto River and Mud Run. The factors considered and significance determined are presented in Table 23. In making a determination, a wetland may have different levels of significance. It is recognized that all wetlands are important as habitat for fish and wildlife. Within the context of Executive Order 11990, additional factors must be considered before any decision to alter a wetland is made.

Wetland size is important. Large wetlands support a diversity of life. Diversity of life tends to create a more stable ecosystem. Major changes have been observed in floral and faunal composition in low diversity ecosystems following natural events as well as man-induced alterations. Larger wetland ecosystems are altered less by seasonal and/or peak natural events and recover more quickly to their previous state than smaller ones. Therefore, very small wetlands are often considered less significant than large ones due to the vulnerability of their inhabitants to devastation by unusual but not uncommon natural events such as storms, freezes, droughts, etc. The regional context of a wetland is important if the wetland ecosystem is unique in the region even though it may not harbor floral or faunal elements recognized as threatened or endangered on the state or national level.

In terms of health and welfare, wetlands are commonly described as areas which hold water during peak runoff periods, thereby reducing flooding downstream. Runoff water frequently carries considerable quantities of dissolved and suspended solids. Wetlands are considered sinks in which solids and dissolved nutrients as well as toxic materials are deposited or incorporated into plant tissue, thereby releasing relatively clean, clear water following its passage through the wetland. Wetlands are sometimes described as zones of aquifer recharge, thereby playing an important role in maintaining groundwater levels for well water supplies. The latter characteristics are not applicable to the wetlands within or near the study area.

Surrounding Land Use. The wetlands are located on the east side of the Scioto River. Wetland number one is located at the base of the existing bridge structure. Wetland number two exists in the lower portion of a high-flow channel. Flood-plain forest occurs immediately adjacent to the wetland areas.

Physical Features. Wetland number one occurs as an expanded depression along each side of the drainage ditch which lies adjacent to the north side of State Route 762. This depression is periodically inundated by high flow conditions in the Scioto River. Under low flow conditions in the Scioto River, the depression is a mud flat except for the drainage ditch channel itself. The greatest extent of the wetland covers an area of approximately 2874 square meters (Plate 1).

Wetland number two exists as riverine habitat when periodic high flow conditions in the Scioto River breach the bar at the upper end of the channel. The lower portion of this channel functions as a wetland of variable extent depending on the low flow condition of the Scioto River. During low flow conditions the Scioto River water level extends into the lower end of the high flow channel to create slackwater conditions and wetland development. The greatest extent of the wetland covers an area of approximately 4645 square meters (Plate 1).

Biological Features. Dominant vegetation is silver maple, sycamore (Platanus occidentalis), and arrowhead (Saggitaria sp.). No characteristic zonation of aquatic vegetation was apparent. Both wetlands serve as habitat for the American toad (Bufo americana). The presence of young-of-the-year grass pickerel indicates that these wetlands probably

serve as spawning and nursery areas for this species. Sunfishes are also common. Although the adjacent flood plain forest is used by a diversity of fauna, the wetland areas are frequented to a lesser degree by fewer species of birds and mammals. The only waterfowl observed in the area was the wood duck (Aix sponsa).

Wetland Classification and Significance Determination. The wetland areas are classified as freshwater emergent vegetation riverine wetlands. The field investigation and wetland evaluation indicate wetland number one cannot be considered significant due to its small size and extremely limited biological diversity. Although larger, wetland number two is of marginal significance. At least ten similar areas were observed during aerial reconnaissance along the Scioto River between Columbus and Circleville.

IMPACT ASSESSMENT

The information from the biological and water quality survey along with information from previous studies, were utilized to assess the possible impacts of the proposed project on the ecosystem. The realignment of SR 762 will involve the construction of a new bridge over the Scioto River and Mud Run and the removal of the existing structures. The present plan for the bridge over Mud Run calls for two piers, one on either side of the stream, with a poured concrete cap approximately 50 feet long. The stream bed will be reformed or channelized for a distance of approximately 200 feet under the bridge. It is proposed that the new structure over the Scioto River will be supported by approximately ten piers. Two of these will be in the river itself, the others will be located over the farmland to the east of the stream. There are three possible alignments for the new structure. The northernmost location is approximately 200 feet south of the existing structure. The southernmost alternative lies approximately 600 feet south of the existing structure, while the mid-line alternative lies between the north and the south alternatives. Construction along any of the alternative alignments will likely destroy the habitat for a distance of approximately 200 feet north and south of the new structure. A causeway will be constructed part way across the river to allow construction on the new structure. This causeway will be removed upon completion of the new bridge.

All of the terrestrial vegetation and associated wildlife habitat in the right-of-way will be eliminated. The natural vegetation is not unique to this site and is found in abundance in adjacent areas. The existing plants will be replaced by slope-stabilizing ground cover and highway surface. Therefore, the present floodplain community of plants and animals will be lost along the right-of-way. Adjacent areas, beyond 200 feet from the highway surface, will remain essentially unaltered.

The impact of the removal of the existing structure will alter wetland number one to an unknown. Whatever alteration occurs will be minimized by restricting construction equipment from the immediate vicinity of the wetland. Equally important in minimizing impact on

wetland number one is assurance that water flow in and out of the wetland via drainage ditches and the connecting channel to the Scioto River be unimpeded. If the existing depression of the wetland is maintained, any losses of aquatic vegetation resulting from the project will be short term due to rapid recolonization. Access to the bridge structure is possible both north and south of the bridge approach and the drainage ditches adjacent to it (Plate 1). Wetland number two will be largely unaltered so long as construction is limited to within about 200 feet of the southernmost of the three proposed alignments. The only impacts foreseen for wetland number two involves the effect of increased turbidity, dissolved solids, and suspended solids (associated with construction) upon rooted aquatic vegetation and aquatic organisms. The existing organisms are relatively tolerant of high turbidity. The impact upon terrestrial flora and fauna in the area adjacent to wetland number two will be minimal.

During the construction period increased turbidity can be expected downstream of the crossings. It is likely however, that this turbidity will not greatly surpass that caused by natural storms or spring melt-water conditions. Depending on the timing of the construction period, increased turbidity can diminish the phytoplakton population which forms the nutritional base for the aquatic animals, including fish. Reasonable care in construction procedures can minimize this problem. Other problems associated with increased turbidity include a decrease in dissolved oxygen, increase in dissolved solids and attenuation of light needed for photosynthesis in submerged aquatic plants. Considering water quality and the aquatic community, each of the three proposed alignments can be expected to produce similar impacts.

The benthic macroinvertebrate community of the Scioto River in the vicinity of the new structure will be destroyed only in the areas covered by and immediately adjacent to the construction causeway and the piers of the new structure. In Mud Run the benthic macroinvertebrate community within the 200-foot construction corridor will also be destroyed. However, the benthic community of both the Scioto River and Mud Run are not unique to these locales and are dominated by forms capable of rapid recolonization (chironomids, oligochaetes, and crayfish). Following removal of the causeway, this area will be rapidly recolonized with only the insignificant area covered by the piers being totally lost. This recolonization will also occur in Mud Run.

The greatest potential for adverse impact to the fish communities of the Scioto River and Mud Run will be the potential for interference with spawning migrations of suckers and pickerel caused by construction of the causeway in the Scioto River or channelization of Mud Run. If these operations can be completed prior to or after this spring migratory movement, there should be no significant adverse effect on the fish communities due to construction of the new bridges and removal of the existing structures. It should be noted that this area of the Scioto

River is not a spawning area, while it is likely that this area of Mud Run is used for spawning by darters and dace. However, the amount of potential spawning habitat to be lost in Mud Run is insignificant relative to that available.

Although this report documents a number of endangered fish species that have been reported for the Scioto River in Pickaway County, none have been reported in recent years. No endangered species were observed at the study site during the present survey.

In summary, all terrestrial life along the righ-of-way will be displaced. The mid and southernmost alignment will least alter the existing wetlands. Removal of the existing bridge structures will undoubtedly result in some alteration of wetland number one. If construction activities and plans in the vicinity of wetland number one are controlled, such alterations can be minimized and will probably be of short-term duration. If the integrity of the wetland depression is maintained, rapid recolonization of emergent aquatic vegetation will occur. If the construction area is 200 feet south of the southernmost alignment, the impact to wetland number two will be minimal. Benthic habitats at the crossing will be greatly altered and most life forms eliminated. Again, rapid recolonization can be anticipated. Increased turbidity is likely to be the most serious water quality problem, but of short term nature. Fish movement patterns and thereby upstream spawning success may be impacted by instream construction. The location of this site in an area of documented pollution degradation, limits the ecological importance of this site. This fact combined with the occurrence of very similar habitats in adjacent areas, results in impacts of only localized concern. The foregoing report documents only minimal disturbance to the aquatic and terrestrial ecosystem beyond the limits of the right-of-way.

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TABLES

TABLE 1

STATION LOCATIONS AND STREAM CHARACTERISTICS
FOR SCIOTO RIVER AND MUD RUN

Station Code	Location	Water Depth (m)	Bottom Material
SR-1	Scioto River, 100 ft. upstream of Rt. 762 Bridge	2.1	Sand and Gravel, clean
SR-2	Scioto River, 100 ft. downstream of Rt. 762 Bridge	2.2	Sand and gravel, detritus and leafs
SR-3	Scioto River, 200 ft. downstream of Rt. 762 Bridge	2.1	Sand and gravel, clean
SR-4	Scioto River, 300 ft. downstream of Rt. 762 Bridge	2.1	Sand and gravel, clean with twigs
SR-5	Scioto River, 500 ft. downstream of Rt. 762 Bridge at divergence on east bank of river	2.1	Sand and gravel, clean with twigs
SR-6	Mud Run, 100 ft. upstream of Rt. 762 Bridge	0.3	Sand and gravel, clean; over clay silt in pools, gravel in riffles

TABLE 2

CALCULATED MEAN, MAXIMUM, AND MINIMUM SCIOTO RIVER LEVEL ELEVATIONS AT OHIO STATE ROUTE 762 BRIDGE, PICKAWAY COUNTY, OHIO

Month	1975-76			1976-77		
	Mean	Max	Min	Mean	Max	Min
Oct	666.3	669.0	665.5	665.7	666.4	665.4
Nov	666.1	666.7	665.7	665.9	666.5	665.5
Dec	667.5	671.2	666.2	665.5	666.0	665.2
Jan	669.3	674.1	666.2	665.2	665.3	665.2
Feb	671.9	679.7	666.5	667.4	673.8	665.2
Mar	668.5	672.4	666.9	669.4	672.4	667.2
Apr	666.5	669.8	666.0	669.4	677.1	666.4
May	665.9	666.4	665.5	667.0	670.6	665.6
Jun	667.3	669.8	665.8	666.0	667.5	665.3
July	666.7	670.0	665.5	666.0	667.1	665.4
Aug	667.0	671.9	665.5	665.7	667.2	665.2
Sept	665.9	666.8	665.4	665.8	666.9	665.2

Data Source: U.S. Geological Survey (1977, 1978)
Note: River level elevations in feet above mean sea level

TABLE 3

PHYTOPLANKTON ANALYSIS FOR THE SCIOTO RIVER AND MUD RUN IN THE VICINITY OF STATE ROUTE 762 PICKAWAY COUNTY, OHIO*

Plankton Groups	Scioto River Station No. 1		Scioto River Station No. 3		Scioto River Station No. 5		Mud Run Station No. 6	
	Cells, Colonies or Filaments per liter	Relative Abundance (%)	Cells, Colonies or Filaments per liter	Relative Abundance (%)	Cells, Colonies or Filaments per liter	Relative Abundance (%)	Cells, Colonies or Filaments per liter	Relative Abundance (%)
CYANOPHYTA (Blue-Green Algae)					0.5	0.7		
1. Aphanizomenon flos-aquae	0.5	0.8						
2. Microcystis aeruginosum	3.5	5.8	8.0	6.8	6.0	8.2	0.2	1.5
3. Oscillatoria agardhii	0.5	0.8	0.5	0.4	1.5	2.1		
4. Oscillatoria princeps								
CHLOROPHYTA (Green Algae)								
5. Pediastrum duplex	3.5	5.8	7.0	5.9	4.5	6.2		
6. Ankistrodesmus falcatus	1.5	2.4						
7. Closterium sp.	1.0	1.6	1.5	1.2	1.0	1.4	0.2	1.5
8. Cosmarium sp.			0.5	0.4				
9. Dictyosphoerium pulchellum			1.0	0.8				
10. Scenedesmus abundans	1.0	1.6	1.0	0.8	1.0	1.4		
11. Scenedesmus acuminatus			0.5	0.4				
12. Spirogyra sp.	1.5	2.4	0.5	0.4	1.0	0.7	0.2	1.5
13. Mougeotia sp.							0.2	1.5
14. Undif. green colony	0.5	0.8						
BACILLARIOPHYCEAE (Diatoms)								
15. Asterionella formosa	1.0	1.6	4.0	3.4	4.0	5.5		
16. Cyclotella sp.					0.5	0.7		
17. Cymbella sp.							0.6	4.4
18. Fragilaria crotonensis	0.5	0.8	0.5	0.4				
19. Fragilaria sp.	1.5	2.4	2.5	2.1	0.5	0.7	1.2	8.8
20. Gyrosigma sp.					0.5	0.7	0.4	2.9
21. Melosira sp.	10.5	17.1	10.0	8.9	5.0	7.0	0.4	2.9
22. Melosira granulata	23.5	38.2	62.0	52.3	30.0	41.2		
23. Melosira varians			5.0	4.2	5.5	7.6	0.6	4.4
24. Naviculoid diatoms	1.5	2.4						
25. Nitzschia sigmoidea	2.0	3.3	2.5	2.1	2.5	3.5	6.0	44.1
26. Nitzschia sp.	0.5	0.8	1.0	0.8	0.5	0.7	0.6	4.4
27. Surirella sp.					0.5	0.7	0.6	4.4
28. Synedra sp.	4.0	6.6	8.0	6.7	7.5	10.3	2.2	16.2
29. Tabellaria flocculosa	1.5	2.4	2.0	1.6			0.2	1.5
CHRYSOPHYTA (Chrysophytes)					0.5	0.7		
30. Dinobryon diverogens								
PYRROPHYTA (Dinoflagellates)								
31. Ceratium hirundinella	0.5	0.8	0.5	0.4				
32. Peridinium sp.	0.5	0.8						
EUGLENOIDS								
33. Phacus sp.	0.5	0.8						
TOTAL ALGAE (cells, colonies, or filaments)	61.5	100.0	118.5	100.0	73.0	100.0	13.6	100.0

* Note: Organisms are expressed in numbers per liter as observed in one ml of a 100 ml concentrated sample obtained from a 2 meter vertical tow (horizontal 5 meter tow in Mud Run) with a 11.5 cm diameter Wisconsin plankton net on May 30, 1979.

TABLE 4

ENVIRONMENTAL SIGNIFICANCE OF ALGAE IN THE SCIOTO RIVER AND MUD RUN

Phytoplankton Species	Attached Algae	Clean Water Algae	Eutrophication Indicators	Freshwater Pollution Indicators	Stream Algae	Taste and Odor Algae	Filter Clogging Algae
CYANOPHYTA (Blue-Green Algae)							
Aphanozomenon flos-aquae			X				X
Microcystis aeruginosum			X		X		
Ocillatoria agardhii			X		X		
Ocillatoria princeps			X	X	X		X
CHLOROPHYTA (Green Algae)							
Pediastrum duplex					X		
Ankistrodesmus falcatus		X	X		X		
Closterium sp.			X		X		
Cosmarium sp.			X		X	X	
Dictyosphaerium pulchellum					X		X
Scenedesmus abundans					X		
Scenedesmus acuminatus					X		
Spirogyra sp.							X
Mougeotia sp.	X		X				X
BACILLARIOPHYCEAE (Diatoms)							
Asterionella formosa					X		X
Cyclotella sp.		X			X		
Cymbella sp.	X	X			X		
Fragilaria crotonensis					X		X
Fragilaria sp.			X		X	X	
Gyrosigma sp.			X		X		
Melosira granulata			X		X		X
Melosira varians			X		X		X
Melosira sp.			X		X		
Nitzschia sigmoidea			X		X		
Nitzschia sp.			X	X	X		X
Surirella sp.			X		X		
Synedra sp.			X	X	X	X	X
Tabellaria flocculosa			X		X		X
CHRYSOPHYTA							
Dinobryon diverogens						X	
PYRROPHYTA (Dinoflagellates)							
Ceratium hirundinella						X	
Peridinium sp.					X		
EUGLENOPHYTA							
Phacus sp.			X	X	X		

Data Source: Palmer (1977)

TABLE 5

ZOOPLANKTON ANALYSIS FOR THE SCIOTO RIVER AND MUD RUN IN THE VICINITY OF STATE ROUTE 762, PICKAWAY COUNTY, OHIO*

Plankton Groups	Scioto River Station No. 1		Scioto River Station No. 3		Scioto River Station No. 5		Mud Run Station No. 6	
	Animals per liter	Relative Abundance (%)	Animals per liter	Relative Abundance (%)	Animals per liter	Relative Abundance (%)	Animals per liter	Relative Abundance (%)
ROTIFERA (Rotifers)								
1. Asplanchna priodonta	0.5	0.3	0.5	0.5				
2. Brachionus sp.	0.5	0.3			1.5	2.5		
3. Brachionus calyciflorus	3.5	2.6	0.5	0.5				
4. Brachionus havaniensis	0.5	0.3			0.5	0.5		
5. Chromogaster ovalis	1.0	0.7			1.0	1.0	2.0	27.0
6. Euchlanis dilatata			3.5	3.3				
7. Keratella cochlearis	1.0	0.7						
8. Keratella quadrata	0.5	0.3	0.5	0.5				
9. Monostyla bulla	0.5	0.3	0.5	0.5	0.5	0.5		
10. Platyias quadricornis			1.5	1.4	3.5	3.5	0.2	2.7
11. Polyarthra dolichoptera	3.0	2.0	0.5	0.5	0.5	0.5		
12. Polyarthra vulgaris	0.5	0.5	1.5	1.4	2.5	2.5		
13. Undif. rotifer sp.	2.0	1.4						
CLADOCERA (Cladocerans)								
14. Alona sp.	0.5	0.3						
15. Bosmina longirostris	71.5	50.2	62.5	57.4	41.0	41.6	1.6	21.6
16. Daphnia galeata	12.5	8.8	0.5	0.5	8.0	8.1	0.4	5.4
17. Chydorus sphaericus							0.2	2.7
18. Moina sp.	0.5	0.3						
COPEPODA (Copepods)								
19. Cyclops bicuspidatus	0.5	0.3			0.5	0.5		
20. Cyclopoid copepodids	10.5	7.5	4.5	4.1	3.5	3.5	0.2	2.7
21. Diaptomus oregonensis	0.5	0.3						
22. Mesocyclops edax	0.5	0.3			0.5	0.5		
23. Tropocyclops prasinus					34.5	35.0	2.8	37.9
24. Nauplius larvae	32.0	22.6	32.0	29.4				
TOTAL ZOOPLANKTON	142.5	100.0	108.5	100.0	98.0	100.0	7.4	100.0
PROTOZOAN AND OTHER ANIMALS IN ZOOPLANKTON SAMPLE								
1. Difflugia sp.	0.5	33.3	0.5	33.3	1.5	20.0	0.4	25.0
2. Epistylis sp.					1.5	20.0		
3. Vorticella sp.					1.0	13.3		
4. Ciliated protozoans	0.5	33.3	1.0	66.7	1.0	13.3	1.2	75.0
5. Oligochaetes	0.5	33.4			2.5	33.4		
6. Nematodes								
TOTAL OTHERS	1.5	100.0	1.5	100.0	7.5	100.0	1.6	100.0

* Note: Organisms are expressed in numbers per liter as observed in one ml of a 100 ml concentrated sample obtained from a 2 meter vertical tow (horizontal 5 meter tow in Mud Run) with a 11.5 cm diameter Wisconsin plankton net on May 30,1979.

TABLE 6

BENTHIC MACROINVERTEBRATE POPULATIONS[1]
FROM THE SCIOTO RIVER - 30 MAY 1979

TAXA \ STATION	1	2	3	4	5	MEAN
ANNELIDA						
Oligochaeta						
no hair setae	7	754	183	43		197
hair setae	7	129	32	32	22	44
Subtotal	14	883	215	75	22	241
ARTHROPODA						
Chironomidae						
Chironomus sp.		129		11		28
C. einfeldia				11		2
C. endochironomus					11	2
Cryptochironomus sp.		22	11			7
Glyptotendipes sp.				22		4
Paralauterborniella sp.				54		11
Polypedilum sp.				22		4
Procladius sp.		22		11		7
Unidentified		65		108		35
Subtotal	0	238	11	239	11	100
MOLLUSCA						
Gastropoda						
Physa sp.		22				
Helisoma sp.		22				
Subtotal	0	44	0	0	0	9
TOTAL	14	1165	226	314	33	350

[1] Collected with a six inch by six inch Ekman Dredge from the stations described in Table 1. Multiple grabs were collected and combined at each station to assure an adequate sample. Five grabs were collected at Station 1, two grabs at Station 2, and four each at Stations 3, 4, and 5. Data are presented as number of individuals per square meter.

TABLE 7

BENTHIC MACROINVERTEBRATE POPULATIONS[1]
FROM MUD RUN - 30 MAY 1979

TAXA	No./m^2
ANNELIDA	
Oligochaeta	
hair setae	360
no hair setae	720
Subtotal	1,080
Chironomidae	
Chironomus sp.	1,080
Polypedilum sp.	1,080
Unidentified Chironomini	51,840
Unknown from thesis	180
Subtotal	54,180
MOLLUSCA	
Gastropoda	180
Pelecypoda	180
Subtotal	360
TOTAL	54,540

[1] Collected at Route 762 in Pickaway Co., Ohio by forcing a collection jar with an 8.41 cm diameter mouth into the stream bottom by hand.

TABLE 8

HISTORICAL REVIEW[1] OF FISH SPECIES INHABITING THE SCIOTO RIVER WITHIN PICKAWAY COUNTY, OHIO

COMMON NAME	SCIENTIFIC NAME[2]
Paddlefish (1926-1950)[3]	Polyodon spathula
Lake Sturgeon (prior to 1916)	Acipenser fulvescens
Longnose Gar	Lepisosteus osseus
Goldeye	Hiodon alosoides
Gizzard Shad	Dorosoma cepedianum
Grass Pickerel	Esox americanus
Bigmouth Buffalo	Ictiobus cyprinellus
Black Buffalo	Ictiobus niger
Black Redhorse	Moxostoma duquesnei
Creek Chubsucker	Erimyzon oblongus
Golden Redhorse	Moxostoma erythrurum
Highfin Carpsucker	Carpiodes velifer
Northern Hogsucker	Hypentelium nigricans
Quillback	Carpiodes cyrpinus
River Redhorse	Moxostoma carinatum
Shorthead Redhorse	Moxostoma macrolepidotum
Silver Redhorse	Moxostoma anisurum
Spotted Sucker	Minytrema melanops
White Sucker	Catostomus commersoni
Bigeye Chub	Hybopsis amblops
Blacknose Dace	Rhinichthys atratulus
Bluntnose Minnow	Pimephales notatus
Bullhead Minnow	Pimephales vigilax
Carp	Cyprinus carpio
Creek Chub	Semotilus atromaculatus
Emerald Shiner	Notropis atherinoides
Fathead Minnow	Pimephales promelas
Goldenshiner	Notemigonus chrysoleucas
Goldfish (in Scioto River north of Pickaway County)	Carassius auratus
Hornyhead Chub	Nocomis biguttatus
Mimic Shiner	Notropis volucellus
River Chub	Nocomis micropogon
Rosefin Shiner	Notropis ardens
Rosyface Shiner	Notropis rubellus
Silver Chub[3]	Hybopsis storeriana
Silverjaw Minnow	Ericymba buccata
Silver Shiner	Notropis photogenis
Sand Shiner	Notropis stramineus
Southern Redbelly Dace	Phoxinus erythrogaster
Spotfin Shiner	Notropis spilopterus
Steelcolor Shiner	Notropis whipplei
Stoneroller	Campostoma nomalum
Streamline Chub	Hybopsis dissimilis
Striped Shiner	Notropis chrysocephalus

TABLE 8 (continued)

HISTORICAL REVIEW[1] OF FISH SPECIES INHABITING THE SCIOTO RIVER WITHIN PICKAWAY COUNTY, OHIO

COMMON NAME	SCIENTIFIC NAME[2]
Suckermouth Minnow	Phenacobius mirabilis
Black Bullhead	Ictalurus melas
Brindled Madtom	Noturus miurus
Channel Catfish	Ictalurus punctatus
Flathead Catfish	Pilodictis olivaris
Stonecat	Noturus flavus
Tadpole Madtom	Noturus gyrinus
Yellow Bullhead (prior to 1937)	Ictalurus natalis
American Eel	Anguilla rostrata
Blackstripe Topminnow	Fundulus notatus
Trout-perch	Percopsis omiscomaycus
Brook Silverside	Labidesthes sicculus
Black Crappie	Pomoxis nigromaculatus
Bluegill	Lepomis macrochirus
Green Sunfish	Lepomis cyanellus
Largemouth Bass	Micropterus salmoides
Longear Sunfish	Lepomis megalotis
Orangespotted Sunfish	Lepomis humilis
Pumpkinseed	Lepomis gibbosus
Rock Bass	Ambloplites rupestris
Smallmouth Bass	Micropterus dolomieui
Warmouth	Lepomis gulosus
Banded Darter	Etheostoma zonale
Blackside Darter	Percina maculata
Bluebreast Darter	Etheostoma camurum
Dusky Darter	Percina sciera
Eastern Sand Darter[3]	Ammocrypta pellucida
Fantail Darter	Etheostoma flabellare
Greenside Darter	Etheostoma blennioides
Johnny Darter	Etheostoma nigrum
Logperch	Percina caprodes
Orangethroat Darter	Etheostoma spectabile
Rainbow Darter	Etheostoma caeruleum
Sauger	Stizostedion canadense
Slenderhead Darter[3]	Percina phoxocephala
Spotted Darter[3]	Etheostoma maculatum
Tippecanoe Darter[3] (prior to 1900)	Etheostoma tippecanoe
Variegate Darter	Etheostoma variatum
Walleye	Stizostedion vitreum vitreum
Yellow Perch	Perca flavescens
Freshwater Drum	Aplodinotus grunniens
Mottled Sculpin	Cottus bairdi

1 From Trautman (1957)
2 Common and scientific names according to Bailey et al. (1970)
3 Ohio endangered species

TABLE 9

SCIENTIFIC AND COMMON NAMES[1] OF FISH SPECIES COLLECTED[2] FROM THE SCIOTO RIVER AND THE DRAINAGE DITCH AT THE STATE ROUTE 762 BRIDGE, PICKAWAY COUNTY, OHIO, 30 MAY, 28 JUNE, AND 18 JULY 1979

COMMON NAME	SCIENTIFIC NAME
Bluegill	*Lepomis macrochirus*
Bluntnose Minnow[3]	*Pimephales notatus*
Creek Chub	*Semotilus atromaculatus*
Golden Redhorse	*Moxostoma erythrurum*
Grass Pickerel[3]	*Esox americanus*
Green Sunfish	*Lepomis cyanellus*
Johnny Darter	*Etheostoma nigrum*
Largemouth Bass	*Micropterus salmoides*
Longear Sunfish	*Lepomis megalotis*
Orangespotted Sunfish	*Lepomis humilis*
Quillback	*Carpiodes cyprinus*
Spotfin Shiner[3]	*Notropis spilopterus*
Striped Shiner	*Notropis chrysocephalus*

[1] From Bailey et al. (1970)
[2] Collected using seines varying from 1.5 - 9 m in length
[3] Found in the drainage ditch

TABLE 10

SUMMARY OF SEINE CATCH OF FISH FROM THE SCIOTO RIVER AND THE DRAINAGE DITCH AT THE STATE ROUTE 762 BRIDGE, PICKAWAY COUNTY, OHIO, 30 MAY, 28 JUNE, AND 18 JULY 1979

Species	Number Captured	% of Total by Number	Length (mm)		Weight (g)		% of Total by Weight
			Mean	Range	Mean	Total	
Bluegill	2	3.2	47	45 - 49	4.0	8.0	1.4
Bluntnose Minnow	15	23.8	38	25 - 78	1.9	28.5	4.8
Creek Chub	2	3.2	48	45 - 51	2.5	5.0	1.0
Golden Redhorse	1	1.6	24	-	1.0	1.0	0.2
Grass Pickerel	1	1.6	146	-	57.0	57.0	9.7
Green Sunfish	1	1.6	28	-	1.0	1.0	0.2
Johnny Darter	2	3.2	59	55 - 63	1.0	2.0	0.3
Largemouth Bass	1	1.6	27	-	1.5	1.5	0.2
Longear Sunfish	1	1.6	69	-	3.5	3.5	0.5
Orangespotted Sunfish	3	4.8	46	31 - 61	2.5	7.5	1.3
Quillback	1	1.6	222	-	421.0	421.0	71.6
Spotfin Shiner	2	3.2	72	69 - 75	2.8	5.5	0.9
Striped Shiner	31	49.2	53	41 - 75	1.5	46.5	7.9
TOTAL	63	100.0				588.0	100.0

TABLE 11

SCIENTIFIC AND COMMON NAMES[1] OF FISH SPECIES COLLECTED[2] FROM MUD RUN AT THE STATE ROUTE 762 BRIDGE, PICKAWAY COUNTY, OHIO, 30 MAY, 28 JUNE, 18 JULY 1979

COMMON NAME	SCIENTIFIC NAME
Blacknose Dace	Rhinichthys atratulus
Bluntnose Minnow	Pimephales notatus
Creek Chub	Semotilus atromaculatus
Johnny Darter	Etheostoma nigrum
Mottled Sculpin	Cottus bairdi
Rainbow Darter	Etheostoma caeruleum
Silverjaw Minnow	Ericymba buccata
Southern Redbelly Dace	Phoxinus erythrogaster
Striped Shiner	Notropis chrysocephalus
Stoneroller	Campostoma anomalum
White Sucker	Catostomus commersoni

[1] From Bailey et al. (1970)
[2] Collected using seines varying from 1.5 - 9 m in length

TABLE 12

SUMMARY OF SEINE CATCH OF FISH FROM MUD RUN AT THE STATE ROUTE 762 BRIDGE, PICKAWAY COUNTY, OHIO, 30 MAY, 28 JUNE, AND 18 JULY 1979

Species	Number Captured	% of Total by Number	Length (mm)		Weight (g)		% of Total by Weight
			Mean	Range	Mean	Total	
Blacknose Dace	4	2.3	54	45 - 68	2.0	8.0	3.4
Bluntnose Minnow	16	9.2	28	26 - 72	1.2	19.0	8.2
Creek Chub	42	24.3	16	13 - 51	0.9	38.0	16.4
Johnny Darter	36	20.8	42	31 - 53	1.1	39.5	17.1
Mottled Sculpin	1	0.5	14	-	0.5	0.5	0.2
Rainbow Darter	12	6.9	46	33 - 48	1.3	16.0	6.9
Silverjaw Minnow	5	2.9	55	48 - 61	1.7	8.5	3.7
Southern Redbelly Dace	6	3.5	73	69 - 78	2.0	12.0	5.2
Striped Shiner	16	9.2	50	41 - 59	1.9	30.5	13.2
Stoneroller	34	19.6	58	56 - 62	1.7	57.0	24.6
White Sucker	1	0.5	69	-	2.5	2.5	1.1
TOTAL	173	100.0				231.5	100.0

TABLE 13

LISTING OF VASCULAR FLORA

State Route 762 at the Scioto River-Pickaway County

Common Name	Scientific Name
Trees:	
Black Willow	*Salix nigra*
Cottonwood	*Populus deltoides*
American Elm	*Ulmus americana*
Hackberry	*Celtis occidentalis*
Sycamore	*Platanus occidentalis*
Honey Locust	*Gleditsia triacanthos*
Box Elder	*Acer negundo*
Red Maple	*Acer rubrum*
Silver Maple	*Acer saccharinum*
Ohio Buckeye	*Aesculus glabra*
Ash	*Fraxinus sp.*
Shrubs:	
Hawthorn	*Crataegus sp.*
Red Bud	*Cercis canadensis*
Herbaceous Vegetation:	
Tiger Lily	*Lilium tigrinum*
Asparagus	*Asparagus officinalis*
Solomon's Seal	*Polygonatum sp.*
Stinging Nettle	*Urtica sp.*
Goosefoot	*Chenopodium sp.*
Rue Anemone	*Anemonella thalictroides*
Garlic Mustard	*Alliaria officinalis*
Watercress	*Nasturtium officinale*
Yellow Rocket	*Barbarea vulgaris*
Wood Sorrel	*Oxalis sp.*
Poison Ivy	*Rhus radicans*
Jewelweed	*Impatiens sp.*
Riverbank Grape	*Vitus riparia*
Virginia Creeper	*Parthenocissus quinquefolia*
Marsh Blue Violet	*Viola cucullata*
Poison Hemlock	*Conium maculatum*
Golden Alexander	*Zizia aurea*
Queen Anne's Lace	*Daucus carota*
Common Milkweed	*Asclepias syriaca*
Bluebell	*Mertensia virginica*
Henbit	*Lamium purpurea*
Raspberry	*Rubus sp.*
Common Burdock	*Arctium minus*
Dandelion	*Taraxacum officinale*
Rooted Aquatic Vascular Plants:	
Arrowhead	*Sagittaria sp.*
Smartweed	*Polygonum sp.*

TABLE 14

LISTING OF AMPHIBIAN AND REPTILIAN
FAUNA OBSERVED WITHIN THE STUDY AREA

COMMON NAME	SCIENTIFIC NAME
Amphibians	
American Toad	*Bufo americanus americanus*
Bullfrog	*Rana catesbeiana*
Green Frog	*Rana clamitans*
Reptiles	
Northern Water Snake	*Natrix sipedon sipedon*
Snapping Turtle	*Chelydra serpentina*

TABLE 15

LISTING OF AVIFAUNA OBSERVED WITHIN THE STUDY AREA-May 6, 1979

State Route 762 at the Scioto River-Pickaway County

Common Name	Scientific Name
Mallard	*Anas platyrhynchos*
Turkey Vulture	*Cathartes aura*
Osprey	*Pandion halioetus carolinensis*
Spotted Sandpiper	*Actitis macularia*
Mourning Dove	*Zenaidura macroura*
Chimney Swift	*Choetura pelagica*
Common Flicker	*Colaptes auratus*
Eastern Wood Pewee	*Contopus virens*
Blue Jay	*Cyanocitta cristata*
Common Crow	*Corvus brachyrhynchos*
Tufted Titmouse	*Parus bicolor*
White-breasted Nuthatch	*Sitta carolinensis*
House Wren	*Troglodytes aedon*
Gray Catbird	*Dumetella carolinensis*
Robin	*Turdus migratorius*
Wood Thrush	*Hylocichla mustelina*
Starling	*Sturnus vulgaris*
White-eyed Vireo	*Vireo griseus*
Red-eyed Vireo	*Vireo olivaceus*
Warbling Vireo	*Vireo gilvus*
Blue-winged Warbler	*Vermivora pinus*
Yellow-rumped Warbler	*Dendroica coronata*
Black-throated Green Warbler	*Dendroica virens*
Common Yellowthroat	*Geothlypis trichas*
House Sparrow	*Passer domesticus*
Orchard Oriole	*Icterus spurius*
Northern Oriole	*Icterus galbula*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Scarlet Tanager	*Piranga olivacea*
Cardinal	*Richmondena cardinalis*
White-throated Sparrow	*Zonotrichia albicollis*
Song Sparrow	*Melospiza melodia*

TABLE 16

LISTING OF AVIFAUNA OBSERVED WITHIN THE STUDY AREA-June 22, 1979

State Route 762 at the Scioto River-Pickaway County

Common Name	Scientific Name
Wood Duck	*Aix sponsa*
Rock Dove	*Columbia livia*
Mourning Dove	*Zenaidura macroura*
Chimney Swift	*Chaetura pelagica*
Common Flicker	*Colaptes Auratus*
Red-bellied Woodpecker	*Centurus carolinus*
Hairy Woodpecker	*Dendrocopos villosus*
Great-crested flycatcher	*Myiarchus crinitus*
Eastern Wood Pewee	*Contopus virens*
Black-capped Chickadee	*Parus atricapillus*
House Wren	*Troglodytes aedon*
Gray Catbird	*Dumetella carolinensis*
Robin	*Turdus migratorius*
Wood Thrush	*Hylocichla mustelina*
Starling	*Sturnus vulgaris*
Red-eyed Vireo	*Vireo olivaceus*
Warbling Vireo	*Vireo gilvus*
Common Yellowthroat	*Geothlypis trichas*
House Sparrow	*Passer domesticus*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Cardinal	*Richmondena cardinalis*
Indigo Bunting	*Passerina cyanea*
American Goldfinch	*Spinus tristis*

TABLE 17

LISTING OF AVIFAUNA OBSERVED WITHIN THE STUDY AREA - JULY 30, 1979
STATE ROUTE 762 AT THE SCIOTO RIVER - PICKAWAY COUNTY

COMMON NAME	SCIENTIFIC NAME
Mourning Dove	Zenaidura macroura
Blue Jay	Cyanocitta cristata
Tufted Titmouse	Parus bicolor
White-breasted Nuthatch	Sitta carolinensis
House Wren	Troglodytes aedon
Gray Catbird	Dumetella carolinensis
Robin	Turdus migratorius
Red-eyed Vireo	Vireo olivaceus
Warbling Vireo	Vireo gilvus
Common Yellowthroat	Geothlypis trichas
House Sparrow	Passer domesticus
Red-winged Blackbird	Agelaius phoeniceus
Common Grackle	Quiscalus quiscula
Cardinal	Richmondena cardinalis
Indigo Bunting	Passerina cyanea
Song Sparrow	Melospiza melodia

TABLE 18

LISTING OF MAMMALIAN FAUNA OBSERVED WITHIN THE STUDY AREA
STATE ROUTE 762 AT THE SCIOTO RIVER - PICKAWAY COUNTY

COMMON NAME	SCIENTIFIC NAME
Cottontail Rabbit	*Sylvilagus floridanus*
Eastern Chipmunk	*Tamias striatus*
Eastern Gray Squirrel	*Sciurus carolinensis*
Meadow Jumping Mouse	*Zapus hudsonius*
Mink	*Mustela vison*
Raccoon	*Procyon lotor*
Shorttail Shrew	*Blarina brevicauda*
Whitetail Deer	*Odocoileus virginianus*

TABLE 19

WATER QUALITY ANALYSIS FOR THE SCIOTO RIVER AND MUD RUN
IN THE VICINITY OF STATE ROUTE 762, PICKAWAY COUNTY, OHIO

Parameter	Units	Scioto River Station No. 1	Scioto River Station No. 3	Scioto River Station No. 5	Mud Run Station No. 6
Date		5/30/79	5/30/79	5/30/79	5/30/79
Time		3:30 p.m.	4:00 p.m.	4:45 p.m.	5:30 p.m.
Temperature	^{o}C	18.8	18.8	19.1	22.8
Turbidity	NTU	11	--	28	8
Transparency	meters	0.40	0.40	0.45	> 0.30
Conductivity	umhos/cm	570	570	595	610
Dissolved oxygen	ppm	9.4	9.5	9.3	8.5
Hydrogen ion (pH)	pH units	7.89	--	7.94	8.22
Soluble phosphorus	ppb	286.0	--	290.0	22.2
Total phosphorus	ppb	386.0	--	398.0	41.6
Ammonia nitrogen	ppb	4.3	--	7.4	4.5
Nitrate + nitrite	mg/l	8.7	--	10.0	4.5
Chloride	mg/l	43	--	44	27
Total alkalinity	mg/l	154	--	148	244
Iron	ppb	290	--	710	160
Sulfate	mg/l	130	--	120	72
Total hardness	mg/l	298	--	304	274
Total acidity	mg/l	15	--	11	9
Water depth	meters	2.1	2.1	2.1	0.3

TABLE 20

WATER QUALITY DATA FOR THE SCIOTO RIVER AT COLUMBUS, OHIO

1. Year	1976	1976	1977	1977
2. Date	April 1	August 20	March 1	July 6
3. Time	1045	1200	1445	1430
4. Discharge (CFS)	675	339	2630	422
5. Conductivity (umhos/cm)	600	530	440	640
6. pH (units)	7.6	8.0	7.5	8.5
7. Temperature (^{o}C)	11.0	25.0	2.0	28.5
8. Dissol. oxygen (mg/l)	9.5	8.0	13.2	11.8
9. DO saturation (%)	86	95	96	150
10. BOD-5 day (mg/l)	2.9	4.2	5.7	5.7
11. Hardness (mg/l)	270	230	170	260
12. Dissol. calcium (mg/l)	73	60	44	65
13. Dissol. magnesium (mg/l)	22	19	14	24
14. Dissol. sodium (mg/l)	17	20	17	22
15. Dissol. potassium (mg/l)	2.8	3.6	5.8	3.6
16. Total alkalinity (mg/l)	167	147	90	161
17. Carbon dioxide (mg/l)	8.2	2.9	5.6	1.0
18. Dissol. sulfate (mg/l)	92	75	53	95
19. Dissol. chloride (mg/l)	30	36	34	40
20. Dissol. flouride (mg/l)	0.3	0.8	0.2	0.4
21. Dissol. silica (mg/l)	5.7	4.1	4.8	0.2
22. Dissol. solids (mg/l)	344	307	227	347
23. Nitrate (N, mg/l)	3.0	2.5	3.2	1.8
24. Nitrite (N, mg/l)	0.08	0.09	0.06	0.04
25. Ammonia (N, mg/l)	0.25	0.15	0.62	0.10
26. Total phosphorus (mg/l)	0.27	0.16	0.33	0.12
27. Total arsenic (ug/l)	0.0	3.0	2.0	3.0
28. Total chromium (ug.l)	10	<10	30	10
29. Total copper (ug.l)	30	10	30	6
30. Dissol. iron (ug/l)	100	30	60	30
31. Total lead (ug/l)	17	44	23	36
32. Dissol. manganese (ug/l)	30	20	40	10
33. Total mercury (ug/l)	<0.5	<0.5	0.0	0.0
34. Total zinc (ug/l)	40	90	60	40
35. Total organic carbon (ug/l)	10	13	9.8	6.2

Data Source: U.S. Geological Survey (1977, 1978) Hydrologic Station No. 03227500

TABLE 21

WATER QUALITY DATA FOR THE SCIOTO RIVER AT CIRCLEVILLE, OHIO

1. Year	1976	1976	1977	1977
2. Date	April 6	August 12	March 2	July 27
3. Time	1345	1415	1400	1200
4. Discharge (CFS)	1640	1650	4320	597
5. Conductivity (umhos/cm)	680	620	560	745
6. pH (units)	8.0	7.6	7.9	7.5
7. Temperature (^{o}C)	13.0	24.0	3.0	24.0
8. Dissol. oxygen (mg/l)	7.7	4.6	12.1	4.0
9. DO saturation (%)	86	54	90	47
10. BOD-5 day (mg/l)	3.1	3.9	5.5	4.7
11. Hardness (mg/l)	310	280	240	260
12. Dissol. calcium (mg/l)	75	71	61	66
13. Dissol. magnesium (mg/l)	30	25	22	24
14. Dissol. sodium (mg/l)	22	19	20	38
15. Dissol. potassium (mg/l)	3.1	3.6	4.6	5.6
16. Total alkalinity (mg/l)	208	197	144	153
17. Carbon dioxide (mg/l)	4.1	9.6	3.5	9.5
18. Dissol. sulfate (mg/l)	95	69	66	120
19. Dissol. chloride (mg/l)	34	28	40	51
20. Dissol. flouride (mg/l)	0.4	0.4	0.3	0.5
21. Dissol. silica (mg/l)	4.5	7.7	5.6	5.4
22. Dissol. solids (mg/l)	389	342	306	403
23. Nitrate (N, mg/l)	2.7	2.7	2.9	2.4
24. Nitrite (N, mg/l)	0.20	0.16	0.06	0.35
25. Ammonia (N, mg/l)	0.99	0.46	0.82	0.80
26. Total phosphorus (mg/l)	0.51	0.52	0.39	1.10
27. Total arsenic (ug/l)	0.0	2.0	2.0	2.0
28. Total chromium (ug.l)	10	<10	20	10
29. Total copper (ug.l)	10	10	13	11
30. Dissol. iron (ug/l)	50	30	70	40
31. Total lead (ug/l)	7	10	14	9
32. Dissol. manganese (ug/l)	50	40	40	40
33. Total mercury (ug/l)	<0.5	<0.5	0.0	0.0
34. Total zinc (ug/l)	30	40	30	70
35. Total organic carbon (ug/l)	7.3	7.5	4.5	6.2

Data Source: U.S. Geological Survey (1977, 1978) Hydrologic Station No. 03230700

TABLE 22

OHIO EPA WATER QUALITY STANDARDS

Parameter	Warmwater Habitat	Exceptional Warmwater Habitat	Limited Warmwater Habitat*
1. Ammonia	13 mg/l	6.5 mg/l	13 mg/l
2. Beryllium	110 ug/l	110 ug/l	110 ug/l
3. Cadmium	12 ug/l	1.2 ug/l	12 ug/l
4. Chlorine (total residual)	2 ug/l	2 ug/l	2 ug/l
5. Cyanide	25 ug/l	25 ug/l	25 ug/l
6. Dissolved Oxygen	5.0 mg/l	6.0 mg/l	5.0 mg/l
7. Dissolved Solids	1500 mg/l	1500 mg/l	1500 mg/l
8. Conductivity	2400 mg/l	2400 mg/l	2400 mg/l
9. Iron	100 ug/l	100 ug/l	100 ug/l
10. Lead	30 ug/l	30 ug/l	30 ug/l
11. Nickel	25 ug/l	25 ug/l	25 ug/l
12. Zinc	30 ug/l	30 ug/l	30 ug/l
13. Mercury	0.2 ug/l	0.2 ug/l	0.2 ug/l
14. Chromium	100 ug/l	50 ug/l	100 ug/l
15. Phenolic Compound	10 ug/l	10 ug/l	10 ug/l
16. Phthalate Esters	3 ug/l	3 ug/l	3 ug/l
17. PCB's	0.001 ug/l	0.001 ug/l	0.001 ug/l
18. MBAS	500 ug/l	500 ug/l	500 ug/l
19. Oil and Grease	5 mg/l	5 mg/l	5 mg/l
20. pH	6.5 - 9.0	6.5 - 9.0	6.5 - 9.0

Data Source: Ohio Environmental Protection Agency (1978)

* Standards for the support of this use designation are the same as the standards for the support of the use designation for Warm Water Habitat. However, individual criterian will be varied on a case-by-case basis and will supersede the standards for other use designations where applicable.

TABLE 23

SUMMARY OF WETLAND SIGNIFICANCE

SIGNIFICANCE FACTORS	WETLAND EVALUATION
Identified Scientific Importance	0
Unusual, Threatened, Endangered Species	0
Pollution Degradation and Disturbance	0
Wetland Wildlife Importance	1
Health and Welfare	0
Wetland Size	0
Regional Context	0
Identified Natural Area	0
Recreation	0
Natural Area Qualities	0

0 - not significant
1 - marginally significant
2 - significant
x - significance not determined

FIGURES

JONES - STUCKEY LIMITED
1500 WEST FIRST AVENUE
COLUMBUS, OHIO 43212

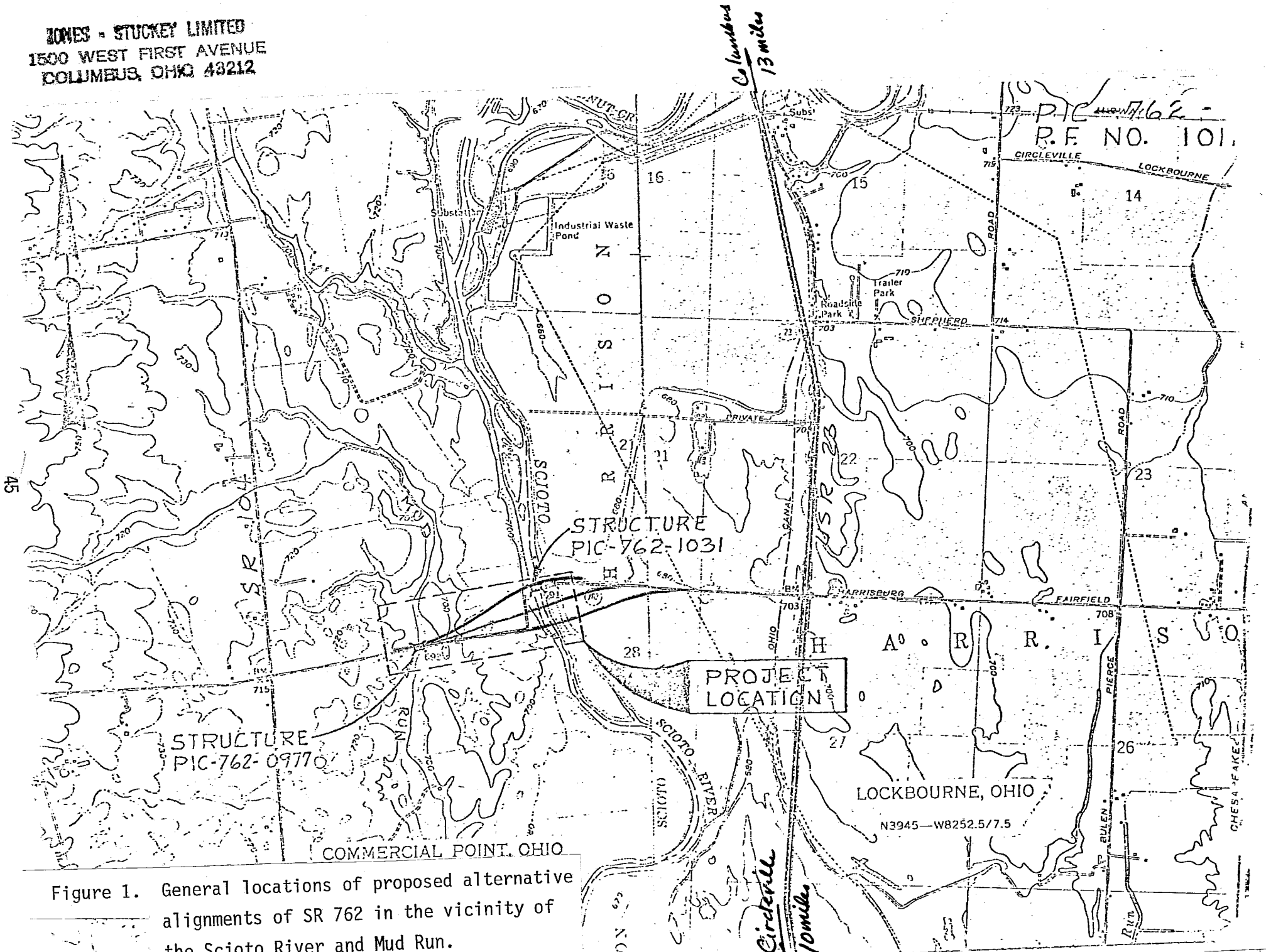


Figure 1. General locations of proposed alternative alignments of SR 762 in the vicinity of the Scioto River and Mud Run.

Figure 2. Predicted Monthly Scioto River Water Level at State Route 762 Bridge for 1976 Water Year.

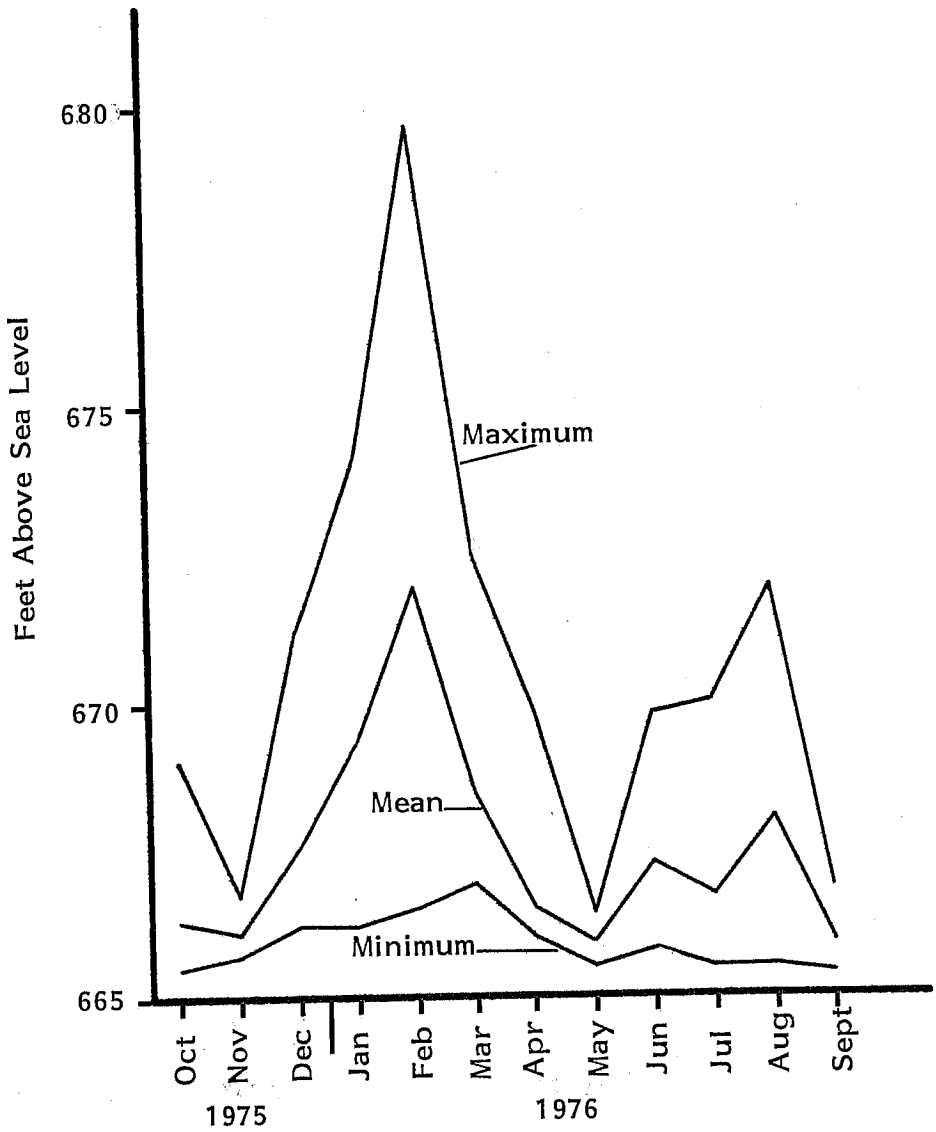
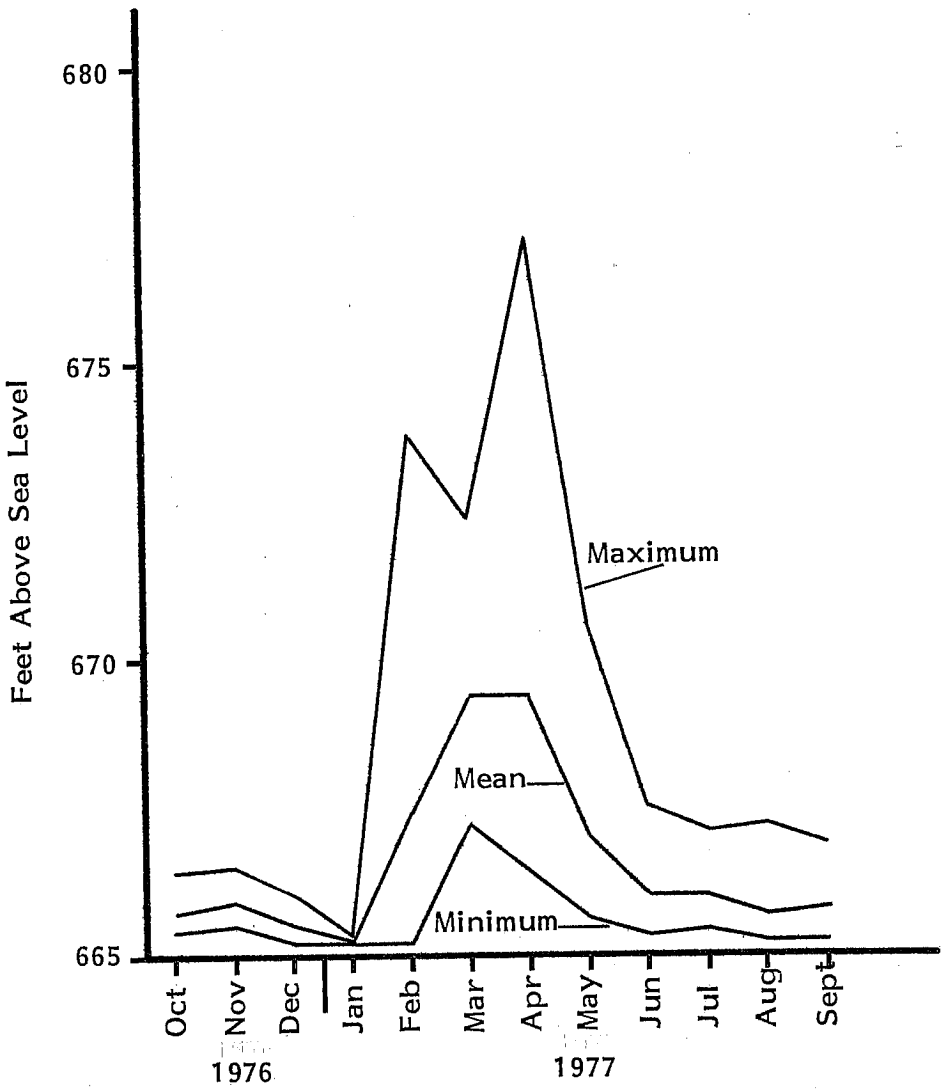
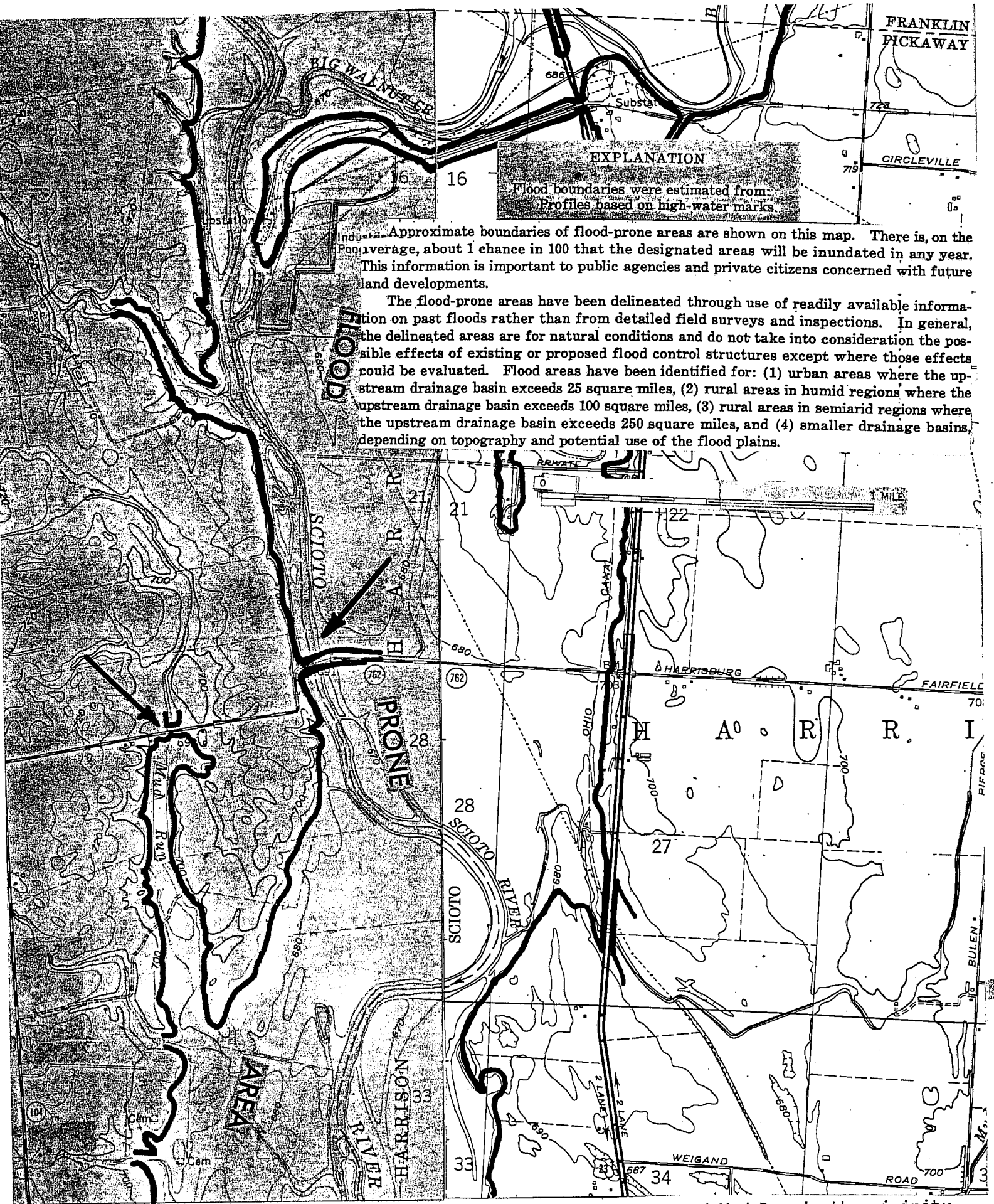


Figure 3 . Predicted Monthly Scioto River Water Level at State Route 762 Bridge for 1977 Water Year.





Approximate boundaries of flood-prone areas are shown on this map. There is, on the average, about 1 chance in 100 that the designated areas will be inundated in any year. This information is important to public agencies and private citizens concerned with future land developments.

The flood-prone areas have been delineated through use of readily available information on past floods rather than from detailed field surveys and inspections. In general, the delineated areas are for natural conditions and do not take into consideration the possible effects of existing or proposed flood control structures except where those effects could be evaluated. Flood areas have been identified for: (1) urban areas where the upstream drainage basin exceeds 25 square miles, (2) rural areas in humid regions where the upstream drainage basin exceeds 100 square miles, (3) rural areas in semiarid regions where the upstream drainage basin exceeds 250 square miles, and (4) smaller drainage basins, depending on topography and potential use of the flood plains.

Figure 4. Flood-prone areas in the valleys of the Scioto River and Mud Run in the vicinity of State Route 762 bridges (U.S.G.S., 1973 and 1974).