

CLEAR TECHNICAL REPORT NO. 126



A GENERAL OVERVIEW OF LAKE ERIE'S
NEARSHORE BENTHIC MACROINVERTEBRATE FAUNA

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INTRODUCTION

The area of Lake Erie adjacent to the shoreline which acts as a boundary region between the land and the main lake is the nearshore zone. It may also be referred to as the "coastal boundary layer" (CBL); that is, the area of the lake where the effect of the coast upon the hydrodynamics of lake water flow is pronounced (Csanady, 1977). This nearshore zone is very intensively used by man for drinking water, recreation, navigation, habitation, food resources, aesthetics, industrial process water, and waste disposal. The invertebrate biota of the nearshore zone, for the most part, has not until relatively recently been of major concern to users of the nearshore zone. Given the current national interest in all aspects of the environment, particularly with respect to maintaining and upgrading its quality, a study of the aquatic biota in the nearshore zone is a necessity to assess or measure changes in the aquatic environment.

Benthic macroinvertebrates, commonly referred to as benthos in limnological literature, are the bottom-living invertebrates larger than approximately 0.5 mm. This group is a large component of the aquatic biota and is composed primarily of organisms which are not highly migratory in nature, but rather remain in the same region of the lake bottom for much of their life history. As a result these organisms can be considered as integrating monitors of environmental changes.

The benthic macroinvertebrates are a major food resource to fish species in the nearshore zone. As a result, they are part of a food web which may include man. Activities of these organisms may regulate, moderate, or enhance various physical-chemical processes in their environment (e.g. bioturbation, the physical mixing of the bottom sediments by their activity). Some benthic species may concentrate materials, possibly toxic compounds, and through the process of biomagnification may allow these materials to infiltrate into the human resource base. Some species may prove to be nuisances.

PURPOSE OF THIS STUDY

The objectives of this study are to: (1) provide a listing of the benthic macroinvertebrate species found in Lake Erie's nearshore zone through a review of the literature; (2) provide some sort of assessment of the suitability of previous studies toward their use as a data base from which a baseline set of data may be drawn; and (3) where possible provide some historical data concerning the composition of the nearshore benthic macroinvertebrate fauna.

ASSESSMENT CRITERIA FOR LITERATURE

The suitability of a specific study towards its use in a reference data base was determined using the following criteria: (1) purpose of the study; (2) taxonomic level of the data; (3) site specificity; and (4) the quantitativeness or qualitiveness of the data.

LAKE ERIE NEARSHORE BENTHOS

Composition

Benthic macroinvertebrate species reported as being present at one time or another in the Lake Erie nearshore zone since 1843 number in excess of 500 species. Since the classification of the many taxonomic groups has changed over the years, many species reported present in the nearshore are merely synonyms of other species. The expertise of the individual investigator as well as the availability of taxonomic keys may be regarded as a source of redundancy in the data.

In general, the 500+ species of the nearshore benthos represent eight phyla within the animal kingdom (Table 1). Many of the species reported in the Lake Erie nearshore zone have no site-specific collection data. The result has been the exclusion of these species from an examination of the various study areas with site-specific information.

The benthic macroinvertebrate fauna of the nearshore zone of the Detroit River mouth consists of thirty-six reported taxa. The aquatic oligochaetes dominate the fauna in this region, numerically comprising 80-97% of the fauna with densities ranging up to 39,000 ind/m² (Carr and Hiltunen, 1965; Waybrant and Siler, 1976). Oligochaetes also dominate in terms of number of species contributing to the diversity (Table 2).

The western shore of Lake Erie along the Michigan coast has a benthic community composed of thirty-four taxa with 16 taxa present both north and south of the Raisin River and 24 taxa present in the region of the Raisin River (Tables 3, 4, and 5). Aquatic oligochaetes again predominate, comprising in excess of 80% of the fauna (Carr and Hiltunen, 1965) and contributing ten species to the total faunal diversity (Hiltunen, 1969).

The Toledo and Maumee Bay region of Lake Erie has a benthic macroinvertebrate community composed of at least 65 taxa (Table 6). The bulk of the benthos in this region is also primarily composed of oligochaetes, approximately 88% numerically (Carr and Hiltunen, 1965; Herdendorf and Cooper, 1975; USACE, 1976; Pliodzinskas, 1978). Even though oligochaetes dominate the fauna, the greatest contribution to species diversity is from the aquatic insects which contribute 38 taxa in comparison with the 11 taxa of the oligochaetes.

Eastward along the south shore of Lake Erie lies Locust Point. Locust Point is the site of the Davis-Besse Nuclear Power plant. In this region 27 taxa are reported to occur (Table 7). Aquatic oligochaetes are dominant, making up 83.5% of the fauna with the chironomid larvae contributing 11% (Center for Lake Erie Area Research, 1974/1975). Oligochaete densities in this region are approximately 1600 ind/m² while the chironomid larvae densities are approximately 250 ind/m².

East of Locust Point lies the Portage River. Benthic species reported from this region of Lake Erie include 6 taxa (Table 8). The level of identification is reported at the family and genus level. The number of actual species is much larger but at present is unknown.

Benthic macroinvertebrates reported present in the Port Clinton, Ohio nearshore zone number at least 14 taxa (Table 9). Aquatic oligochaetes are again predominant. Oligochaete densities in this section range from 300 to 1200 ind/m² and chironomid larval densities range from 19 to 250 ind/m² (United States Army Corps Engineers, 1977).

Just to the east of Port Clinton lies West Harbor. Benthic macroinvertebrates reported in this zone number 12 taxa (Table 10). In this area aquatic oligochaetes and chironomid larvae are essentially co-dominant, with total faunal densities ranging from 0 to 627 ind/m² (United States Army Corps of Engineers, 1977).

Adjacent to West Harbor is East Harbor State Park. Benthic macroinvertebrate taxa reported in the nearshore zone in this region consists of one species, the naidid oligochaete Chaetogaster diaphanus. It is highly probable that the same faunal elements found at West Harbor are also found at East Harbor.

To the east of East Harbor lies Sandusky Bay. The total number of benthic macroinvertebrates reported in this region of Lake Erie number 101 taxa (Table 11). Lindsay (1976) states that the current benthic community of Sandusky Bay is dominated by oligochaetes and chironomid larvae. He notes that six species make up 90% of the benthic fauna: Branchiura sowerbyi, Limnodrilus hoffmeisteri, Pelosclex ferox (oligochaetes), Chironomus plumosus, Procladius bellus, and Coelotanypus scapularus (Chironomids). The bulk of species reported from the Sandusky Bay area are the Odonata (dragonflies and damselflies) recorded by Hine (1901).

At the junction of Sandusky Bay with Lake Erie lies Cedar Point. Benthic macroinvertebrates reported in this region number 36 taxa consisting of 16 bivalve molluscs, 10 oligochaetes, and 10 soldier-flies (Table 12).

Further east of Sandusky Bay and Cedar Point lies the Huron River. Brown (1953) reported six benthic macroinvertebrate taxa in the Huron River mouth (Table 13). Brown (1953) indicated that eight benthic macroinvertebrate taxa were found at the mouth of the Vermilion River (Table 14) and eight in the mouth of the Black River (Table 15). Maximum oligochaete densities in Huron and Vermilion Rivers were on the order of 6450 and 430 ind/m². The maximum oligochaete density reported by Brown (1953) for the Black River was 1.66×10^6 ind/m² (1040 ind/in²).

Avon Lake, Ohio is the site of a fossil-fueled electric power generating plant operated by The Cleveland Electric Illuminating Company. Benthic macroinvertebrates reported in this region of the Lake Erie nearshore zone consist of 31 taxa (Table 16). The maximum density of all organisms in this area was 361 ind/m² with oligochaetes being the dominant group (Aquatic Ecology Associates, 1976).

East of Avon Lake is Rocky River. Twelve benthic macroinvertebrate taxa are reported at its mouth (Table 17). Aquatic oligochaetes dominate the fauna in this region with densities reaching 270,000 ind/m² (Brown, 1953).

The Cleveland region of the Lake Erie nearshore encompasses the entire Cuyahoga County shoreline. At least fifty benthic macroinvertebrate taxa are reported specifically from Cleveland's nearshore zone (Table 18). Aquatic oligochaetes dominate the fauna and compose better than 94% of the fauna, with densities ranging up to 40,000 ind/m² (Rolan, 1973).

Eastlake, Ohio is the site of another fossil-fueled electric power plant operated by The Cleveland Electric Illuminating Company. Twenty-five taxa are reported in the nearshore zone in the vicinity of the power plant (Table 19). Oligochaetes dominate the fauna. The maximum density reached 5587 ind/m², of which approximately 5000 ind/m² were oligochaetes (Aquatic Ecology Associates, 1976). Davis (1957) reported the presence of the colonial hydrozoan Cordylophoa lacustris in this region.

The Grand River area of the Lake Erie nearshore zone encompasses not only the mouth of the Grand River but also Mentor Marsh, a wetland adjacent to the lake. Sixty-five taxa have been reported from this region (Tables 20 & 21). Currently aquatic oligochaetes and chironomid larvae dominate the fauna (United States Army Corps of Engineers, 1975). Oligochaete densities in this area of Lake Erie are approximately 1600 ind/m² (unpublished data, USEPA, Ohio-Michigan Office, 1974).

Ashtabula lies between the Grand River and Conneaut Creek. The benthic fauna in this portion of the lake is composed of 32 taxa (Table 22). Aquatic oligochaetes dominate this region with densities ranging up to 9000 ind/m² (Brown, 1953).

Conneaut, Ohio is the proposed site of a very large steel plant by the United States Steel Company. Benthic macroinvertebrates in this area of Lake Erie (including the mouths of Conneaut Creek and Turkey Creek) are reported to include at least 37 taxa (Table 23). Aquatic oligochaetes dominate in Conneaut Creek with densities ranging up to 3440 ind/m² (Brown, 1953). Hard bottom conditions exist at the mouth of Turkey Creek. In Turkey Creek aquatic insects seem predominant. Stoneflies are present, indicating cool running water.

The next major region east of Conneaut Creek is at Erie, Pennsylvania and Presque Isle. At least three species of pelecypod were reported to be present in the vicinity of Erie: Fusconia flava, Lasmigonia costata, and Elliptio dilatatus (Grier, 1920).

The final south shore region is that encompassed by the state of New York. Benthic macroinvertebrates reported from this region number at least 44 taxa (Table 24). Oligochaeta, chironomidae, and sphaeriidae are the dominant forms present in this fauna. In the vicinity of Lackawanna, oligochaete densities ranged up to 2600 ind/m² while the chironomids ranged up to 650 ind/m², and the sphaeriids up to 140 ind/m² (State University College at Buffalo, 1969).

A totally separate area which may be considered to have a nearshore zone is that of the Lake Erie islands. This region has had reported at least 132 taxa (Table 25).

GENERAL LITERATURE SYNOPSIS

A number of studies dealing with specific components or taxonomic groups of the benthos have been conducted. The major works specifically dealing with the entire benthic fauna of this region were: Kreeker and Lancaster (1933), Brown (1953), and Veal and Osmond (1968). Wright and Tidd (1933), Shelford and Boesel (1942), Wright et al. (1955), Carr and Hiltunen (1965), and Brinkhurst, et al. (1968) also studied the nearshore zone, but a large portion of their studies dealt with main lake benthos.

In this decade numerous studies of the nearshore benthos have appeared. Many of these studies are not in the general scientific literature but rather are in various technical reports and environmental impact statements. Barton and Hynes (1978 a,b) report on the Canadian shore (Table 26). The U.S. shore reports include those of: Great Lakes Laboratory (1972, 1973), Rolan (1973), Zagorski and Wilcox (1973), Center for Lake Erie Area Research (1974/1975), Herdendorf and Cooper (1975), U.S. Army Corps of Engineers (1975; 1976 a, b, c, d; 1977 a, b, c, d), Waybrant and Siler (1976), Cooper and Herdendorf (1977), and the United States Environmental Protection Agency (1977).

Kreeker and Lancaster (1933) studied the nearshore zone in the western end of Lake Erie. The purpose of this study was to select the major types of shoreline and to study the relationship of shore conditions to the distribution and abundance of the animals present, i.e., a study of substrate-organism interactions. The major parameters of interest were: (1) water depth; (2) substrate type; (3) total number of individuals present; (4) total number of different taxa present; and (5) a listing of the benthos found in each substrate-depth category. Specific collecting sites were not given in this study. The taxonomic level of the data was at the genus level with some taxa being labeled only at the family level. This study provided a listing of 44 taxa (37 genera, 7 families) present to a depth of six feet. This study is an excellent source of information on the very nearshore waters of the southwestern edge of Lake Erie. It is also the only nearshore study within the first three decades of the twentieth century.

Brown (1953) conducted a study specifically limited to the river mouths of ten south shore rivers. The study's purpose was to survey the bottom macroinvertebrate fauna and use the abundance of Tubificid oligochaetes to determine the relative degree of pollution present. The major parameters of concern were: (1) abundance of the fauna; (2) composition of the fauna; and (3) use of these parameters as an index of pollution. Collecting sites were at the mouths of the following rivers: Maumee, Portage, Sandusky, Huron, Vermilion, Black, Rocky, Grand, Ashtabula, and Conneaut. The taxonomic levels of the data in this study are a mixture of family, genus, and species designations. Quantitative data on tubificids is presented

for all rivers but the Grand. Qualitative composition data are presented for all rivers along with notes on the relative abundance of the various groups. This study provides a generalized survey of the Lake Erie benthos associated with river mouths along the Ohio shore and is a reasonable source of information prior to the 1960's.

Veal and Osmond (1968) studied the Canadian nearshore of the entire lake (Table 26). These authors stated that previous information on the benthos of the Central and Eastern Lake Erie Basins was practically non-existent. Their study was performed to supplement limnological data gathered by the Ontario Water Resources Commission and to assist in determining water quality. They hoped that their study would provide useful comparative data for future studies. Specific collecting locales are indicated in the study but a comparison of the three basins is the major emphasis of the publication. Taxa were identified at the genus and species levels. Data gathered were both quantitative and qualitative and provide essentially the first assessment of the Canadian benthic fauna.

Several studies sampled both nearshore and main lake sites. The results of a Western Basin survey conducted in 1929 and 1930 were presented in Wright and Tidd (1933) and Wright, et al. (1955). Site specific data of both a quantitative and qualitative type are to be found in these reports. Taxa identified are a mixture of taxonomic levels (Class, Order, Family, Genus, and Species). These investigators devised a pollution index utilizing the density of aquatic oligochaetes and the mayfly Hexagenia. The use of this index in Lake Erie has provided a reference point for other investigators to compare the degree of change in the status of the lake and the areal extent of pollution. This report is a good source of information showing the relative areal extent of pollution of the western end of Lake Erie.

In the summer of 1937, Shelford and Boesel (1942) examined the bottom fauna of the island region of Lake Erie. These authors defined four benthic communities based upon the dominant species. The community types associated with the nearshore zone of the mainland at Catawba Point were: the Hydro-psyche-Goniobasis and the Pleurocera-Lampsilis communities. Site specific data as such are not given but the taxa collected in each community type are listed along with abundance data. This study can be rated as a good source in terms of faunal composition, primarily at the genus and species levels.

Carr and Hiltunen (1965) resurveyed the study areas of Wright and Tidd (1933) and Wright, et al. (1955) and compared the fauna of their 1961 study to the 1929/30 studies. They found the areal extent of pollution had increased substantially, from 263 km² to 1020 km², or approximately 500%. Specific collection sites are noted in this study as well as the taxonomic groups present at each site. Organisms reported as being present were identified to the family, genus, and species levels except for leeches which were classified at the level of class. The data presented was both quantitative and qualitative. This study provides an excellent source of information regarding changes in the benthic fauna of western Lake Erie.

Brinkhurst, Hamilton, and Herrington (1968) reported the results of a series of synoptic cruises throughout Lakes Erie, Ontario, and Georgian Bay

of Lake Huron. The study dealt with open water benthos. However, sampling sites nearest the shore may represent some of the nearshore fauna. The study contained site specific information for Lake Erie with station location maps and collection sites for each species. Identification was at the genus and species levels. The data were semiquantitative in that actual densities by species (at least on range maps) was either by open or closed symbols -- open symbols, less than 9 ind/m²; closed symbols, greater than 9 ind/m². This study also provides a key to the tubificid oligochaetes found in the Great Lakes as well as providing a trophic condition index. Other studies have examined individual groups of organisms in the nearshore zone and are abstracted in Table 27.

Barton and Hynes (1976, 1978 a,b) examined the benthic macroinvertebrates of Lake Erie's Canadian shorewave-swept zone (Table 26). The purpose of these studies was to expand the knowledge of large-lake benthos to include the wave-swept zone (0-2m depth). The parameters of interest were: (1) species composition; (2) substrate type; (3) number of taxa; (4) density; and (5) seasonal variation. Specific collection sites are noted on location maps. Taxonomic levels of the data were largely at the genus and species level. These studies provide a list of 170 taxa, are an excellent source of information on the Canadian nearshore zone and serve as the only major studies of this region to date.

Rolan (1973) studied the zooplankton and benthos of Cleveland's nearshore zone. The purpose of the study was to delineate the macrobenthic communities of this region, to make estimates of abundance, and to make preliminary assessments of pollution effects. The parameters of interest were: species composition, density, and "degree" of pollution. Ordination analysis was used to order community components against a pollution continuum. Specific collecting sites are noted in this study and species composition by site is given. The taxonomic level of the data is at the species level with some organisms listed at the family and genus levels. The data are quantitative and are a good source of information on the benthos of the Cleveland Harbor and its surrounding areas.

Zagorski and Wilcox (1973) examined the macroinvertebrates of Presque Isle Bay and Peninsula. The purpose of the study was to provide data concerning benthos in the vicinity of Erie, Pennsylvania. Three sampling sites are noted in this paper. The major parameters of interest are taxonomic composition and density. The taxonomic level of the data is at the genus and species level and is quantitative. This study lists 14 taxa present in the Presque Isle region of Lake Erie with oligochaetes, chironomid larvae, and sphaeriid clams predominant.

Investigators at Ohio State University's Center for Lake Erie Area Research examined various biological parameters, including benthos, in the vicinity of the Davis-Besse Nuclear Power Plant (CLEAR, 1974/75). The purpose of the study was to ascertain the character of the Lake Erie aquatic ecosystem prior to the operation of the power plant. Specific sampling sites are noted and given in a location map. The parameters of interest were species composition and density. The taxonomic level of the data was the genus and species level and the data were quantitative. Thirty-two taxa were

reported present with the total population density ranging from 19 to 5857 individuals/m². Aquatic oligochaetes were predominant. This set of studies is the only one for this particular region.

From 1972 through 1974 CLEAR investigators (OSU) studied a portion of Sandusky Bay as part of a site feasibility study for a power plant (CLEAR, 1975). The sites sampled were detailed in the location map and site specific data presented. The major benthos parameters were composition and abundance. The taxonomic data were quantitative and at the genus and species levels. Twenty-eight benthic genera were found in Sandusky Bay but the benthos was dominated by six species, 3 oligochaete and 3 chironomid. A dissertation on the benthos of the bay resulted from the CLEAR studies (Lindsay, 1976).

Other studies in the nearshore are those of Herdendorf and Cooper (1975) and Cooper and Herdendorf (1977). Herdendorf and Cooper (1975) examined the impact of commercial sand and gravel dredging in the Maumee River and Maumee Bay area of Lake Erie. The study is extensive and provides a large amount of site specific information. The data are quantitative and at the taxonomic level of genus and species. Cooper and Herdendorf (1977) produced an examination of the resources of the Lake Erie Island Region for the Ohio Coastal Zone Management Program. Benthic populations are discussed on a qualitative basis with taxonomic levels at the family, genus, and species levels.

A study by the Michigan Department of Natural Resources (Waybrant and Siler, 1976) examined the Michigan portion of Lake Erie. The purpose of the study was to perform a survey of the Michigan waters. The parameters of interest were species composition and density. Specific collection sites were given and data provided for each site. Taxonomic levels of the data are at the class, order, family, genus, and species level. The data are quantitative. This is an excellent source of information on the nearshore waters of Michigan with oligochaetes, chironomids, and sphaeriid clams dominating the benthic fauna.

Impact statements by the U.S. Army Corps of Engineers provide a source of literature on the nearshore zone. The 1976 Final Statement for the Detroit River (USACE, 1976) states that the lower Detroit River benthos has very high numbers and percentages of forms tolerant of environmental stress. Site specific data are not given. Only a general overall assessment is provided. Benthos data for the River Raisin and Monroe Harbor (USACE, 1976) are those of Carr and Hiltunen (1965) as well as other data gathered for this report. Oligochaetes made up 49-93% wet weight of the total benthos. The greatest number of benthic organisms were in the organically rich sediments of Plum Creek while the least were in the wave swept zones. No benthos was present in the River Raisin during the summer months. Aside from the data of Carr and Hiltunen (1965) used in this report, very little new data, except for total wet weight, appear in these reports.

The confined disposal site at Bolles Harbor has a benthic fauna composed of forms considered to be pollution tolerant (USACE, 1975). Seven taxa of benthos are found in the Toledo Harbor area with oligochaetes dominating (USACE, 1976). Aquatic oligochaetes dominate the benthic fauna in the Port Clinton navigation channel with total numbers ranging from 300 to

1200/m² (USACE, 1977). At West Harbor the USACE (1977) found 14 taxa, identified at the genus and species levels. Oligochaete and chironomid densities in this region are very similar. Apparently co-dominance of the community occurs. The data in both the Port Clinton and West Harbor reports are site specific and quantitative. Ottawa River Harbor has a benthic fauna composed of oligochaetes and chironomids (USACE, 1976). Oligochaetes dominate with densities up to 6800/m². The data are site specific and quantitative with the taxonomic level of the data being at the family and genus levels. The Erie, Pennsylvania, harbor has a bottom fauna composed of four taxa and dominated by oligochaetes (USACE, 1975). The taxonomic level of the data at this site was family and genus level. The data were quantitative and site specific. Buffalo Harbor contains 17 taxa (oligochaetes predominating). Taxonomic data were at the family, genus, and species level. The data were both quantitative and site specific (USACE, 1974).

The Great Lakes Laboratory of State University College at Buffalo sampled the benthic fauna at the mouth of Cattaraugus Creek and at Times Beach in New York (GLL 1972, 1973). The purpose of both reports was to provide information for the Corps of Engineers. Site specific data and taxonomic information at the family and genus levels are provided. The data are quantitative. Cattaraugus Creek had six taxa while the Times Beach area had seven taxa. Both regions were dominated by oligochaetes.

The USEPA sponsored a number of studies involving the nearshore zone. Sargent (1975) studied Buffalo River and cited a 1963 report by Blum indicating no bottom organisms were present in the dredged portion of the river. Sargent cited a series of reports by Sweeney and the Great Lakes Laboratory of State University College at Buffalo which indicated the presence of eight taxa described at the order and family level. In 1977, the USEPA (Philip Berkeley, USACE-personal communication, 1978) examined the bottom sediments of Dunkirk and Barcelona (New York), and Conneaut and Ashtabula (Ohio). These reports provided benthic data which were site specific, quantitative, and at the genus and species taxonomic levels. The benthic fauna at Dunkirk was dominated by oligochaetes and was composed of 16 taxa. Barcelona, Conneaut, and Ashtabula likewise had oligochaetes dominating the benthic fauna. The total number of taxa collected at these sites were 18, 24, and 22 at Barcelona, Conneaut, and Ashtabula, respectively.

Various consulting firms have produced a number of technical reports concerning Lake Erie's nearshore fauna. For the most part this source of information was not included in this general synopsis of the literature.

HISTORICAL CHANGES IN LAKE ERIE NEARSHORE BENTHOS

For all intents and purposes benthic macroinvertebrate data for Lake Erie's nearshore zone prior to 1900 is non-existent. Due to this paucity of information an adequate historical treatment is precluded. As a result only tenuous statements about the pre-1900 benthos are made.

European man settled in the Lake Erie region in the 1600's with the first major settlement being at Pontchartrain du Detroit in 1701. Fur trading was the main economic concern for settling the area in this period. It is at this location where the pollution of Lake Erie probably began with the flow of skin processing wastes into streams feeding the Detroit River. No noticeable effect on the benthic fauna of Lake Erie's nearshore zone is likely to have occurred at this time because of the small volume of waste and the large assimilative capacity of the lake. Other major settlements sprang up in 1753 (Erie, Pa.), 1794 (Fort Industry), 1796 (Cleveland, Windsor), and 1803 (Buffalo). No perceptible effect on the benthos in these regions of Lake Erie's nearshore is likely to have occurred.

The first changes in the nearshore benthos probably occurred in the period of 1825-1827 with the opening of the Erie and Cleveland-Akron canals. What changes occurred, if any, are not known. Benthic community changes began at the major settlements of Windsor, Detroit, Toledo, Cleveland, Erie, and Buffalo but were very slight and only gradually began to spread outward from these specific areas.

The benthos of the Lake Erie nearshore was probably dominated by aquatic insects, particularly mosquitos, mayflies, caddisflies, dragonflies, beetles, and midges. Large concentrations or beds of naiad mussels are likely to have been present from Fort Erie to Detroit. Sponges, bryozoa, leeches, flatworms, and hydras were very likely common.

The Western Basin of the lake has a low-lying shore which was and is frequently subject to flooding by the lake. The shores in this basin were mixtures of swamp, marsh, and wet prairies (Langlois, 1954; Taft and Kishler, 1973). The fauna of the nearshore zone was undoubtedly a mixture of lake, riverine, and marsh species, as well as select glacial species. Changes in the fauna of the nearshore of this region, other than at Toledo and Detroit, probably began in the period after 1843 with the opening of the Toledo Canal to Indiana and the drainage of the Black Swamp prior to 1868. From that period to the present agricultural runoff has entered Lake Erie's Western Basin.

The benthic macroinvertebrate fauna of the Cleveland nearshore zone probably showed a large change, if not in composition then in abundance, in the period 1827 to 1850. Cleveland's public water supply is Lake Erie and in the period 1850 to 1900 the water quality deteriorated dramatically with an oil refinery waste slick extending up to 1 mile (1.6 km) outward into Lake Erie (Garlauskas, 1974). Such a large change in water quality was very likely reflected in the benthos.

The first indication of the composition of Lake Erie's nearshore benthos is found in the works of Kellicott (1891, 1897, 1899), Hine (1901), Landacre (1901), Walton (1906), Herms (1907), Gary (1910), Goodrich (1911, 1916, 1920), Allen (1915), Grier (1918, 1920) and Walker (1913). The organisms listed on these studies were sponges, bryozoans, aquatic oligochaetes of the family Naididae, a fresh-water shrimp, odonata, snails and bivalves (mussels). These studies covered the shore from South Bass Island and Sandusky Bay to the Niagara River (Table 28). In all, these studies account for 170 species.

The period 1920 to 1970 showed marked changes in the benthos of Lake Erie. Much of the change has been documented for the Western Basin of Lake Erie. Equivalent changes likely occurred in the nearshore zone of the other 2 basins. Aquatic insects, particularly the chironomids, numerically dominated the nearshore fauna. Total organism densities were greatest at water depths of 18 inches (45.7 cm) and least at a depth of 72 inches (182.9 cm) with the density range being from 500 ind/yd² (625 ind/m²) to 4000 ind/yd² (5000 ind/m²) (Krecker and Lancaster, 1933). Caddisfly larvae and midge larvae along with the two snails, Goniohasis and Physa, were present at every depth. Krecker and Lancaster described the bottom fauna to a depth of six feet as a midge-caddis-snail association numerically dominated by midges.

In 1929-30, studies further offshore (Wright, et al., 1955) found the fauna dominated by tubificid oligochaetes nearest to land with tubificids losing dominance lakeward until the fauna became dominated by the mayfly Hexagenia.

In the island region in 1937, two benthic nearshore assemblages were noted by Shelford and Boesel (1942); a Goniohasis-Hydropsyche community (essentially the midge-caddis-snail assemblage of Krecker and Lancaster) and a Pleurocera-Lampsilis community. Water-penny larvae (Psephenus lecontei) were common in very shallow water as were chironomid larvae.

Aquatic oligochaetes dominated ten river mouths in Ohio during the 1950's (Brown, 1953). It is very likely that oligochaetes were predominant in most of the other major harbors and river mouths. (Table 29).

In the 1960's, Lake Erie's northern nearshore benthic fauna was comprised of 57 known taxa with aquatic oligochaetes dominating at all sites except one (Veal and Osmond, 1968). Total organism densities ranged from 1900 ind/m² to over 16000 ind/m². The abundance of pollution-intolerant taxa was found to increase from west to east. Caddisfly larvae (with the exception of Oecetis sp.) were found only in the Eastern Basin. The amphipod Pontoporeia affinis was not found in the Western Basin but was collected in both the Central and Eastern Basins while another amphipod, Gammarus fasciatus, increased in the stations sampled from 12% in the Western Basin to 76% in the Eastern Basin. During the period 1891 through 1920, over 170 species were reported as in the nearshore zone. In 1933, 44 taxa were reported and a study in 1937 indicated 49 taxa. Twenty-four taxa were reported along the south shore in the early 1950's. Fifty-seven taxa were reported along the north shore in the late 1960's. Seemingly, a drastic decline in species numbers has occurred.

Studies of the benthos of the Canadian shore by Barton and Hynes (1976, 1978 a,b) conducted 1973 through 1976 indicate the presence of 170 taxa. Gammarus fasciatus was the most frequently collected taxon, with Caenis, the Thienemannimyia-group, Cheumatopsyche, and Hydra also being widespread and sometimes abundant. These studies differed from the one of Veal and Osmond in that these are studies of the wave swept shore, very much shoreward of the stations sampled by Veal and Osmond (1968).

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T A B L E S

TABLE 1

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Porifera

Carterius tubisperma
C. latitenta
C. tenosperma
Heteromeyenia latitentus
Meyenia fluviatilis
Spongilla aspinosa
S. cinerea
S. fragilis
S. lacustris

Phylum Coelenterata

Craspedacusta sowerbyi
Cordylophora lacustris
Hydra oligactis
H. pseudoligactus
H. americanus
H. littoralis
H. carnea
Chlorohydra viridissima

Phylum Bryozoa

Pottsiella erecta
Uratella gracilis
Palucidells articulata
Pectinatella magnifica
Fredricella sultana
Lophobdella carteri
Cristalella mucedo
Plumatella sp.
Plumatella emarginata
Plumatella polymorpha

Phylum Platyhelminthes

Dugesia sp.
Dugesia tiginum
Planaria sp.
Rhabocoela sp.

Phylum Aschelminthes

Class Nematormorpha
Gordius sp.

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Aschelminthes

Class Nematoda
Dorylaimus sp.
Mesodorylaimus sp.
Alaimus sp.

Phylum Annelida

Class Hirudinea
Dina fervida
Erpobdella punctata
Glossiphonia complanata
G. heteroclita
G. nepheloidea
Helobdella elongata
H. fusca
H. stagnalis
Moorobdella sp.
Placobdella montifera

Class Polychaeta
Manayunkia speciosa

Class Oligochaeta
Aulodrilus americanus
A. limnobius
A. piqueti
A. pluriseta
Branciura sowerbyi
Ilyodrilus templetoni
Limnodrilus angustipennis
L. cervix
L. cervix variant
L. claperedeianus
L. hoffmeisteri
L. maumeensis
L. profundicola
L. spiralis
L. udekemianus
Peloscolex ferox
P. freyi
P. variegatus
Potamothrix moldaviensis
P. vejdoskyi
Psammoryctides curvisetosus
Tubifex tubifex
Amphichaeta sp.
Dero digitata
Chaetogaster diaphanus

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Annelida

Class Oligochaeta
Chaetogaster langi
C. pellucidus
C. limnaei
Dero vagus
Nais pardis
N. communis
N. pseudobtusa
N. variabilis
N. parviseta
N. parvula
N. tenuidentis
N. tortuosa
Naidium osborni
Paranais sp.
Ophidonais serpentina
Pristina foreli
P. serpentina
Stylaria lacustris
S. fossularis
Vejdovskyella intermedia
Slavina appendicualta
Paranais frici
Uncinaiis uncinaiis

Phylum Mollusca

Class Pelecypoda
Pisidium sp.
P. virginicum
P. casertanum
P. henslowanum
P. lilljeborgi
P. amnicum
P. compressum
P. fallax
P. nitidium
P. punctatum
P. subtruncatum
Sphaerium sp.
S. transversum
S. lacustre
S. securis
Musculium transversum
Musculium sp.
Andonta grandis

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Mollusca

Class Pelecypoda

Fusconia flava
Lampsilis radiata siliquodea
Leptodea fragilis
Ligumia nasuta
Proptera alata
Truncilla donaciformes
Lasmigona costata
Elliptio dilatatus
Quadrula pustulosa
Cyclonais tuberculata
Amblyema plicata
Strophites rugosus
Ptychobranthus fasciolaris
Obliquaria reflexa
Obovaria leibii
Carunculina parva
Eurynia nasuta
Ligumia recta
Lampsilis ventricosa
Dysnomia perplexa
D. triquerta
Truncilla truncata
Pleurobema cordatum
Micromyia fabalis
Obovaria subrotunda
Anodonta marginata
Amblyema costata
Lampsilis ovata ventricosa
Sphaerium corneum
Quadrula quadrula
Unio merus tetralasmus
Leptodea fragilis
Lasmigona compressa
Anodonta imbecilis
Anodontooides ferrussacianus
Strophitus undulatus
Actinonais subrotunda
Carunculina parva
Villosa fabalis
Villosa iris
Lampsilis fasciola
Dysnomia tortulosa
Pleurobema coccineum pauperculum

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Mollusca

Class Pelecypoda

Lampsilis ventricosa canadensisTruncilla sulcataTruncilla perplexaLampsilis multiradiataL. luteola rosaceaL. recta sageriL. gracilisL. leptodonObovaria ellipsisPlagiola elegansPlagiola donaciformesAnodontooides subcylindaceaSymphynota compressaS. costataAlasmidonta marginataA. calceolusHemilastena ambiguaUnio gibbosusQuadrula hippopaeaQ. lachrymosaQ. rubigenosaQ. undataQ. coccineaQ. subrotundaQ. tuberculataPtychobranthus phaseolusObovaria circularisQuadrula kirklandianaQ. plicata

Class Gastropoda

Amnicola sp.Amnicola limosaBulimus tentaculataLymnaea sp.Physa sp.Physa ancillariaGyraulus sp.Viviparus japonicusValvata sinceraValvata bicarinataV. tricarinataCampeloma subsolium

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Mollusca

Class Gastropoda

Campeloma rufum
Amnicola integra
Pleurocera acuta
Succinea higginsia
Planorbis trivolvis
Goniobasis livescens
Limnea humilis
L. woodruffi
Planorbis parvus
Planorbis exactus
Valvata piscinalis
Planorbis anceps
Physa elliptica
Ferrissia fusca
F. parallela
F. rivularis
Helisoma sp.
Lioplax sp.
Planorbula crissilabris
Amnicola integra
Lymnaea stagnalis
Stagnicola emarginata
S. catascopium
Helisoma (Piersoma) trivolvis
Planorbula jenksii
Physa sayii
Campeloma decisum
Amnicola (Marstonia) lustrica
Amnicola (Probythinella) binneyana
Promenetus exaguus
Pyrgulopsis letsoni
Goniobasis haldemani

Phylum Arthropoda

Class Crustacea

Cambarus argillicola
Orconectes propinquus
O. rusticus
O. immunis
O. virilis
Asellus intermedius
A. forbesi
A. rocovitzai
Lirceus lineatus

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Crustacea

Asellus attenuatus
Asellus dentadactylus
Gammarus fasciatus
G. lacustris
G. pseudolimneus
Hyallolella azteca
H. knickerbockeri
Pontoporeia affinis
Synurella sp.
Crangonyx gracilis
C. pseudogracilis
Paleononetes exilipes

Class Arachnida

Lunnesia undulata

Class Insecta

Order Trichoptera

Cheumatopsyche sp.
Hydropsyche betteni
Hydroptila sp.
Glossoma sp.
Neureclipsis sp.
Cyrnellus fraternus
Polycentropus sp.
Hydropsyche orris
Potamyia flavus
Ecdyonurus sp.
Branchycentrus nigrisoma
Leptocercus ancylus
Athripsodes sp.
Molanna sp.
Platyphylae designatus
Rhyacophila sp.
Limnophilus sp.
Agraylea multipunctata
Hydroptila albicornis
H. angusta
H. hamata
H. spatulata
H. wabesiana
Ithytrichia clavata
Neotrichis sp.
Orthotrichia americanus

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Trichoptera

Oxytrichia pallida
Polytrichia tarsalis
Cheumatopsyche campyla
Hydropsyche recurvata
Cernotina pallida
Cernotina sp.
Neureclipsis parvula
Nyctiophylax marginalis
N. vestitus
Phylocentropus placidus
Plectoenemia cinereae
Polycentropus confusus
Psychomyella flavida
Psychomia diversa
Molanna uniophila
Arthripsodes ancylus
A. angustus
A. dilutus
A. erullus
A. resugens
A. saccus
A. submaculus
A. tarsipunctatus
Leptocella sp.
L. exquisita
Oecetis avara
O. cinerascens
O. eddlisoni
O. immobilis
O. inconspicua
O. persimilis
Mysticides sepulchralis
Trianodes flavescens
T. injusta
Limnephilus submonilifer
Heliopsyche borealis
Lepidostoma sp.

Order Coleoptera

Psephanus sp.
P. lecontei
Stenelmis sp.

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Coleoptera

Stenelmis crenata
S. bicarinata
Dubiraphia sp.
Optioservas sp.
Narpus sp.
Ancryonyx sp.
Elmis sp.
Gyrinus sp.
Helichus lithophilus
Hydroporous sp.
Elophilia sp.
Cnemidotus edentulus
Hydroporous modestus
Copelatus glyphiens
Agabus disintegratus
Dytiscus hybridus
D. fasciventris
Cybister finbriolatus
Gyrinus ventralis
Dinuetes assimilis
Helophorous triangularis
H. minbatus
H. glaber
Listotrophus cingulatus
Creophilus villosus
Staphylinus vulpinus
S. maculosus
S. cinamopterus
S. violaceus
Philonthus aeneus
P. cyanipennis
Xantholinus cephalus
Paederus litorarius
Oxyporous major

Order Lepidoptera

Order Megaloptera

Sialis sp.
Sialis infumata

Order Neuroptera

Climacia areolaris

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Hemiptera

Arctocorixa lineata

Beleostoma fluminea

Corixa sp.

Sigara lineata

Trepobates pictus

Velia stagnalis

Gerris argenticalis

Order Odonata

Gomphus plagiatus

G. vastus

Neurocordulia yamaskensis

Macroma illinoiensis

Argia moesta

Tramea lacerata

Anax junius

Libellula pulchella

L. luctuosa

Lestes rectangularis

Anomalagrion hastatum

Chromagrion conditum

Enallagma attenatum

E. carunculatum

E. ebrium

E. exulsans

E. signatum

Calypteryx maculata

Hetaerina americana

Lestes unguiculata

L. disjuncta

L. forcipata

L. vigeax

L. inequalis

Argia putrida

A. violacea

Nehalennia posita

Amphiagrion saucium

Enallagma aspersum

E. geminatum

E. fisheri

E. pollutum

Ishnura verticalis

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Odonata

Anomalagrion hastatum
Hagenius brevistylus
Gomphus fraternus
G. exilis
G. spicatus
Dromphogomphus spinosus
D. spoliatus
Fonscolomba vinosa
Aeschna constricta
A. verticalis
Macromia taeniolata
Epicordula princeps
Pantala flavescens
Libellula basalis
L. incesta
L. quadrimaculata
Plathemis trimaculata
Celethemis elisa
C. eponina
Leucorhinia intacta
Diplax rubicundula
D. assimilata
D. obtrusa
D. vicina
D. semieincta
D. corrupta
Perithemis domitia
Mesothemis simplicicollis
Pachydiplax longipennis
Lestes uncatus
L. eurinus
Agria sedula
A. apicalis
Nehalennia arene
Enallagma civile
Gomphus furcifer
Epiaeschna heros
Tetragoneuria cynosura
Sympetrum obstusum
S. rubicundulum
S. vicinium
S. senictum

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Odonata

Sympetrum corruptum

Plathemis lydia

P. mesothemis simplicicollis

Order Ephemeroptera

Stenonema sp.

S. gildersleevi

Baetis sp.

Caenis sp.

Hexagenia sp.

Caenis diminuta

Ephemera varia

Ephemerella sp.

Heptagenia tripunctata

H. luridipennis

H. canadensis

H. interpunctatata

Ephoron album

Ephemera simulans

Hexagenia affiliata

H. bilineata

H. oculata

H. rigida

H. rigida var. albida

Stenonema bipunctatum

S. birdi

S. canadense

S. conjunctum

S. femoratum

S. heterotarsale

S. integrum

S. interpunctum

S. scitulum

S. tripunctum

Heptagenia aphrodite

H. hebo

H. juno

H. maculipennis

Iron pleuralis

Stenonema lutum

S. nepotellum

S. ohioensis

S. pallidum

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Ephemeroptera

Stenonema proximum

S. puchellum

S. rubromaculatum

S. rubrum

Paraleptophebia guttata

Blasturus cupidus

Choroterpes basalis

Habrophlebiodes americana

Baetisca lacustris

B. obesa

Centroptilum sp.

Ephemerella dorathea

Brachycercus sp. 1.

Brachycercus sp. 2.

Caenis anceps

C. forcipata

C. hilaris

C. jocosa

C. punctata

C. ridens

C. simulans

Callibaetis fluctuans

Baetis propinquus

B. pygmaeus

Cloen rubropictum

C. simplex

Order Diptera

Simulium sp.

Tipula sp.

Chrysogaster sp.

Psychodidae

Hemerodromia sp.

Larsia sp.

Chaoborus punctipennis

Palapomyia tibialis

Palapomyia sp.

Ceratopogonidae

Culicidae

Aedes cantator

Culex restuans

C. pipiens

Aedes canadiensis

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Diptera

Aedes communis

Culex territans

C. salinarus

Anopheles quadrimaculatus

Aedes flavescens

Culiseta inordinata

Aedes impigier

A. cineris

A. intrudens

A. grossbecki

A. riparius

A. vexans

A. sollicitans

A. trivittatus

A. stimulans

A. aurifer

A. dorsalis

A. sticticus

Anopheles barberi

A. punctipennis

Coquillitidea perturbans

Uranotaenia sapphirina

Chironomidae

Chironomus sp.

C. nais

C. plumosus

C. riparius

Coelotanypus concinnus

Micropsectra sp.

Polypedilum sp.

Procladius sp.

P. adumbratus

P. attenuatus

P. euliciformes

P. riparius

Tanypus sp.

Polypedilum fallax

Rheotanytarsus exigua

Trissocladius nivoriunda

Corynoneura tarsis

Orthocladinae

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Diptera

Demicryptochironomus sp.Potthastia longimanusThienemannimyia sp.Hemerooronia sp.Ablabesmyia sp.Paratanypus sp.Pentaneura sp.Cryptochironomus sp.Dicrotendipes sp.Einfeldia sp.Glyptotendipes sp.Kiefferulus sp.Eukiefferiella sp.Parachironomus sp.Pseudochironomus sp.Stenochironomus sp.Tribelos sp.Cricotopus sp.Orthocladius sp.Psectrocladius sp.Trichcladius sp.Thienemaniella sp.Psectrotanypus sp.Harshnia niasProcladius denticulatusMicrotendipes pedullusStictochironomus sp.Paralauterborniella nigrohalteralisXenochironomus xenolabisParacladopelma obscuraHeterotrissocladius subpilosusMonodiamesa bathyphilaPentaneura monilisProcladius euliciformesCoelotanypus scapularisChironomus pallidusC. digitatusC. flavusC. decorusC. curtimellatusCricotopus exilisC. trifasciatusProcladius bellus

TABLE 1 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Diptera

Anatopynia sp.Clinotanypus sp.Glyptotendipes senilisChironomus brachialisC. festivusC. fumidusC. tenuicaudatusC. obscuraC. modestusC. crassicaudatusC. pallidivittatusC. nitensC. fulvusC. viridicollisC. cayugeC. biciliatusC. lanceolatusC. parilisC. curtilamellatusC. abbreviatusPhaenopsectra regalisTanytarsus flavellusT. iuliusT. gilvusT. dissimilisT. neoflavellusT. irusT. macerT. getaMicropsectra furvaM. pictaLundstroemia muticaPseudochironomus luteusP. albicornisP. richardsoniLauterborniella varipennisL. cirtaStictochironomus devinctusMicrotendipes flavusM. pallidusM. aberrans

TABLE 1 (Con't.)
BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE

Phylum Arthropoda

Class Insecta

Order Diptera

Polypedilum hertipes

P. halteralis

P. fragilis

P. needhami

P. griseopunctatus

Stenochironomus hilaris

Kribioxenus babyi

Glyptotendipes lobifercus

Endochironomus nigricans

E. fusciventris

E. quadripunctatus

TABLE 2

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE PRESENT
IN THE DETROIT RIVER MOUTH REGION OF LAKE ERIE: 1800's TO PRESENT

Phylum Annelida	Class Polychaeta
	<u>Manayunkia speciosa</u>
	Class Oligochaeta
	<u>Aulodrilus americanus</u>
	<u>A. limnobius</u>
	<u>A. pluriseta</u>
	<u>A. piqueti</u>
	<u>Limnodrilus sp.</u>
	<u>L. cervix</u>
	<u>L. cervix variant</u>
	<u>L. claperedeianus</u>
	<u>L. hoffmeisteri</u>
	<u>L. maumeensis</u>
	<u>L. udekemianus</u>
	<u>Pelosclex ferox</u>
	<u>P. multisetosus</u>
	<u>Potamothrix moldaviensis</u>
	<u>P. vejovskyi</u>
	<u>Nais elinguis</u>
	<u>Ophidonais serpentina</u>
	<u>Paranais frici</u>
	<u>Slavina appendiculata</u>
	Class Hirudinea
	<u>Erpobdella punctata</u>
	<u>Glossiphonia complanata</u>
	<u>G. heteroclita</u>
	<u>Helobdella elongata</u>
	<u>H. fusca</u>
	<u>H. stagnalis</u>
Phylum Mollusca	Class Pelecypoda
	<u>Musculium sp.</u>
	<u>Pisidium sp.</u>
	<u>Sphaerium sp.</u>
	Class Gastropoda
	<u>Amnicola sp.</u>
	<u>Bithynia sp.</u>
	<u>Bulimus tentaculata</u>
	<u>Lymnaea sp.</u>
	<u>Physa sp.</u>
	<u>Valvata sp.</u>
	<u>V. sincera</u>
	<u>V. tricarinata</u>

TABLE 2 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE PRESENT
IN THE DETROIT RIVER MOUTH REGION OF LAKE ERIE: 1800's TO PRESENT

Phylum Arthropoda

Class Insecta
Hexagenia sp.

Sources: Wright, et al. 1955
Carr and Hiltunen, 1965
Hiltunen, 1969
U.S.A.C.E. 1976
Waybrant and Siler, 1976

TABLE 3

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE PRESENT
 IN THE LAKE ERIE NEARSHORE ZONE
 IN THE VICINITY OF SWAN CREEK (MICHIGAN)

Phylum Annelida	Class Hirudinea
	Class Oligochaeta <u>Limnodrilus cervix</u> variant <u>L. hoffmeisteri</u>
Phylum Mollusca	Class Pelecypoda <u>Pisidium</u> sp. <u>Sphaerium</u> sp. <u>Ligumia nasuta</u>
	Class Gastropoda <u>Bulimus tentaculata</u> <u>Physa</u> sp. <u>Pleurocera acuta</u> <u>Valvata sincera</u> <u>V. tricarinata</u>
Phylum Arthropoda	Class Crustacea <u>Gammarus</u> sp.
	Class Insecta Order Diptera : <u>Chironomus</u> sp. <u>C. plumosus</u> <u>Procladius</u> sp. <u>Glyptotendipes</u> sp.

Source: U.S.A.C.E. 1975

TABLE 4

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE
PRESENT IN THE RAISIN RIVER MOUTH REGION OF LAKE ERIE

Phylum Annelida	Class Oligochaeta <u>Aulodrilus americanus</u> <u>A. limnobi</u> <u>A. piqueti</u> <u>A. pluriseta</u> <u>Branciura sowerby</u> <u>Limnodrilus cervix</u> <u>L. cervix variant</u> <u>L. hoffmeisteri</u> <u>L. maumeensis</u>
Phylum Mollusca	Class Hirudinea Class Pelecypoda <u>Pisidium sp.</u> <u>Spaerium sp.</u> Class Gastropoda <u>Amnicola sp.</u> <u>Goniobasis sp.</u> <u>Valvata sp.</u>
Phylum Arthropoda	Class Crustacea <u>Gammarus sp.</u> Class Insecta Order Diptera Chironomidae <u>Chironomus sp.</u> <u>C. plumosus</u> <u>Procladius sp.</u> <u>Chironomus anthrocinus</u> Order Trichoptera <u>Hydropsyche sp.</u> <u>Oecetis sp.</u> Order Ephemeroptera <u>Hexagenia sp.</u>

Source: Wright, et al. 1955
U.S.A.C.E. 1976

TABLE 5

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE PRESENT IN
THE LAKE ERIE NEARSHORE ZONE ALONG THE SOUTHWESTERN SHORE, SOUTH OF
MONROE, MICHIGAN AND NORTH OF TOLEDO, OHIO AND INCLUDES THE OTTAWA RIVER

Phylum Annelida	Class Oligochaeta <u>Limnodrilus cervix</u> <u>L. cervix variant</u> <u>L. hoffmeisteri</u> <u>L. maumeensis</u>
	Class Hirudinea
Phylum Mollusca	Class Pelecypoda <u>Proptera alata</u>
Phylum Arthropoda	Class Insecta Order Diptera <u>Chironomus sp.</u> <u>C. plumosus</u> <u>Coelotanypus sp.</u> <u>Polypedilum sp.</u> <u>Procladuis sp.</u> <u>Cladotanytarsus sp.</u> <u>Glyptotendipes sp.</u> <u>Chironomus anthrocinus</u> <u>Leptochironomus sp.</u>
	Class Crustacea <u>Gammarus sp.</u>

Source: U.S.A.C.E. 1976

TABLE 6

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE
PRESENT IN THE NEARSHORE ZONE OF LAKE ERIE
IN THE MAUMEE BAY, MAUMEE RIVER, TOLEDO AREA

Phylum Platyhelminthes	Class Turbellaria Planaridae (Family)
Phylum Annelida	Class Oligochaeta <u>Aulodrilus limnobi</u> <u>A. piqueti</u> <u>Branchiura sowerbyi</u> <u>Limnodrilus cervix</u> <u>L. cervix variant</u> <u>L. hoffmeisteri</u> <u>L. maumeensis</u> <u>L. profundicola</u> <u>Pelosclex ferox</u> <u>P. multisetosus</u> <u>P. variegatus</u>
Phylum Mollusca	Class Hirudinea Class Pelecypoda <u>Musculium</u> sp. <u>Pisidium</u> sp. <u>Sphaerium</u> sp. <u>S. corneum</u> <u>Anodonta grandis</u> <u>Proptera alata</u> Class Gastropoda <u>Amnicola</u> sp. <u>Bithynia</u> sp. <u>Ferrissia</u> sp. <u>Lymnaea auricularia</u> <u>Goniobasis livescens</u> <u>Valvata</u> sp. <u>Physa</u> sp.
Phylum Arthropoda	Class Crustacea <u>Gammarus</u> sp. Class Arachnida Hydracarina Class Insecta Order Odonata <u>Ishnura</u> sp. Order Diptera Chironomidae <u>Chironomus</u> sp.

TABLE 6 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE
PRESENT IN THE NEARSHORE ZONE OF LAKE ERIE
IN THE MAUMEE BAY, MAUMEE RIVER, TOLEDO AREA

Phylum Arthropoda

Class Insecta

Order Diptera

Polypedilum sp.
Cryptochironomus sp.
Procladius sp.
Glyptotendipes sp.
Cricotopus sp.
Psectrocladius sp.
Parachironomus sp.
Ablabesmyia sp.
Paratanypus sp.
Pentaneura sp.
Thienemannimyia sp.
Dicrotendipes sp.
Einfeldia sp.
Kiefferulus sp.
Stenochironomus sp.
Tribelos sp.
Rheotanytarsus sp.
Tanytarsus sp.
Eukiefferiella sp.
Orthocladius sp.
Thienemanniella sp.
Trichocladius sp.
Psectrotanypus sp.
Chaoborus sp.

Order Trichoptera

Psychomyia sp.
Polycentropus sp.
Cheumatopsyche sp.
Hydropsyche sp.
H. orris
Potamyia flava
Cyrnellus fraternus

Order Diptera

Empididae (Family)

Order Ephemeroptera

Baetis sp.
Caenis sp.
Hexagenia sp.

Source: Brown, 1953
Wright, et al. 1955
Carr and Hiltunen, 1965
Hiltunen, 1969
Herdendorf and Cooper, 1975
U.S.A.C.E. 1976

TABLE 7

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN
LAKE ERIE'S NEARSHORE ZONE IN THE VICINITY OF LOCUST POINT

Phylum Coelenterata	Class Hydrozoa <u>Hydra sp.</u>
Phylum Annelida	Class Oligochaeta <u>Branchiura sowerbyi</u> <u>Limnodrilus cervix</u> <u>L. cervix variant</u> <u>L. claperedeianus</u> <u>L. hoffmeisteri</u> <u>L. maumeensis</u> <u>L. udekemianus</u> <u>Peloscolex multisetosus</u> <u>Potamothrix moldaviensis</u> <u>P. vej dovskyi</u>
	Class Hirudinea <u>Helobdella elongata</u> <u>H. stagnalis</u>
Phylum Mollusca	Class Pelecypoda <u>Proptera alata</u>
	Class Gastropoda <u>Bulimus sp.</u>
Phylum Arthropoda	Class Crustacea <u>Gammarus fasciatus</u> <u>Hyallolella azteca</u> <u>Orconectes sp.</u> <u>Leptodora kindti</u>
	Class Insecta Order Diptera <u>Chironomus sp.</u> <u>Polypedilum sp.</u> <u>Cryptochironomus sp.</u> <u>Pseudochironomus sp.</u> <u>Procladius sp.</u> <u>Cricotopus sp.</u> <u>Tanytarsus sp.</u>
	Order Ephemeroptera <u>Caenis sp.</u>

Source: CLEAR/OSU, 1974/1975

TABLE 8

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE NEARSHORE
 ZONE OF LAKE ERIE IN THE VICINITY OF THE PORTAGE RIVER

Phylum Annelida	Class Hirudinea
	Herpobdellidae
Phylum Arthropoda	Class Oligochaeta
	<u>Limnodrilus</u> sp.
	<u>Tubifex</u> sp.
	Class Crustacea
	<u>Gammarus</u> sp.
	Class Insecta
	Order Diptera
	<u>Chironomidae</u>
	<u>Chaoborus</u> sp.

Source: Brown, 1953

TABLE 9

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
LAKE ERIE NEARSHORE ZONE AT PORT CLINTON

Phylum Coelenterata	Class Hydrozoa <u>Hydra</u> sp.
Phylum Annelida	Class Oligochaeta <u>Branchiura sowerbyi</u> <u>Limnodrilus cervix</u> <u>L. hoffmeisteri</u> <u>L. maumeensis</u>
Phylum Arthropoda	Class Crustacea <u>Gammarus fasciatus</u> <u>Synurella</u> sp.
	Class Insecta Order Diptera <u>Chironomus</u> sp. <u>Coelotanypus</u> sp. <u>Polypedilum</u> sp. <u>Tanytarsini</u> (Tribe) <u>Cryptochironomus</u> sp. <u>Procladius</u> sp.
Phylum Aschelminthes	Class Nematomorpha <u>Gordius</u> sp.

Source: U.S.A.C.E. 1977

TABLE 10

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
LAKE ERIE NEARSHORE ZONE IN THE VICINITY OF WEST HARBOR

Phylum Annelida	Class Oligochaeta <u>Brachiura sowerbyi</u> <u>Limnodrilus cervix</u> <u>L. hoffmeisteri</u> <u>L. maumeensis</u> <u>Potamothrix vej dovskyi</u>
Phylum Arthropoda	Class Insecta Order Diptera <u>Chironomus sp.</u> <u>C. plumosus</u> <u>Coelotanypus sp.</u> <u>Polypedilum sp.</u> <u>Tanypus sp.</u> <u>Cryptochironomus sp.</u> <u>Pseudochironomus sp.</u> <u>Procladius sp.</u>

Source: U.S.A.C.E. 1977

TABLE 11

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE PRESENT
IN THE LAKE ERIE NEARSHORE ZONE IN THE VICINITY
OF SANDUSKY BAY, INCLUDING SANDUSKY BAY

Phylum Porifera	Class Desmospongiae <u>Spongilla aspinosa</u> <u>S. cincera</u> <u>S. fragilis</u>
Phylum Bryozoa	Class Ectoprocta <u>Pectinatella magnifica</u> <u>Plumatella emarginata</u> <u>P. polymorpha</u>
Phylum Annelida	Class Oligochaeta <u>Bothrioneurum vej dovskyanum</u> <u>Branchiura sowerbyi</u> <u>Limnodrilus hoffmeisteri</u> <u>Pelosclex ferox</u> <u>Amphichaeta sp.</u> <u>Chaetogaster diaphanus</u>
	Class Hirudinea <u>Glossiphonia complanata</u> <u>Helobdella stagnalis</u>
Phylum Mollusca	Class Pelecypoda <u>Pisidium sp.</u> <u>Sphaerium sp.</u> <u>Anodonta grandis</u>
	Class Gastropoda <u>Amnicola sp.</u> <u>Bulimnaea sp.</u> <u>Ferrissia sp.</u> <u>Goniobasis livescens</u> <u>G. haldemani</u> <u>Heliosoma sp.</u> <u>Planorbula sp.</u> <u>Valvata sp.</u> <u>Viviparus japonicus</u> <u>Viviparus sp.</u>
Phylum Arthropoda	Class Crustacea <u>Hyalella azteca</u> <u>Palaemoentes exilipes</u>
	Class Insecta Order Odonata <u>Calopteryx maculata</u> <u>Hetaerina americana</u> <u>Lestes unguiculatus</u>

TABLE 11 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE PRESENT
IN THE LAKE ERIE NEARSHORE ZONE IN THE VICINITY
OF SANDUSKY BAY, INCLUDING SANDUSKY BAY

Phylum Arthropoda	Class Insecta
	Order Odonata
	<u>Lestes uncatus</u>
	<u>L. disjunctus</u>
	<u>L. forcipatus</u>
	<u>L. rectangularis</u>
	<u>L. vigilax</u>
	<u>L. inequalis</u>
	<u>L. eurinus</u>
	<u>Agria putrida</u>
	<u>A. violacea</u>
	<u>A. sedula</u>
	<u>A. apicalis</u>
	<u>Nehalennia posita</u>
	<u>N. irene</u>
	<u>Enallagma civile</u>
	<u>E. ebrium</u>
	<u>E. carunculatum</u>
	<u>E. aspersum</u>
	<u>E. exsulsans</u>
	<u>E. geminatum</u>
	<u>E. antennatum</u>
	<u>E. signatum</u>
	<u>E. pollutum</u>
	<u>Amphiagrion saucium</u>
	<u>Ishnura verticalis</u>
	<u>Gomphus vastus</u>
	<u>G. fraternus</u>
	<u>G. furcifer</u>
	<u>G. exilis</u>
	<u>G. spicatus</u>
	<u>G. plagiatus</u>
	<u>Dromogomphus spinosus</u>
	<u>Epiaeschna heros</u>
	<u>Aeschna verticalis</u>
	<u>A. constricta</u>
	<u>Anax junius</u>
	<u>Macomia illinoiensis</u>
	<u>Epicordulia princeps</u>
	<u>Tetragoneuria cynosura</u>
	<u>Trameai carolina</u>
	<u>T. lacerata</u>
	<u>Pantala flavescens</u>
	<u>Neurocordulia yamaskanensis</u>
	<u>Libellula basalis</u>
	<u>L. formaculata</u>
	<u>L. semifasciata</u>

TABLE 11 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE PRESENT
IN THE LAKE ERIE NEARSHORE ZONE IN THE VICINITY
OF SANDUSKY BAY, INCLUDING SANDUSKY BAY

Phylum Arthropoda

Class Insecta

Order Odonata

Libellula pulchella

L. incesta

Sympetrum obstrusum

S. rubicundulum

S. vicinium

S. semicinctum

S. corruptum

Pachydiplax longipennis

P. mesothemis

Perithemis domitia

Leucorhina intacta

Celethemis eponina

C. elisa

Ishnura sp.

Order Diptera

Chironomus plumosus

Polypedilum sp.

Pseudochironomus sp.

Clinotanypus sp.

Coelotanypus scapularis

Procladius bellus

Anatopynia sp.

Culicidae (Family)

Chaoborus sp.

Ceratopogonidae (Family)

Order Hemiptera

Velia stagnalis

Gerris argenticalis

Source: Hine, 1901
Landacre, 1901
CLEAR/OSU, 1975
Lindsay, 1976

TABLE 12

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM THE
NEARSHORE ZONE OF LAKE ERIE IN THE VICINITY OF CEDAR POINT (OHIO)

Phylum Annelida	Class Oligochaeta <u>Chaetogaster langi</u> <u>C. pellucidas</u> <u>Dero vagus</u> <u>Naidium osborni</u> <u>Nais parviseta</u> <u>N. parvula</u> <u>N. tenuidentis</u> <u>N. tortuosa</u> <u>Pristina serpentina</u> <u>Stylaria lacustris</u>
Phylum Mollusca	Class Pelecypoda <u>Anodonta grandis</u> <u>Quadrula pustulosa</u> <u>Lampsilis ventricosa</u> <u>L. recta</u> <u>L. nasuta</u> <u>L. alata</u> <u>L. gracilis</u> <u>Obovaria circulus</u> <u>Quadrula undulata</u> <u>Q. rubiginosa</u> <u>Unio gibbosus</u> <u>Quadrula plicata</u> <u>Q. coccineus</u> <u>Strophites edentulus</u> <u>Anodontoides ferussacianus</u> <u>Plagiola donaciformes</u>
Phylum Arthropoda	Class Insecta Order Diptera <u>Odontomyia cincta</u> <u>O. hydroleonoides</u> <u>O. virgo</u> <u>O. vertebrata</u> <u>O. nigerrima</u> <u>Stratiomyia badia</u> <u>S. lativentris</u> <u>S. meigeni</u> <u>S. normula</u> <u>S. discalis</u>

Source: Walton, 1906
 Gary, 1910
 Fulton, 1911

TABLE 13

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM THE NEARSHORE
ZONE OF LAKE ERIE IN THE VICINITY OF THE HURON RIVER (OHIO)

Phylum Annelida	Class Oligochaeta <u>Branchiura sowerbyi</u>
Phylum Mollusca	Class Gastropoda <u>Physa</u> sp.
Phylum Arthropoda	Class Crustacea <u>Asellus</u> sp.
	Class Insecta Order Diptera Order Ephemeroptera

Source: Brown, 1953

TABLE 14

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN LAKE ERIE'S
NEARSHORE ZONE IN THE VICINITY OF THE VERMILION RIVER

Phylum Annelida	Class Oligochaeta <u>Limnodrilus</u> sp.
Phylum Mollusca	Class Pelecypoda <u>Musculium transversum</u>
Phylum Arthropoda	Class Crustacea <u>Gammarus fasciatus</u>
	Class Insecta
	Order Odonata <u>Ishnura</u> sp.
	Order Diptera Chironomidae (Family) <u>Chaoborus</u> sp.
	Order Coleoptera <u>Elmis</u> sp.
	Order Ephemeroptera <u>Hexagenia</u> sp.

Source: Brown, 1953

TABLE 15

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM THE
NEARSHORE ZONE OF LAKE ERIE IN THE VICINITY OF THE BLACK RIVER

Phylum Annelida	Class Oligochaeta <u>Limnodrilus</u> sp. <u>Tubifex</u> sp.
	Class Hirudinea <u>Herpobdellidae</u> <u>Glossiphonia nepheloidea</u>
Phylum Annelida	Class Pelecypoda <u>Musculium transversum</u>
Phylum Arthropoda	Class Crustacea <u>Gammarus fasciatus</u>
	Class Insecta Order Diptera Chironomidae (Family) Tipulidae (Family)

Source: Brown, 1953

TABLE 16

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
LAKE ERIE NEARSHORE ZONE IN THE VICINITY OF AVON LAKE

Phylum Bryozoa	Class Ectoprocta <u>Plumatella casmiana</u>
Phylum Coelenterate	Class Hydrozoa <u>Cordylophora lacustris</u> <u>Hydra sp.</u>
Phylum Platyhelminthes	Class Turbellaria <u>Dugesia tigrina</u>
Phylum Annelida	Class Oligochaeta <u>Branchiura sowerbyi</u> <u>Limnodrilus hoffmeisteri</u> <u>Paranaïs sp.</u> <u>Nais sp.</u> <u>Stylaria lacustris</u>
Phylum Annelida	Class Pelecypoda <u>Sphaerium sp.</u>
	Class Gastropoda <u>Lioplax sp.</u> <u>Physa sp.</u>
Phylum Arthropoda	Class Crustacea <u>Gammarus fasciatus</u>
	Class Arachnida Hydracarina
	Class Insecta
	Order Diptera
	<u>Ceratopogonidae (Family)</u>
	<u>Chironomus sp.</u>
	<u>Procladius sp.</u>
	<u>P. adumbratus</u>
	<u>Glyptotendipes sp.</u>
	Order Ephemeroptera
	<u>Stenonema sp.</u>
	Order Diptera
	<u>Cricotopus sp.</u>
	<u>Psectrocladius sp.</u>
	<u>Parachironomus sp.</u>
	<u>Dicrotendipes sp.</u>
	<u>Larsia sp.</u>
	Order Ephemeroptera
	<u>Caenis sp.</u>

TABLE 16 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
LAKE ERIE NEARSHORE ZONE IN THE VICINITY OF AVON LAKE

Phylum Arthropoda

Class Insecta

Order Trichoptera

Polycentropus sp.

Cheumatopsyche sp.

Neureclipsis sp.

Athripsodes sp.

Synclita sp.

Source: Aquatic Ecology Associates, 1976

TABLE 17

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE IN THE VICINITY OF ROCKY RIVER

Phylum Annelida	Class Oligochaeta <u>Branchiura sowerbyi</u> <u>Limnodrilus</u> sp. <u>Tubifex</u> sp.
	Class Hirudinea Herpobdellidae
Phylum Mollusca	Class Pelecypoda <u>Pisidium</u> sp.
Phylum Arthropoda	Class Crustacea <u>Gammarus fasciatus</u>
	Class Insecta
	Order Diptera Chironomidae <u>Chaoborus</u> sp.
	Order Coleoptera <u>Elmis</u> sp.
	Order Hemiptera <u>Trepobates pictus</u>
	Order Lepidoptera
	Order Trichoptera <u>Potamyia flava</u>

Source: Brown, 1953

TABLE 18

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
LAKE ERIE NEARSHORE ZONE IN THE VICINITY OF CLEVELAND, OHIO

Phylum Coelenterata	Class Hydrozoa <u>Hydra</u> sp.
Phylum Aschelminthes	Class Nematoda <u>Alaimus</u> sp. <u>Dorylaimus</u> sp. <u>Mesodorylaimus</u> sp.
Phylum Annelida	Class Polychaeta <u>Manayunkia speciosa</u>
	Class Oligochaeta <u>Aulodrilus piqueti</u> <u>A. pluriseta</u> <u>Branchiura sowerbyi</u> <u>Ilyodrilus templetoni</u> <u>Limnodrilus angustipenis</u> <u>L. cervix</u> <u>L. claperedeianus</u> <u>L. hoffmeisteri</u> <u>L. profundicola</u> <u>L. udekemianus</u> <u>Pelosclex ferox</u> <u>P. multisetosus</u> <u>Potamothrix moldaviensis</u> <u>P. vejnovskyi</u> <u>Tubifex tubifex</u> <u>Dero digitata</u> <u>Nais communis</u> <u>N. pseudobtusa</u> <u>N. variabilis</u> <u>Ophidonais serpentina</u> <u>Stylria fossularis</u>
	Class Hirudinea <u>Illinobdella</u> sp. <u>Helobdella stagnalis</u>
Phylum Mollusca	Class Pelecypoda <u>Pisidium</u> sp. <u>P. casertanum</u> <u>P. henslowanum</u> <u>P. lilljeborgi</u> <u>Sphaerium</u> sp.

TABLE 18 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
LAKE ERIE NEARSHORE ZONE IN THE VICINITY OF CLEVELAND, OHIO

Phylum Mollusca	Class Gastropoda <u>Amnicola</u> sp. <u>Physa</u> sp. <u>Valvata sincera</u>
Phylum Arthropoda	Class Crustacea <u>Lirceus</u> sp. <u>Cypricercus</u> sp. <u>Asellus intermedius</u> <u>Gammarus fasciatus</u> <u>Pontoporeia affinis</u>
	Class Insecta
	Order Diptera
	<u>Chironomus</u> sp.
	<u>C. plumosus</u>
	<u>C. riparius</u>
	Tanytarsini (Tribe)
	<u>Procladius</u> sp.
	<u>P. adumbratus</u>
	<u>P. attenuatus</u>
	<u>P. euliciformes</u>
	<u>P. riparius</u>

Source: Rolan, 1973
Nacht, 1977

TABLE 19

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE LAKE ERIE NEARSHORE
 ZONE IN THE VICINITY OF EASTLAKE, OHIO, INCLUDING THE CHAGRIN RIVER

Phylum Bryozoa	Class Ectoprocta <u>Palucidella articulata</u> <u>Plumatella casmiana</u>
Phylum Coelenterata	Class Hydrozoa <u>Cordylophora lacustris</u> <u>Hydra</u> sp.
Phylum Platyhelminthes	Class Turbellaria <u>Dugesia</u> sp.
Phylum Annelida	Class Oligochaeta <u>Limnodrilus hoffmeisteri</u> <u>Pelosclex variegatus</u> <u>Potamothrix vejdvskyi</u> <u>Paranais</u> sp. <u>Pristina foreli</u> <u>Nais</u> sp. <u>Pristina</u> sp. <u>Dero</u> sp. <u>Limnodrilus</u> sp. <u>Stylaria lacustris</u>
	Class Hirudinea <u>Erpobdella</u> sp.
Phylum Arthropoda	Class Crustacea <u>Gammarus</u> sp. <u>Orconectes</u> sp.
	Class Insecta Order Diptera <u>Chironomus</u> sp. <u>Polypedilum</u> sp. <u>Procladius</u> sp. <u>Cricotopus</u> sp. <u>Tanytarsus</u> sp. Order Trichoptera <u>Hydropsyche</u> sp.
	Class Arachnida Hydracarina

Source: Aquatic Ecology Associates, 1976

TABLE 20

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE LAKE ERIE
NEARSHORE ZONE IN THE VICINITY OF THE GRAND RIVER (OHIO)

Phylum Annelida	Class Oligochaeta <u>Limnodrilus</u> sp. <u>Tubifex</u> sp. <u>Lumbriculidae</u> (Family) <u>Branchiura sowerbyi</u>
Phylum Mollusca	Class Pelecypoda <u>Pisidium</u> sp. <u>Anodonta grandis</u> <u>Lampsilis ventricosa</u> <u>L. multiradiata</u> <u>L. luteola</u> <u>L. ligamentina</u> <u>L. recta</u> <u>L. iris</u> <u>L. parva</u> <u>Obovaria circulus</u> <u>Ptychobranthus phasedus</u> <u>Quadrula undulata</u> <u>Q. kirklandiana</u> <u>Q. rubiginosa</u> <u>Unio gibbosus</u> <u>Symphonota compressa</u> <u>S. costata</u> <u>Alasmidonta marginata</u> <u>Hemilastina ambigua</u> <u>Stophites edentulus</u> <u>Anodontoïdes ferussacianus</u> <u>Sphaerium corneum</u>
	Class Gastropoda <u>Physa</u> sp.
Phylum Arthropoda	Class Crustacea <u>Gammarus fasciatus</u> <u>Hyallela azteca</u>
	Class Insecta Order Diptera <u>Atherix variegatus</u> <u>Chaoborus</u> sp. <u>Clinotanypus</u> sp.

TABLE 20 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE LAKE ERIE
NEARSHORE ZONE IN THE VICINITY OF THE GRAND RIVER (OHIO)

Phylum Arthropoda

Class Insecta

Order Diptera

Eukiefferiellas sp.

Psectrotanypus sp.

Tanypus sp.

Cryptochironomus sp.

Procladius sp.

Cladotanytarsus sp.

Order Trichoptera

Source: P. Gehring (USEPA, Ohio-Michigan Office) Personal communication, 1976

TABLE 21

MOSQUITOS* REPORTED IN MENTOR MARSH (OHIO), A WETLAND ADJACENT
TO LAKE ERIE, IN THE VICINITY OF THE GRAND RIVER (OHIO)

Phylum Arthropoda

Class Insecta

Order Diptera

Culicidae (Family)

Aedes cantator

Culex restuans

Culex pipiens

Aedes canadiensis

Aedes communis

Culex territans

Culex salinarus

Anopheles quadrimaculatus

Aedes flavescens

Culiseta inornata

Aedes impigier

Aedes cinerus

Aedes intrudens

Aedes grossbecki

Aedes riparius

Aedes vexans

Coquillitidea perturbans

Uranotaenia sapphirina

Aedes sollicitans

Aedes trivittatus

Aedes stimulans

Anopheles punctipennis

Aedes dorsalis

Aedes sticticus

Anopheles barberi

* While mosquitos are not part of the benthos per se, they may be taken in bottom samples.

Source: Teraguchi, 1976

TABLE 22

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM
LAKE ERIE'S NEARSHORE ZONE IN THE VICINITY OF ASHTABULA, OHIO

Phylum Aschelminthes	Class Nematoda <u>Dorylaimus</u> sp.
Phylum Annelida	Class Oligochaeta <u>Branchiura sowerbyi</u> <u>Limnodrilus</u> sp. <u>Tubifex tubifex</u>
	Class Hirudinea <u>Glossiphonia heteroclita</u> <u>Helobdella fusca</u> <u>H. stagnalis</u>
Phylum Mollusca	Class Pelecypoda <u>Musculium</u> sp. <u>M. transversum</u> <u>Pisidium</u> sp. <u>Sphaerium</u> sp. <u>S. securis</u> <u>Pisidium amnicum</u>
	Class Gastropoda <u>Amnicola limosa</u> <u>Bulimus tentaculata</u> <u>Gyraulus</u> sp. <u>Physa</u> sp. <u>Valvata tricarinata</u> <u>Viviparus</u> sp.
Phylum Arthropoda	Class Crustacea <u>Gammarus fasciatus</u> <u>Asellus</u> sp.
	Class Insecta Order Diptera Chironomidae (Family) <u>Chironomus</u> sp. <u>C. nais</u> <u>Coelotanypus cocinnus</u> <u>Micropsectra</u> sp. <u>Polypedilum</u> sp. <u>Tanypus</u> sp. <u>Procladius</u> sp. <u>Chrsogaster</u> sp. <u>Chaoborus</u> sp.

TABLE 22 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM
LAKE ERIE'S NEARSHORE ZONE IN THE VICINITY OF ASHTABULA, OHIO

Phylum Arthropoda

Class Insecta

Order Coleoptera

Elmis sp.

Order Trichoptera

Psychomia sp.

Order Ephemeroptera

Stenonema sp.

Source: Brown, 1953
P. Gehring, (personal communication) 1976
USEPA 1977

TABLE 23

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE NEARSHORE ZONE
OF LAKE ERIE IN THE VICINITY OF CONNEAUT, OHIO INCLUDING TURKEY CREEK

Phylum Coelenterata	Class Hydrozoa <u>Hydra</u> sp.
Phylum Annelida	Class Oligochaeta
Phylum Arthropoda	Class Insecta
	Order Plecoptera
	<u>Nemoura</u> sp.
	<u>Alloperla</u> sp.
	Order Diptera
	<u>Chironomus</u> sp.
	<u>Coelotanypus</u> sp.
	<u>Polypedilum</u> sp.
	<u>Cryptochironomus</u> sp.
	<u>Procladius</u> sp.
	<u>Harshnia nias</u>
	<u>Thienemannimyia</u> sp.
	<u>Tanytarsus</u> sp.
	Ceratopogonidae (Family)
	Order Ephemeroptera
	<u>Stenonema gildersleevei</u>
	<u>Stenonema</u> sp.
	Order Coleoptera
	<u>Stenelmis</u> sp.
	Order Trichoptera
	<u>Hydropsyche betleni</u>
	<u>Hydrophila</u> sp.
	<u>Glossoma</u> sp.
	<u>Rhyacophila</u> sp.
	<u>Neureclipsis</u> sp.
	<u>Micrasmea</u> sp.
	<u>Athripsodes</u> sp.
	Order Coleoptera
	<u>Psephenus</u> sp.
	<u>Optioservus</u> sp.
	<u>Narpus</u> sp.
	<u>Ancyronyx</u> sp.
	Order Diptera
	<u>Rheotanytarsus exigua</u>
	<u>Trissocladius nivoriunda</u>
	<u>Coryneura taris</u>

TABLE 23 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE NEARSHORE ZONE
OF LAKE ERIE IN THE VICINITY OF CONNEAUT, OHIO INCLUDING TURKEY CREEK

Phylum Arthropoda

Class Insecta

Order Diptera

Orthocladinae

Parametricnemus sp.

Natarsis fastuosa

Hemerodromia sp.

Simulium sp.

Tipula sp.

Culicidae (Family)

Source: Brown, 1953
Gehring (personal communication) 1976
Aquatic Ecology Asso., 1977
USEPA, 1977

TABLE 24

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE IN NEW YORK,
INCLUDING BUFFALO AND THE NIAGARA RIVER REGION

Phylum Porifera	Class Desmospongiae <u>Carterius latitenta</u> <u>C. tenosperma</u> <u>C. tubisperma</u> <u>Heteromeyenia</u> sp. <u>Meyenia carteriformes</u> <u>M. fluviatalis</u> <u>M. mulleri</u> <u>Spongilla fragilis</u> <u>Tubella</u> sp.
Phylum Coelenterata	Class Hydrozoa <u>Hydra</u> sp.
Phylum Mollusca	Class Pelecypoda <u>Spaerium sulcatum</u> <u>Pisidium variable</u> <u>Pleurobema cordatum pauperculum</u> <u>Elliptio dilatatus sterkii</u> <u>Lasmigona costata eriganensis</u> <u>Andonta grandis footiana</u> <u>Strophitus rugosus</u> <u>Actinonais carinata</u> <u>Ptchobranthus fasciolare</u> <u>P.f. lacustris</u> <u>Leptodea fragilis</u> <u>Proptera alata</u> <u>Ligumia recta</u> <u>L. nasuta</u> <u>Lampsilis siliquoidea rosacea</u> <u>L. ovata canadiensis</u> <u>Dysnomia triquesta</u> Class Gastropoda <u>Lymnaea stagnalis jugularis</u> <u>Stagnicola emarginata ontariensis</u> <u>S. catascopium niagarensis</u> <u>Helisoma (Pierosoma) trivolvis</u> <u>Planorbula jenkinsii</u> <u>Physa sayii oneida</u> <u>Physa</u> sp. <u>Campeloma decisum</u> <u>Gyraulus</u> sp. <u>Valvata piscinalis</u> <u>Amnicola (Marstonia) lustrica</u>

TABLE 24 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED IN THE
NEARSHORE ZONE OF LAKE ERIE IN NEW YORK,
INCLUDING BUFFALO AND THE NIAGARA RIVER REGION

Phylum Mollusca

Class Gastropoda

Amnicola (Probythinella) binneyana

Pyrgulopsis letsoni

Goniobasis sp.

Phylum Arthropoda

Class Crustacea

Gammarus sp.

Class Insecta

Chironomus sp.

Source: Kellicott, 1891
Robertson and Blakeslee, 1948

TABLE 25

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM THE NEARSHORE OF
THE LAKE ERIE ISLANDS OF THE LAKE ERIE WESTERN BASIN

Phylum Porifera	Class Desmospongiae <u>Heteromeyenia latilentus</u> <u>Spongilla fragilis</u>
Phylum Coelenterata	Class Hydrozoa <u>Craspedacusta sowerbyi</u> <u>Cordylophora lacustris</u> <u>Hydra sp.</u>
Phylum Bryozoa	Class Entoprocta <u>Urnatella gracilis</u> Class Ectoprocta <u>Cristatella mucedo</u> <u>Fredricella sultana</u> <u>Lophobdella carteri</u> <u>Palucidella articulata</u> <u>Pectinatella magnifica</u> <u>Pottsiella erecta</u>
Phylum Platyhelminthes	Class Turbellaria <u>Dugesia sp.</u>
Phylum Annelida	Class Polychaeta <u>Manayunkia speciosa</u> Class Oligochaeta <u>Chaetogaster limnaei</u> <u>Branchiura sowerbyi</u> <u>Chaetogaster diaphanus</u> <u>Nais communis</u> <u>Ophidonais serpentina</u> <u>Slavina appendiculata</u> <u>Stylaria fossularis</u> <u>S. lacustris</u> <u>Uncinaiis uncinaiis</u> <u>Ilyodrilus templetoni</u> <u>Limnodrilus angustipenis</u> <u>L. cervix</u> <u>L. claperedeianus</u> <u>L. hoffmeisteri</u> <u>L. udekemianus</u> <u>Peloscolex spp.</u> <u>Potamothrix moldaviensis</u> <u>Bdellobdrilus americanus</u>

TABLE 25 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM THE NEARSHORE OF
THE LAKE ERIE ISLANDS OF THE LAKE ERIE WESTERN BASIN

Phylum Annelida

Class Hirundinea

Dina fervida
Erpobdella punctata
Glossiphonia complanata
G. nepheloidea
Helobedlla stagnalis
Placobdella montifera
P. ornata
Helobdella fusca

Phylum Mollusca

Class Pelecypoda

Anodonta grandis
Fusconia flava
Lampsilis radiata siliquoidea
Leptodea fragilis
Ligumia nasuta
Proptera alata
Pisidium sp.
Spaerium sp.
Truncilla donaciformis
Sphaerium transversum
Musculium sp.
Lasmigona costata
Elliptio dilutatus
Quadrula pustulosa
Cyclonais tuberculata
Amblyema plicata
Strophitus rugosus
Ptychobranhus fasciolaris
Obliquaria reflexa
Obovaria leibii
Carunculina parva
Eurynia nasuta
Ligumia recta
Lampsilis ventricosa
Dysnomia perplexa
D. triquerta
Truncilla truncata
Pleurobema cordatum
Sphaerium corneum
S. striatum
Micromyia fabalis
Obvaria subrotunda

TABLE 25 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM THE NEARSHORE OF
THE LAKE ERIE ISLANDS OF THE LAKE ERIE WESTERN BASIN

Class Gastropoda

Amnicola sp.
Bulimus tentaculata
Campeloma sp.
Gyraulus sp.
Helisoma sp.
Lioplax sp.
Physa sp.
Somatogyrus sp.
Valvata sincera
V. tricarinata
Amnicola limosa
Goniobasis livescens
Helisoma antrosa
H. trivolvis
Menetus exacuus
Gyraulus parvus
Planorbula crassilabris
Physella gyrina
Physa sayii
P. magnalacustris
Ferrissia parallela
F. rivularis
Campeloma decisum
Somatogyrus subglobosus
S. integer
Pleurocera acuta
Lymnaea dalli
Valvata sp.
V. lewisii
V. bicarinata
Amnicola integra
A. binneyana
Helisoma anceps

Phylum Arthropoda

Class Crustacea

Gammarus fasciatus
Orconectes propinquus
Hyallela sp.
Asellus sp.
Illyocryptus sp.

Class Arachnida

Hydracarina

TABLE 25 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED FROM THE NEARSHORE OF
THE LAKE ERIE ISLANDS OF THE LAKE ERIE WESTERN BASIN

Phylum Arthropoda

Class Insecta

Order Diptera

Tanytarsus sp.

Coelotanypus sp.

Cricotopus sp.

Chironomus (Cryptochironomus) sp.

Glyptotendipes sp.

Tanypus sp.

Pentaneura sp.

Procladius sp.

Chironomus plumosus

Chaoborus sp.

Order Neuroptera

Climacia areolaris

Order Megaloptera

Sialis sp.

Order Hemiptera

Sigara lineata

Order Ephemeroptera

Hexagenis sp.

Ephemera sp.

Baetisca lacustris

Stenonema interpunctatum

Order Trichoptera

Molanna sp.

Oecetis sp.

Oecetis eddlistoni

Polycentropus sp.

Phylocentropus sp.

Source: Allen, 1915
Ahlstrom, 1930
Shelford and Boesel, 1942
Wood, 1953, 1963
Britt, Addis, and Engel, 1973
Cooper and Herdendorf, 1977

TABLE 26

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE
PRESENT IN THE CANADIAN NEARSHORE WATERS OF LAKE ERIE

Phylum Annelida

Class Oligochaeta

Aulodrilus americanus
A. pluriseta
Bothrioneurum vej dovskyanum
Branciura sowerbyi
Limnodrilus angustipenis
L. cervix
L. claperedeianus
L. hoffmeisteri
L. udekemianus
Peloscolex ferox
P. freyi
P. multisetosus
Potamothrix moldaviensis
P. vej dovskyi
Psammoryctides curvisetosus
Tubifex tubifex
Stylodrilus heringianus
Ophidonais serpentina
Stylaria lacustris

Class Polychaeta

Manayunkia speciosa

Class Hirudinea

Glossiphonia complanata
Helobdella stagnalis
Mooreobdella sp.

Phylum Arthropoda

Class Crustacea

Crangonyx gracilis
Gammarus fasciatus
Gammarus lacustris
G. pseudolimnaeus
Hyalella azteca
Pontoporeia affinis
Asellus intermedius
Asellus sp.
Orconectes virilis

Class Insecta

Order Ephemeroptera

Hexagenia sp.

Order Trichoptera

Athripsodes sp.

Molanna sp.

Polycentropus sp.

TABLE 26 (Con't.)

BENTHIC MACROINVERTEBRATE TAXA REPORTED TO BE
PRESENT IN THE CANADIAN NEARSHORE WATERS OF LAKE ERIE

Phylum Arthropoda	Class Insecta
	Order Diptera
	<u>Chironomus</u> sp.
	<u>Coelotanypus</u> sp.
	<u>Cryptochironomus</u> sp.
	<u>Micropsectra</u> sp.
	<u>Mictrotendipes</u> sp.
	<u>Procladius</u> sp.
	<u>Tanytarsus</u> sp.
Phylum Mollusca	Class Pelecypoda
	<u>Sphaerium</u> sp.
	<u>Pisidium</u> sp.
	<u>Anodonta grandis</u>
	<u>Lampsilis siliquoidea</u>
	<u>Ligumia nasuta</u>
	Class Gastropoda
	<u>Amnicola</u> sp.
	<u>Bulimus tentaculatus</u>
	<u>Goniobasis</u> sp.
	<u>Helisoma</u> sp.
	<u>Lymnaea</u> sp.
	<u>Physa</u> sp.
	<u>Valvata sincera</u>
	<u>V. tricarinata</u>

Source: Veal and Osmond, 1968
Barton and Hynes, 1976

TABLE 27

ANNOTATED LIST OF PRINCIPAL MACROBENTHIC
INVERTEBRATE STUDIES OF THE LAKE ERIE NEARSHORE ZONE

INVESTIGATION	SYNOPSIS
Ahlstrom, 1930	The study was designed to determine the mollusc species composition of the Bass Island Region. Data is qualitative at the species level. Site specificity is limited to the general region of an island, nearest island, pond or island structure. Provides a listing of snails and bivalves, including terrestrial forms.
Ailaen, 1968	A study of the general range of the crayfish <u>Orconectes virilis</u> and indicates that the north shore of Lake Erie may be its southernmost limit in the Lake Erie region.
Allen, 1915	A study designed to survey the molluscs of South Bass Island and Kelley's Island. Data consists of a list of species, primarily land snails, found on either South Bass or Kelly's Island.
Bubna, 1902	This is a checklist of Coleoptera found in Cuyahoga County at the species level. Species are indicated as being common or rare. Common species of aquatic beetles may have been present in Lake Erie. No other data was provided.
Carrick, 1956	This was study of Lake Erie hydras including life history and ecology primarily within the island region of Lake Erie.
Davis, 1957	Noted the presence of the colonial hydrozoan <u>Cordylophora lacustris</u> in the harbor of the Chagrin River.

TABLE 27 (Con't.)

ANNOTATED LIST OF PRINCIPAL MACROBENTHIC
INVERTEBRATE STUDIES OF THE LAKE ERIE NEARSHORE ZONE

INVESTIGATION	SYNOPSIS
Fulton, 1911	This is a listing of soldier flies found in the vicinity of Cedar Point, Ohio. Thirteen species were recorded of which eight species are possibly aquatic.
Furtos, 1933	A study of ostracods found in Ohio includes species found in Lake Erie. Data is qualitative with collection sites and distribution giving nearest island, city, etc.
Gary, 1910	This study compares and contrasts the species of naiad mussels in the region of Cedar Point, Ohio and the Grand River, Ohio. Data is qualitative.
Goodrich, 1911	Notes on the presence of the snail <u>Lymnaea auricularia</u> in Ohio within 100 ft. of Maumee Bay in a marshy stream. Data is qualitative.
Goodrich, 1916	A description of the species <u>Pleurocera subulare</u> , a shell common to Lake Erie. Data qualitative.
Goodrich, 1920	A description of the distribution of three species of <u>Goniobasis</u> in Ohio of which two are found in Lake Erie.
Grier, 1918	A study which lists the finding of three new species of pelecypod (Naiades) from the Presque Isle region of Lake Erie.

TABLE 27 (Con't.)

ANNOTATED LIST OF PRINCIPAL MACROBENTHIC
INVERTEBRATE STUDIES OF THE LAKE ERIE NEARSHORE ZONE

INVESTIGATION	SYNOPSIS
Grier, 1920	This study was basically aimed at discussing mussel shell thickness with respect to CaCO_3 in the water. Contains site specific data for some pelecypods taken at Presque Isle in Lake Erie.
Herms, 1907	A note indicating the presence of a species of <u>Palaemonetes</u> in Sandusky Bay and its habitat as well as describing experiments indicating the effect of light on this organism.
Hine, 1901	A listing of dragonfly species found in the marshes in the vicinity of Sandusky and some notes on these species. Data qualitative.
Kellicott, 1891	A listing of sponge taxa found in the Mills collection. Sponges apparently from the Niagara River region.
Kellicott, 1897	A listing of ten sponge species collected from Ohio of which two species are from the Lake Erie drainage basin.
Kellicott, 1899	A taxonomic work on the dragonfly species of Ohio with notes on their distribution.
Landacre 1901	Basically a set of notes on the presence of three species of sponge and two species of bryozoans in Sandusky Bay.
Langlois, 1954	A book about the general ecology of Lake Erie's western basin with many notes on the benthos. The book summarizes studies conducted over a period of about 60 years.

TABLE 27 (Con't.)

ANNOTATED LIST OF PRINCIPAL MACROBENTHIC
INVERTEBRATE STUDIES OF THE LAKE ERIE NEARSHORE ZONE

INVESTIGATION	SYNOPSIS
Jezerinac, 1967	This study was aimed to describe the crayfish found in the Chagrin River System. Only one species is reported from the mouth of the river at Lake Erie.
Robertson and Blakešlee, 1948	A taxonomic work at the species level describing the species of mollusc present in the Niagara Frontier Region of New York.
Stansberry, 1960	This was study of the naid mussels in and about Fishery Bay South Bass Island.
Turner, 1926	A study of crayfishes found in Ohio with notes on their life history, anatomy and ecology as well as taxonomy. Indicated that seven species are found in the Lake Erie region.
Walker, 1913	A review of the Great Lakes unionid mussel fauna with notes of Lake Erie's mussel fauna. A discussion of glacial activity in relation to mussel distributions is presented.
Walton, 1906	A taxonomic description and key to the nauid oligochaetes of Lake Erie by Cedar Point, Ohio.
Wood, 1953 1963	A study of the bottom fauna of the western basin of Lake Erie with some stations being in the nearshore zone.

TABLE 28

LIST OF LAKE ERIE MACROBENTHOS, 1891-1920

<u>Organism</u>	<u>Locality</u>
Porifera	
<u>Spongilla aspinosa</u>	New York, Niagara River, Ohio, Sandusky Bay
<u>S. cincera</u>	Ohio, Sandusky Bay
<u>S. fragilis</u>	Ohio, Sandusky Bay
<u>Meyenia fluviatilis</u>	New York, Ohio
<u>M. carteriformes</u>	New York
<u>M. milleri</u>	New York
<u>Carterius tubisperma</u>	New York
<u>C. latitenta</u>	New York
<u>C. tenosperma</u>	New York
Bryozoa	
<u>Plumatella polymorpha</u>	Sandusky Bay
<u>Pectinatella magnifica</u>	Sandusky Bay
Annelida -	
Class Oligochaeta	
<u>Chaetogaster langi</u>	Cedar Point
<u>C. pellucidas</u>	Cedar Point
<u>Dero vagus</u>	Cedar Point
<u>Naidium osborni</u>	Cedar Point
<u>Nais parviseta</u>	Cedar Point
<u>N. parvula</u>	Cedar Point
<u>N. tenuidentis</u>	Cedar Point
<u>N. tortuosa</u>	Cedar Point
<u>Pristina serpentina</u>	Cedar Point
<u>Stylaria lacustris</u>	Cedar Point
Mollusca	
Class Gastropoda	
<u>Lymnaea auricularis</u>	Toledo, Maumee Bay, South Bass Island
<u>Pleurocera subulare</u>	Western Basin
<u>Goniobasis livescens</u>	entire lake shore, South Bass Island
<u>G. haldemani</u>	Sandusky Bay and west
<u>Bythinia tentacula</u>	Maumee Bay, South Bass Island
<u>Stagnicola palustris</u>	South Bass Island
<u>S. reflexa</u>	South Bass Island
<u>Heliosoma antrosa</u>	South Bass Island
<u>H. trivolvis</u>	South Bass Island
<u>Menetus exacus</u>	South Bass Island
<u>Gyraulus parvus</u>	South Bass Island
<u>Planorbula crassilateris</u>	South Bass Island
<u>Physella gyrina</u>	South Bass Island

TABLE 28 (Con't.)

LIST OF LAKE ERIE MACROBENTHOS, 1891-1920

<u>Organism</u>	<u>Locality</u>
Mollusca	
Class Gastropoda	
<u>Physella payii</u>	South Bass Island
<u>P. magna lacustris</u>	South Bass Island
<u>Ferrissia parallela</u>	South Bass Island
<u>F. rivularis</u>	South Bass Island
<u>Cameloma decisum</u>	South Bass Island
<u>Valvata tricarinata</u>	South Bass Island
<u>Amnicola limosa</u>	South Bass Island
<u>Somatogyrus subglobassus</u>	South Bass Island
<u>S. integer</u>	South Bass Island
<u>Pleurocera acuta</u>	South Bass Island
Class Pelecypoda	
<u>Truncilla triquesta</u>	Lake Erie
<u>T. sulcata</u>	Lake Erie
<u>T. perplexa</u>	Lake Erie
<u>Micromyia fabalis</u>	Lake Erie
<u>Lampsilis neutrieosa</u>	Lake Erie, Cedar Point, Grand River, Put-in-Bay
<u>L. multiradiata</u>	Lake Erie, Grand River
<u>L. luteola</u>	Lake Erie, Cedar Point, Grand River
<u>L. recta</u>	Lake Erie, Cedar Point, Grand River
<u>L. nasuta</u>	Lake Erie, Cedar Point
<u>L. iris</u>	Lake Erie, Grand River
<u>L. parva</u>	Lake Erie, Grand River
<u>L. alata</u>	Lake Erie, Cedar Point, Grand River
<u>L. gracilis</u>	Lake Erie, Cedar Point
<u>L. leptodon</u>	Lake Erie
<u>L. ligamentina</u>	Grand River
<u>Obonaria leibii</u>	Lake Erie, Put-in-Bay
<u>O. ellipsis</u>	Lake Erie
<u>Plagiola elegans</u>	Lake Erie
<u>P. clonaciformes</u>	Lake Erie, Cedar Point
<u>Obliquaria reflexa</u>	Lake Erie, Put-in-Bay
<u>Strophitus edentulus</u>	Lake Erie, Cedar Point, Grand River
<u>Anodonta marginata</u>	Lake Erie
<u>A. imbecilis</u>	Lake Erie
<u>A. grandis</u>	Lake Erie, Cedar Point, Grand River, Put-in-Bay
<u>Anodontoides ferussaciana</u>	Lake Erie
<u>A. subcylindracea</u>	Lake Erie
<u>Proptera alata</u>	Lake Erie, Put-in-Bay

TABLE 28 (Con't.)

LIST OF LAKE ERIE MACROBENTHOS, 1891-1920

<u>Organism</u>	<u>Locality</u>
Mollusca	
Class Pelecypoda	
<u>Ptychobranthus fasciolare</u>	Put-in-Bay
<u>P. phaseohes</u>	Lake Erie, Grand River
<u>Symphonota compressa</u>	Lake Erie, Grand River
<u>S. costata</u>	Lake Erie, Grand River
<u>Alasmidonta marginata</u>	Lake Erie
<u>A. calceolus</u>	Lake Erie, Grand River
<u>Hemilastena ambigua</u>	Lake Erie
<u>Unio gibbosus</u>	Lake Erie
<u>Quadrula hippopaea</u>	Lake Erie
<u>Q. lachrymosa</u>	Lake Erie, Cedar Point, Put-in-Bay
<u>Q. pustulosa</u>	Lake Erie, Grand River, Cedar Point
<u>Q. rubigenosa</u>	Lake Erie
<u>Q. undata</u>	Lake Erie, Cedar Point
<u>Q. coccinea</u>	Lake Erie
<u>Q. pubrotunda</u>	Lake Erie
<u>Q. tuberculata</u>	Presque Isle, Put-in-Bay
<u>Elliptio dilitatus</u>	Presque Isle, Put-in-Bay
<u>Fusconia flava</u>	Presque Isle
<u>Lasmigona costata</u>	Cedar Point, Grand River
<u>Odonaria circulus</u>	Cedar Point, Grand River
<u>Unio gibbosus</u>	Cedar Point
<u>Quadrula plicata</u>	Cedar Point
<u>Q. undulata</u>	Put-in-Bay
<u>Q. quadrula</u>	Put-in-Bay
<u>Cyclonais tuberculata</u>	Put-in-Bay
<u>Amblema plicata</u>	Put-in-Bay
<u>Pleurobema coccineum</u>	Put-in-Bay
<u>Strophitus rugosus</u>	Put-in-Bay
<u>Leptodea fragilis</u>	Put-in-Bay
<u>Caranculina parva</u>	Put-in-Bay
<u>Euryntia nasuta</u>	Put-in-Bay
<u>Lampsilis siliquoidea</u>	Put-in-Bay
<u>Truncilla donaciformes</u>	Put-in-Bay
<u>Dysnomia periplexa</u>	Put-in-Bay
<u>D. triquesta</u>	Put-in-Bay

TABLE 28 (Con't.)

LIST OF LAKE ERIE MACROBENTHOS, 1891-1920

<u>Organism</u>	<u>Locality</u>
Arthropoda	
Class Crustacea	
<u>Palaemoentes exilipes</u>	Sandusky Bay
Class Insecta	
<u>Calopteryx maculata</u>	Sandusky Bay
<u>Hetaerina americana</u>	Sandusky Bay
<u>Lestes unguiculatus</u>	Sandusky Bay
<u>L. uncatus</u>	Sandusky Bay
<u>L. disjunctus</u>	Sandusky Bay
<u>L. forcipatus</u>	Sandusky Bay
<u>L. rectangularis</u>	Sandusky Bay
<u>L. vigilax</u>	Sandusky Bay
<u>L. inequalis</u>	Sandusky Bay
<u>L. eurinus</u>	Sandusky Bay
<u>Agria putrida</u>	Sandusky Bay
<u>A. violacea</u>	Sandusky Bay
<u>A. sedula</u>	Sandusky Bay
<u>A. apicalis</u>	Sandusky Bay
<u>Nebalennia posita</u>	Sandusky Bay
<u>N. irene</u>	Sandusky Bay
<u>Enallagina civile</u>	Sandusky Bay
<u>E. ebrium</u>	Sandusky Bay
<u>E. carunculatum</u>	Sandusky Bay
<u>E. aspersum</u>	Sandusky Bay
<u>E. exulans</u>	Sandusky Bay
<u>E. geminatum</u>	Sandusky Bay
<u>E. antennatum</u>	Sandusky Bay
<u>E. signatum</u>	Sandusky Bay
<u>E. pollutum</u>	Sandusky Bay
<u>Amphiagrion saucium</u>	Sandusky Bay
<u>Ishnura verticalis</u>	Sandusky Bay
<u>Gomphus vastus</u>	Sandusky Bay
<u>G. fraternus</u>	Sandusky Bay
<u>G. furcifer</u>	Sandusky Bay
<u>G. exilis</u>	Sandusky Bay
<u>G. spicatus</u>	Sandusky Bay
<u>G. plagiatus</u>	Sandusky Bay
<u>Dromphogomphus spinosus</u>	Sandusky Bay
<u>Epiaeschna heros</u>	Sandusky Bay
<u>Aescha verticalis</u>	Sandusky Bay
<u>A. constricta</u>	Sandusky Bay
<u>Anax junius</u>	Sandusky Bay
<u>Macromia illinoiensis</u>	Sandusky Bay

TABLE 28 (Con't.)

LIST OF LAKE ERIE MACROBENTHOS, 1891-1920

<u>Organism</u>	<u>Locality</u>
Arthropoda	
Class Insecta	
<u>Epicordulia princips</u>	Sandusky Bay
<u>Tetragoneuria cynosura</u>	Sandusky Bay
<u>Trameai carolina</u>	Sandusky Bay
<u>T. lacerata</u>	Sandusky Bay
<u>Neurocordulia yamaskanensis</u>	Sandusky Bay
<u>Libellula basalis</u>	Sandusky Bay
<u>L. formaculata</u>	Sandusky Bay
<u>L. semifasciata</u>	Sandusky Bay
<u>L. pulchella</u>	Sandusky Bay
<u>L. incesta</u>	Sandusky Bay
<u>Sympetrum obstrusum</u>	Sandusky Bay
<u>S. rubicundulum</u>	Sandusky Bay
<u>S. vicinium</u>	Sandusky Bay
<u>S. semicinctum</u>	Sandusky Bay
<u>S. corruptum</u>	Sandusky Bay
<u>Pachydiplax longipennis</u>	Sandusky Bay
<u>Plathemis lydia</u>	Sandusky Bay
<u>Perithemis domitia</u>	Sandusky Bay
<u>Leucorhinia intacta</u>	Sandusky Bay
<u>Celethemis eponina</u>	Sandusky Bay
<u>C. elisa</u>	Sandusky Bay

TABLE 29

BENTHOS OF TEN LAKE ERIE SOUTH SHORE
RIVER MOUTHS IN OHIO

Oligochaeta

Tubifex sp.
Limnodrilus sp.
Branchiura sowerbyi

Hirudinea

Glossiphonia stagnalis
G. nepheloidea
G. complanata
Placobdella montifera
Herpobdellidae

Diptera

Chironomidae
Tipulidae
Chaohoues sp.
Atherix variegata

Coleoptera

Elmis sp.

Trichoptera

Potamyia flava

Lepidoptera

Ephemeroptera

Hexagenia sp.
Caenis sp.

Odonata

Ishnura sp.

Amphipoda

Gammarus fasciatus
Gammarus sp.

Pelecypoda

Musculium transnesum
Pisidium sp.

Gastropoda

Bythinia tenlaculata

Hydracarina

Source: Brown (1953)

