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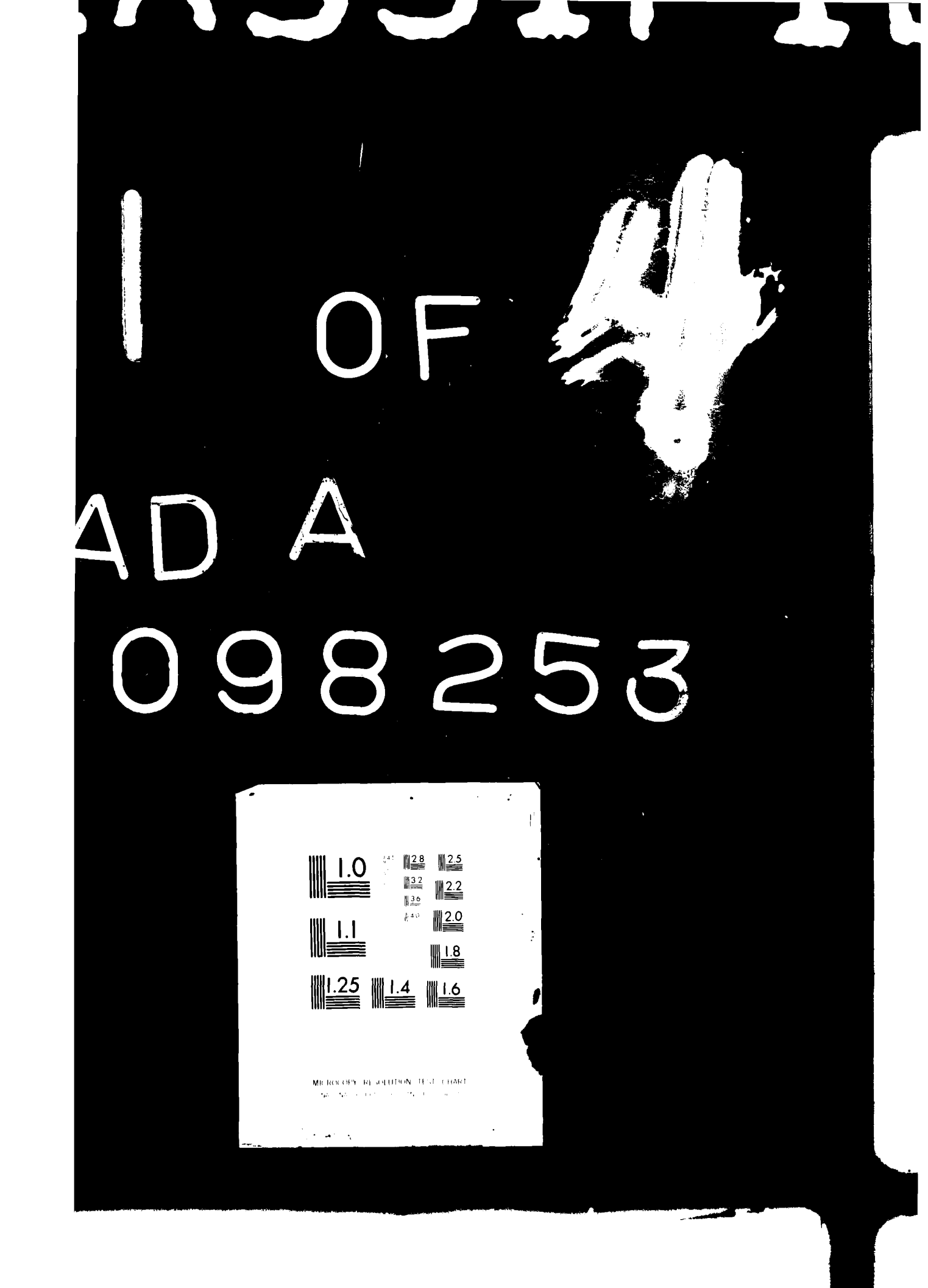
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A098 253	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Annoted Bibliography for Lake Erie Volumes I through V A098252		5. TYPE OF REPORT & PERIOD COVERED Bibliography
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Elaine Pranter Robert Sweeney Robert Oleszko Marjorie Vesley		8. CONTRACT OR GRANT NUMBER(s) DACW49-74-C-0102
9. PERFORMING ORGANIZATION NAME AND ADDRESS Great Lakes Laboratory State University College at Buffalo		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Water Quality Section NCBED-HQ U.S. Army Engineer District, Buffalo 1776 Niagara Street, Buffalo, N.Y. 14207		12. REPORT DATE October 1974
		13. NUMBER OF PAGES Volumes: I-396, II-227, III-337, IV-377, V-289
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for Public Release; Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Copies are available from National Technical Information Service, Springfield, VA 22161

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Limnological Research
Lake Erie
Biological
Chemical
Engineering
Physical
Socio-Economic

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This bibliography provides a reference that will be of aid to those individuals and/or agencies planning or initiating limnological research on Lake Erie and/or its tributaries. The bibliography is divided into five sections: biological, chemical, engineering, physical, and socio-economic. Pertinent information from both United States and Canada are documented. The papers cited in the annotated bibliography are located at Great Lakes Laboratory of the State University College at Buffalo unless otherwise noted.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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ANNOTATED BIBLIOGRAPHY OF for

BIOLOGICAL AND RELATED SUBJECTS CONCERNING LAKE ERIE, AND ENVIRONMENTAL TRIBUTARIES, WITH V. SOCIO-ECONOMIC

Volume VI Socio-Economics

for

(11) F 74

Buffalo District - Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

(15)

Contract DACW 49-74-C-0102

by

(12) 297

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F 3756 xll

Acknowledgements

Buffalo District would like to express appreciation to the following persons who worked on this bibliography at the Great Lakes Laboratory.

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I. INTRODUCTION

The purpose of this study, which was sponsored under Contract DACW 49-74-C-0102 from the Buffalo District of the U. S. Army Corps of Engineers, was to provide a reference that would be of aid to those individuals and/or agencies, planning or initiating limnological research on Lake Erie and/or its tributaries. The task was divided on the basis of disciplines into five (5) sections - biological, chemical, engineering, physical and socio-economic.

The holdings of libraries in both the United States and Canada were surveyed. Each pertinent reference was abstracted and examined with respect to the location(s) in which the study was conducted, parameters measured and techniques employed. In addition, the last known address of the agency or senior author was included to assist in locating the author if further communication is desired.

Unless otherwise noted, the papers cited in the annotated bibliography are located at the Great Lakes Laboratory of the State University College at Buffalo.

Due to limitations in time, we were unable to secure copies of all the references that may contain information relative to Lake Erie. These have been included in this paper.

II. SUBJECT INDEX

The number following each, refers to the number of the paper listed in Section III. Lake Erie was divided into twenty-one (21) regions, which are shown in Figure 1. The number twenty-two (22) refers to lake-wide studies; while numbers twenty-three (23) through thirty-four (34) concern specific tributaries to the lake. Thirty-five (35) concerns Sandusky Bay; while thirty-six (36) includes other tributaries.

A. Study Regions

1. 11, 16, 92, 106, 122, 144, 147, 153, 173, 179, 180, 181, 257, 270, 271, 318, 328, 346, 347, 355, 494, 545, 559, 575, 587, 614, 615, 618, 622, 625, 626, 627, 630, 632, 645, 676, 677, 685, 689, 709, 711, 713, 715, 724, 734, 745

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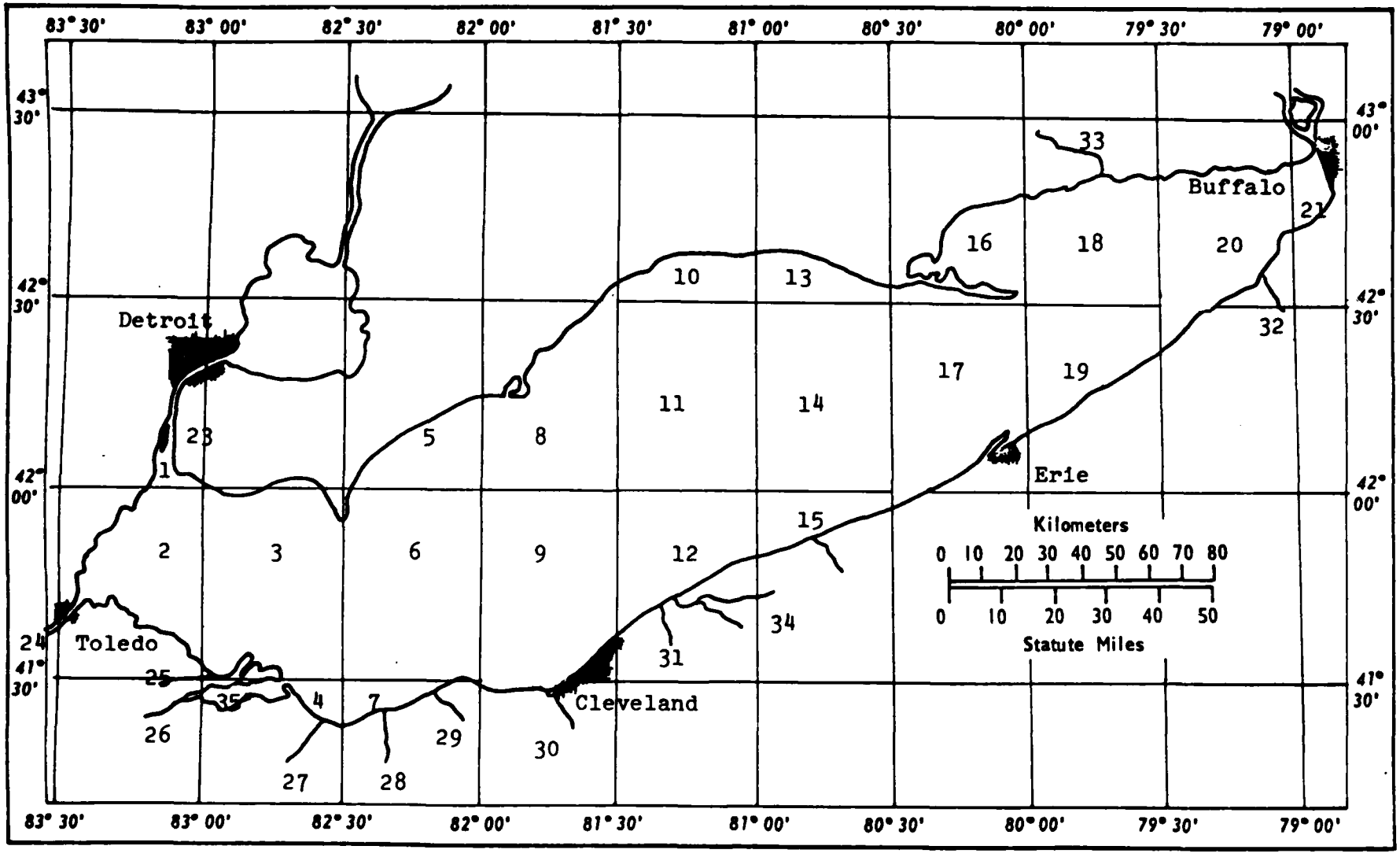
4. 86, 106, 147, 152, 153, 173, 178, 187, 188, 214, 227, 248, 250, 327, 328, 355, 362, 374, 491, 494, 503, 504, 505, 545, 575, 614, 615, 616, 625, 651, 676, 683, 685, 701, 711, 713, 715, 724, 734, 738, 744, 746

5. 80, 143, 144, 173, 188, 228, 249, 270, 271, 328, 508, 545, 548, 615, 618, 622, 626, 627

6. 106, 154, 162, 173, 188, 249, 327, 328, 343, 346, 362, 494, 545, 614, 618, 622, 626, 627, 651, 676, 683, 701, 713, 746

Figure 1 - MAP OF LAKE ERIE



22 = Lakewide

36 = Other Tributaries

KEY TO FIGURE 1

#	Numerical	#	Alphabetical
1 - 21	Quadrants in Lake Erie	29	Black River
22	Lakewide	32	Cattaraugus River
23	Detroit River	31	Chagrin River
24	Maumee River	30	Cuyahoga River
25	Portage River	23	Detroit River
26	Sandusky River	34	Grand River (Ohio)
27	Huron River	33	Grand River (Ontario)
28	Vermilion River	27	Huron River
29	Black River	22	Lakewide
30	Cuyahoga River	24	Maumee River
31	Chagrin River	25	Portage River
32	Cattaraugus River	35	Sandusky Bay
33	Grand River (Ontario)	26	Sandusky River
34	Grand River (Ohio)	28	Vermilion River
35	Sandusky Bay		
36	Other Tributaries		

7. 11, 26, 86, 106, 147, 152, 162, 168, 173, 188, 227, 246, 247, 248, 250, 252, 327, 328, 333, 355, 378, 491, 494, 545, 575, 614, 618, 626, 651, 657, 676, 683, 685, 701, 711, 713, 720, 740, 744, 746

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10. 80, 143, 249, 270, 272, 301, 508, 548, 569

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13. 80, 143, 144, 184, 249, 272, 508, 548, 569, 673

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15. 11, 26, 106, 147, 152, 160, 187, 188, 227, 250, 257, 355, 362, 491, 549, 575, 614, 651, 676, 683, 685, 701, 711, 713, 740

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17. 20, 86, 106, 152, 187, 241, 252, 254, 257, 275, 355, 362, 378, 491, 549, 575, 620, 676, 685, 701, 703, 711, 713, 740, 745, 749

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25. Portage River - 161, 319, 321, 325, 545, 634, 692, 693, 705, 748

26. Sandusky River - 88, 161, 319, 327, 328, 545, 634, 692, 693, 705, 748

27. Huron River - 319, 328, 545, 634, 692, 693, 705

28. Vermilion River - 319, 327, 328, 545, 634, 680, 692, 693, 705, 748

29. Black River - 319, 327, 328, 545, 634, 657, 692, 693

30. Cuyahoga River - 25, 45, 59, 69, 88, 161, 169, 187, 191, 246, 247, 261, 319, 327, 328, 346, 568, 592, 594, 634, 639, 656, 658, 661, 662, 665, 675, 681, 689, 690, 692, 693, 748

31. Chagrin River - 161, 328, 634, 650, 681, 692, 693, 705, 748

32. Cattaraugus River - 276, 399, 469, 485, 669, 684, 692, 694, 705, 728

33. Grand River (Ontario) - 272, 502, 629, 690, 705

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III. ABSTRACTS

1. Adams, David A. 1969. Role of the Great Lakes in the national program of marine sciences. Internat. Assoc. Great Lakes Res. Proc. 12th Conf. Great Lakes Res. pp. 819-824.

The plight of the Great Lakes, particularly Lake Erie, provides both a warning and an opportunity for the conduct of this nation's marine affairs. Of primary consideration is the relationship between the social and economic needs of mankind, natural resources, and research. Municipal, county and state organizations have been formed to deal with problems of resource use and allocation.

2. Albany Weather Bureau. 1957. New York State's weather. Conservationist. 11(5):20-21.

The waters of Lake Erie and Ontario have a tremendous effect on areas adjacent to them. These lakes tend to take the edge off the winter cold, and the burn off summer heat. The fruit growing industry takes advantage of this buffer effect and has been located near the lakes. The lake area climate also produces winter snowfalls that attract skiers. (SM)

3. Allen, Herbert E. 1970. Chemical and biological quality of Lake Erie. In: The Environmental Problems of the Lake Erie Basin. The Carroll Business Bull. Cleveland, Ohio. 10(1):17-21.

Major concern of the article focuses on the pollution of Lake Erie due to man. Projections of the consequences of continuing degradation of the Lake are discussed. Planning and management programs are proposed to insure the future growth of Lake Erie as a national resource.

4. Allin, A. E. 1929. Seining records and food of the intermediate stages of Lake Erie fishes. In: A Biological Survey of the Erie-Niagara System. N. Y. Cons. Dept. Suppl. 18th Ann. Rept. 1928. pp. 95-106.

Production and legislation for Lake Erie fish as discussed here with concern for spawning of fish and their commercial and sport availability.

Allison, Leonard N. - See: Devid R. Wolfert, et al, No. 746.

5. Anderson, D. V. 1966. Recirculation of Water in the Great Lakes. Bull. of the I.A.S.H. 11(4):5-7.

Discussion of water recirculation is made in terms of economic and social benefits, no specific data is given.

6. Anderson, D. V. 1969. To justify Great Lakes research. Proceedings. A Conference for the Users of the Great Lakes. Univ. Toronto. Toronto, Ont. pp. 48-62.

This paper mentions several aspects of Great Lakes Research which is necessary, and cites Lake Erie as an example in a few cases.

7. Anonymous. 1955. The case for Buffalo Harbor. Buffalo Business. Buffalo, N.Y. 30(7):66-69.

The Buffalo Area Chamber of Commerce has been trying for 29 years to obtain adequate federal funds for improvements on the Buffalo Harbor. Insufficient depth prevents commerce growth on the Great Lakes. This article reviews the improvements needed and their costs. (BU)

8. Anonymous. 1957. Army Engineers' centennial. Buffalo Business. Buffalo, N.Y. 32(8):11-13.

While celebrating its 100th year, the Army Corps of Engineers has many projects on the Great Lakes to consider. The opening of the St. Lawrence Seaway will increase traffic and make the enlargement of many harbors necessary. Economic studies must be done to justify these projects. A report on the Buffalo Harbor is due in 1958. (BU)

9. Anonymous. 1957. The St. Lawrence Seaway will open up a new world of commerce for Buffalo. Buffalo Business. Buffalo, N.Y. 32(8):31-33.

Already one of the world's greatest inland ports, Buffalo will become a world port with the opening of the St. Lawrence Seaway. A map shows travel routes through the Seaway and Great Lakes and the major ports on Lake Erie. (BU)

10. Anonymous. 1958. The continued fight for the Buffalo Harbor. Buffalo Business. Buffalo, N.Y. 33(6): 58-59.

The Buffalo Area Chamber of Commerce made an appeal to the Sub-Committee on Public Works of the Senate Committee on Appropriations for $2,000,000 to complete the improvements of the Buffalo Harbor. A table shows recent Buffalo Harbor appropriations, and economic statistics to justify the project. This article stresses the importance of the project. (BU)

11. Anonymous. 1958. Exports and imports via Buffalo. Buffalo Business. Buffalo, N.Y. 33(11):28.

The value of U.S. Exports through the Port of Buffalo increased 120% in 1957 over 1956. The most significant aspect of this climb was the value of dry cargo exported, which showed an upturn of 233%. Imports increased at Buffalo by 42%. Tables show imports and exports through ten principal Great Lakes ports including Ashtabula, Ohio; Buffalo, N.Y.; Cleveland, Ohio; Detroit, Mich.; Lorain, Ohio; Sandusky, Ohio; and Toledo, Ohio. (BU)

12. Anonymous. 1959. Class rate milage. Buffalo Business. Buffalo, N.Y. 35(4):14.

This article lists nautical milage from the port of Buffalo to most major ports of the world. (BU)

13. Anonymous. 1959. Greater Buffalo, the area of opportunity. Buffalo Business. Buffalo, N.Y. 34(8): 19-39.

Through photography and sketches, this article shows the many features of the Buffalo, N.Y., area, including power facilities, transportation, population, and developmental projects for the future. Buffalo is centrally located and travel to Canada or any city on the Great Lakes is easy from this area. (BU)

14. Anonymous. 1960. Great Lakes overseas shipping services at Buffalo. Buffalo Business. Buffalo, N.Y. 35(4):16.

A list of overseas Great Lakes shopping companies and their Buffalo addresses is presented here. (BU)

15. Anonymous. 1960. Great Lakes steamship lines maintaining offices in Buffalo. Buffalo Business. Buffalo, N.Y. 35(4):12.

This article lists the types of ships used and describes them.

16. Anonymous. 1960. Great Lakes tonnage. Buffalo Business. Buffalo, N.Y. 35(4):44-48.

This article emphasizes tonnage statistics of the major U.S. Great Lakes ports. In 1958, Buffalo ranked fifth in this group.

17. Anonymous. 1960. Lake-steamer-distances. Buffalo Business. Buffalo, N.Y. 35(4):18.

A table lists the nautical miles from Buffalo to most Great Lakes ports. (BU)

18. Anonymous. 1960. Port of Buffalo customs limits. Buffalo Business. Buffalo, N.Y. 35(4):12.

Buffalo, one of the largest Great Lakes ports, has been increasing its commercial volume to where it now averages 20,000,000 tons annually. There are 74 piers, wharves, and landings and every facility necessary for shipping is available.

19. Anonymous. 1960. The port of Buffalo traffic pattern. Buffalo Business. Buffalo, N.Y. 35(4):7.

In 1958, the Port of Buffalo handled 571,925 tons of waterborne commerce, 9 % in foreign commerce. This article includes a complete breakdown of the above figures.

20. Anonymous. 1960. Sixteen lake ports report nearly 4,600,000 tons of direct overseas trade in 1959. Buffalo Business. Buffalo, N.Y. 35(4):16.

Great Lakes ports as a group made dramatic gains in their direct overseas commerce in the first year of the seaway. A table gives tonnage of exports and imports in 1959 for Buffalo and other Lake Erie Ports. (BU)

21. Anonymous. 1961. Buffalo's cargo gateway to the ports of the world. Buffalo Business. Buffalo, N.Y. 36(8):22.

A picture shows the Buffalo Port Terminal with three foreign ships loading at the same time. (BU)

22. Anonymous. 1961. The harbor job. Buffalo Business. Buffalo, N.Y. 36(8):23-26.

The merchants exchange, an early form of the Buffalo Chamber of Commerce, was occupied with the Buffalo Harbor. This article gives a history of construction and legislation concerning the harbor since 1946. (BU)

23. Anonymous. 1962. Bright outlook on the waterfront. Buffalo Business. Buffalo, N.Y. 37(1):45-47.

Concentrated developmental programs have enabled the Port of Buffalo to have a record-breaking year in foreign shipping. Description of the activities in the port during the 1961 season are included. (BU)

24. Anonymous. 1962. Transportation profile. Buffalo Business. Buffalo, N.Y. 37(5):16-17.

A vast network of air, rail, water and highway facilities has made Buffalo the most accessible city on the North American continent. The port of Buffalo handled over 17 million tons of water borne traffic in the 1961 season and 1/4 million tons of foreign commerce. (BU)

25. Anonymous. 1965. Cleveland told to fix leaky sewers. Eng. News-Record. January 28, 1965. p. 48.

The Ohio Water Pollution Control Board warns Cleveland that unless sewer deficiencies are corrected, they won't be allowed to continue discharging wastes into Lake Erie. Public interest groups in Cleveland have the support of television and radio in a campaign to demand the cleanup of Lake Erie.

26. Anonymous. 1965. Erie polluted, Ohio hollers uncle. U.S. News and World Report. April 8, 1965. p. 55.

Ohio has changed its statement that it doesn't need the help of the Federal Government to control pollution. A conference was held in Ohio concerning pollution of the Great Lakes and the U.S. Dept. of Health, Education and Welfare was invited to attend.

27. Anonymous. 1965. Filth in the Great Lakes: What can be done about it (interview with an authority on water pollution). U.S. News and World Report. Dec. 13, 1965. pp. 58-65.

Pollution, the problem plaguing American rivers, now threatens to ruin that huge basin of fresh water, the Great Lakes.

Lake Erie is badly polluted. Beaches and fishing are being destroyed. Lake Michigan is in trouble. American and Canadian officials are greatly concerned.

Here, in an exclusive interview, the problem of pollution in the Great Lakes is analyzed by a noted Canadian authority, Dr. George B. Langford. He explains the causes of pollution, tells what can be done about it, what it means to the public and to industry and how much a cleanup is going to cost.

28. Anonymous. 1965. Frontier '64, a special pictorial report, the economy, downtown renewal, business/ industrial expansion, public construction, medicine, education. Buffalo. Buffalo, N.Y. 40(1):20-22, 26-36, 29-46.

Through pictures, sketches and graphs, the present and future developments in Erie County, N.Y., are illustrated. (BU)

29. Anonymous. 1965. Test case on pollution - big clean-up begins. Business Week. No. 1876. pp. 25-26.

Public Health Service (PHS) charged that Lake Erie was literally dying because of unbelievable amounts of municipal and industrial waste discharge. Recreational opportunities have severely declined and commercial fishing has all but disappeared. New pollution standards set up by PHS must be adhered to by polluters. (BU)

30. Anonymous. 1966. The frontier's year, '65, the economy, downtown, business/industrial expansion, public construction, education, and institutions. Buffalo. Buffalo, N.Y. 41(1):25-35, 38-41.

Through photography, and sketches, this article describes the current and future developments in the Buffalo Metropolitan area for 1965. (BU)

31. Anonymous. 1966. Lake Erie: Test case in water pollution battle. U.S. News and World Report. 61:12.

Reference to Lake Erie and the states of New York, Pennsylvania, Ohio, Indiana, and Michigan, which have agreed on a timetable to end further pollution of the lake by cities and industries. A complimentary federal program is described.

32. Anonymous. 1967. The frontier's year '66, the economy, downtown, business and industry, institutions, and transportation. Buffalo. Buffalo, N.Y. 42(1): 21-22.

This article summarizes and highlights the major events in the city of Buffalo, New York, for the year, 1966. Graphs and photographs are included. (BU)

33. Anonymous. 1967. Metrotran 2000. Buffalo. Buffalo, N.Y. 42(10):24-27.

This article gives projections of the developments on the Buffalo metropolitan area, including a description of many new vessels which would increase transportation on the Lake. One would be an aquamotel. (BU)

34. Anonymous. 1968. The frontier's year '67, the economy, downtown, business and industry, transportation, medicine, education. Buffalo. Buffalo, N.Y. 43(1):26-28, 34-38, 42-48, 50-56.

Through photographs, this article highlights the developments in the Erie County Area for 1970. (BU)

35. Anonymous. 1969. The frontier's year '68, Downtown, education, medicine, transportation, business, and industry. Buffalo. Buffalo, N.Y. 44(1): 24-26, 30-33, 36-40, 42-51.

Through photographs, this article highlights the developments in the Erie County Area for 1968. (BU)

36. Anonymous. (Ed.) 1970. The frontier's year '69, the city, medicine, edication, residential development, business and industry. Buffalo. Buffalo, N.Y. 45(1):32-42, 45-49, 50-56.

Through photographs, this article highlights the developments in the Erie County Area for 1969.

37. Anonymous. 1970. We're doing our part to clean up Lake Erie. Bethlehem Review. Bethlehem Steel Corp. Bethlehem, Pa. pp. 16-17.

This report discusses pollution abatement and the upkeep of Lake Erie water quality. Bethlehem discharges are cited.

38. Anonymous. 1971. Environmental clearing house questionnaire for Erie County executive candidates. In: Echo Issues. Environmental Clearing House Organization. Buffalo, N.Y. 2(1):1-3.

This article deals with political authority and its role in an improved environment. The response of the candidates appears, along with their views on pollution abatement and control.

39. Anonymous. 1971. The frontier's year '70, the city, sports and recreation, residential development, transportation, business and industry, education, and health. Buffalo. Buffalo, N.Y. 46(1): 26-54.

Through photographs, this article highlights the developments in the Erie County Area for 1970. (BU)

40. Anonymous. 1972. Emphasis '71. Buffalo. Buffalo, N.Y. 47(1):29-48.

Through photographs, this article highlights the developments in the Erie County Area for 1970. (BU)

41. Anonymous. 1973. Fighting the Shoreline Battle. Limnos. 5(4):25-26, 31.

Federal laws providing assistance to property owners suffering shoreline erosion damages are non-existant. Regulatory controls for shoreline management measures must be established quickly, and based on scientific data to be legally sound.

42. Anonymous. 1973. Greater Niagara vacationland. Buffalo. Buffalo, N.Y. 48(6):insert.

A map shows the eastern end of Lake Erie and marks interesting recreational spots in the Erie-Niagara region of New York. Text describes recreational areas and accomodations. (BU)

43. Anonymous. 1973. Impact '72. Buffalo. Buffalo, N.Y. 48(1):34-56.

Through photographs, this article highlights the developments in the Erie County Area for 1972. (BU)

44. Ansbro, Mary C. (Ed.) 1965. Billions slated for Lake Erie. Water In The News. Soap and Detergent Association. New York, N.Y. October, 1965. p. 3.

An estimated $3-$4 billion was agreed upon to be spent on the cleanup of Lake Erie by five states and the Dept. of Health, Education and Welfare after two weeks of hearings.

45. Ansbro, Mary C. (Ed.) 1966. Community action spurs cleanup of Cuyahoga River near Akron, Ohio. Water In The News. Soap and Detergent Association. New York, N.Y. May, 1966. p. 4.

In addition to Federal and State Aid, community action is needed to aid in the battle against pollution. One such area which is experiencing success is along the Cuyahoga River in Ohio.

46. Ansbro, Mary C. (Ed.) 1966. Congressman concerned about Lake Erie 'death'. Water In The News. Soap and Detergent Association. New York, N.Y. June, 1966. p. 3.

A "Buffalo Evening News" article on April 23, 1966, by Barbara Tufty was inserted in the Congressional record by Rep. Richard D. McCarthy on May 2 because of the description it gives of the history of pollution in Lake Erie.

47. Ansbro, Mary C. (Ed.) 1966. Udall calls Lake Erie 'The big challenge'. Water In The News. Soap and Detergent Association. New York, N.Y. August, 1966. p. 1.

Secretary of Interior Stewart Udall feels that Lake Erie is a big challenge to clean up. He would like to publish an annual list of industries and communities that are not doing their part to control pollution.

48. Ansbro, Mary C. (Ed.) 1966. Lake Erie, Lake Michigan pollution discussed before the Jones Subcommittee. Water In The News. Soap and Detergent Association. New York, N.Y. October, 1966. pp. 1, 3.

The 3rd and 4th hearings on water pollution in the Great Lakes held by the House Natural Resources and Power Subcommittee focused on Lake Erie. The cost of restoring the Lake Erie Watershed in Ohio was estimated to be about $500 million and would be completed by 1970, half by the Federal Government, and half by the local areas.

49. Ansbro, Mary C. (Ed.) 1967. Fisheries Bureau seeks research, water standards for Lake Erie. Water In The News. Soap and Detergent Association. New York, N.Y. February, 1967. p. 4.

The Bureau of Fisheries says that Lake Erie is still the most productive of the Great Lakes. The problem is that the top waters are clean and the bottom waters are fouled.

50. Ansbro, Mary C. (Ed.) 1967. Lake Erie states' clean up plans ok'd. Water In The News. The Soap and Detergent Association. New York, N.Y. May, 1967. p. 3.

At the Federal-State Enforcement Conference, five state programs to abate pollution were approved by the Federal Water Pollution Control Agency, with a 1972 date set as the latest date for full compliance with cleanup directives.

51. Ansbro, Mary C. (Ed.) 1968. IJC plans meeting on river pollution. Water In The News. Soap and Detergent Association. New York, N.Y. January, 1968. p. 1.

Mention is made of an upcomming meeting by the International Joint Commission to inquire into the U.S. and Canadian projects for abatement of pollution of the St. Mary's, Detroit, and St. Clair Rivers.

52. Ansbro, Mary C. (Ed.) 1968. Task force begins algal growth study. Water In The News. Soap and Detergent Association. New York, N.Y. January, 1968. p. 1.

The Joint Government-Industry Task Force, to investigate control of euthrophication, has announced that it will develop a standardized procedure to determine the algal growth potential of various chemicals and waters. Lake Erie is mentioned as an example of serious euthrophication.

53. Ansbro, Mary C. (Ed,) 1968. Working for clean water: Clear Water Inc. Water In The News. Soap and Detergent Association. New York, N.Y. February. p.2.

Clean Water Inc. is a non-profit corporation whose aim is clear water for the Maumee Basin, and eventually for the entire Lake Erie Basin. Located in Toledo, Ohio, the group represents a wide range of area citizens. This group works by providing public information, Boater (Litter) Bags, and making an application for watershed treatment. The hope of the group is to assist in public and private coordination in the watershed.

54. Ansbro, Mary C. (Ed.) 1968. AWWA Conference held in Cleveland. Water In The News. Soap and Detergent Association. New York, N.Y. July, 1968. p. 1.

This article reports on the proceedings of the American Water Works Association's 88th annual Conference in Cleveland. Ohio State and Government officials discussed the states sewage treatment facilities, and recommendations were made for beach restoration and water quality improvement.

55. Ansbro, Mary C. (Ed.) 1968. Progress, problems are reported at new session on Lake Erie. Water In The News. Soap and Detergent Association. New York, N.Y. July, 1968. p. 1.

This article tells of a progress meeting of Federal and State officials to review steps being taken to curb pollution of Lake Erie. The conclusions were that progress is being made. State government officials reported that each area is doing its best to abate pollution.

56. Ansbro, Mary C. (Ed.) 1968. FWPCA releases Lake Erie report. Water In The News. Soap and Detergent Association. New York, N.Y. November. p. 1.

The article findings in the Lake Erie Report were released by the Federal Water Pollution Control Administration. Clean-up of the lake and control of municipal pollution would cost about $ 1.1 billion and $ 285 million for curbing industrial pollution. This would curb pollution through 1990. The report stated that Lake Erie cleanup should be a government responsibility.

57. Ansbro, Mary C. (Ed.) 1968. IJC issues two reports on pollution of Great Lakes and area waters. Water In The News. Soap and Detergent Association. New York, N.Y. December, 1968. p. 2.

Two reports on the current status of pollution and abatement in Great Lakes area waters have been issued by the IJC. The reports discuss the problems of pollutants in these areas, and the anticipation of future problems, and what the IJC can do to stop rapid eutrophication.

58. Ansbro, Mary C. (Ed.) 1968. Water bond vote results mixed. Water In The News. Soap and Detergent Association. New York, N.Y. December, 1968. p. 1.

Voters in Ohio favored $120 million for water pollution control, and a $100 million bond issue for the control and abatement of pollution in the Greater Cleveland area.

59. Ansbro, Mary C. (Ed.) 1969. Symposia on Cuyahoga, Lake Erie highlight AlChE national meeting. Water In The News. Soap and Detergent Association. New York, N.Y. June, 1969. p. 2.

The Symposia were concerned with many aspects of Lake Erie pollution and waste treatment facilities to be installed on the Cuyahoga River.

60. Ansbro, Mary C. (Ed.) 1969. Enzymes not pollutants, Cleveland press reports. Water In The News. Soap and Detergent Association. New York, N.Y. July, 1969. p. 4.

Enzymes were recommended to housewives instead of phosphates because these substances do not cause pollution to water sources.

61. Ansbro, Mary C. (Ed.) 1969. Foes of pollution keep getting younger. Water In The News. Soap and Detergent Association. New York, N.Y. July, 1969. p. 2.

Six Cleveland area high school students appeared before the House Committee on Public Works to present statements on the Water Quality Improvement Act of 1969.

62. Ansbro, Mary C. (Ed.) 1969. 'Lake Erie is not dead yet' says Carl Klein at a progress meeting. Water In The News. Soap and Detergent Association. New York, N.Y. August, 1969. p. 1.

A federal-state meeting on Lake Erie was held in Cleveland. The discussion stressed that Lake Erie can be restored with federal backing.

63. Ansbro, Mary C. (Ed.) 1969. Pollution enforcement actions stepped up by Interior Department. Water In The News. Soap and Detergent Association. New York, N.Y. October, 1969. p. 2.

This article discusses how the Task Force on Pollution Enforcement gathered evidence against violators of water quality standards in the Lake Erie Basin.

64. Ansbro, Mary C. (Ed.) 1969. Report on Great Lakes issued by International Joint Commission. Water In The News. Soap and Detergent Association. New York, N.Y. November, 1969. p. 4.

The IJC Report in 1967 advanced recommendations for controlling pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River. The Soap and Detergent Association recommends that phosphates be eliminated from detergents.

65. Ansbro, Mary C. (Ed.) 1970. Working for clean water; International Joint Commission. Water In The News. Soap and Detergent Association. New York, N.Y. January, 1970. p. 2.

The functions of the IJC, both regulatory and advisory, are discussed. State and Federal Governments accepted the recommendations and set up surveillance boards for the Superior-Huron-Erie and for Erie-Ontario. These regulatory

boards have held conferences with cities and industries in both countries. The IJC has completed other reports concerning pollution in Lake Erie, the most recent concerns oil pollution, in which the Commission has concluded that Ontario, New York and Pennsylvania have adequate regulation to protect the waters of Lake Erie.

66. Ansbro, Mary C. (Ed.) 1970. Abatement lagging, Erie report notes. Water in the News. Soap and Detergent Association. New York, N.Y. July. p. 1.

Out of 110 cities with pollution abatement schedules, 78 have fallen behind schedule for periods ranging from a few months to 40 months. Of 130 industries with schedules, 44 have fallen behind meeting original dates set previously by the Lake Erie Federal-State Conference. The Federal Water Quality Administration has warned that further legal actions will be taken to hasten abatement compliance.

67. Ansbro, Mary C. (Ed.) 1970. IJC issues interim report on lakes. Water in the News. Soap and Detergent Association. New York, N.Y. July. p. 4.

The International Joint Commission has submitted a report to the two governments called "Special Report on Potential Oil Pollution, Eutrophication and Pollution from Watercraft." Suggestions to control oil pollution in Lake Erie are included in this report.

68. Ansbro, Mary C. (Ed.) 1971. Geological Survey Head declares Erie's death greatly exaggerated. Water in the News. Soap and Detergent Association. New York, N.Y. January. p. 1.

The director of the U.S. Geological Survey, Dr. William T. Pecora, feels that Lake Erie is not dying, but going through a natural aging process which all lakes will some day face.

69. Ansbro, Mary C. (Ed.) 1971. Pollution agreements reached in 3 cities. Water in the News. Soap and Detergent Association. New York, N.Y. August. p. 3.

Detroit and Cleveland have reached an agreement with the Environmental Protection Agency which calls for the spending of $1.2 billion to curb Lake Erie pollution. The EPA had served the cities with 180 days to halt violations of Federal-State water quality standards.

70. Ansbro, Mary C. (Ed.) 1971. Lake Erie rallying, so will Michigan, say experts regarding Great Lakes. Water in the News. Soap and Detergent Association. New York, N.Y. December. p. 1.

Lake Erie's water quality has improved greatly due to peoples' putting less pollutants into the lake and upgrading of municipal and industrial treatment facilities.

71. Ansbro, Mary C. (Ed.) 1972. U.S.-Canada lakes pact asks control of phosphorus by waste treatment. Water in the News. Soap and Detergent Association. New York, N.Y. May. p. 1.

The U.S.A. and Canada signed an agreement on April 15, 1972, to enhance the water quality of the Great Lakes. This agreement would call for phosphate removal from sewage which is discharged into Lake Erie, and also removal of phosphates from detergents, which account for 50% of the phosphates in the Lake.

72. Ansbro, Mary C. (Ed.) 1972. Death of Lake Erie called a 'myth' by scientist-BBC-TV producer. Water in the News. Soap and Detergent Association. New York, N.Y. July. p. 4.

Environmental warnings about the pollution damage in Lake Erie has caused the public to think that the lake is dead rather than merely in need of aid.

73. Ansbro, Mary C. (Ed.) 1973. C. A. Hetter on Lake Erie. Water in the News. Soap and Detergent Association. New York, N.Y. March-April. p. 2.

The Special Assistant to the Secretary of State for Environmental Affairs and Chairman of the U. S. Section of the International Joint Commission feels that the quality of Lake Erie is improving and will be in much better shape by 1975.

74. Ansbro, Mary C. (Ed.) 1973. New book, 'Ecological Fantasies' examines 'environmental myths'. Water in the News. Soap and Detergent Association. New York, N.Y. July-August. p. 4.

This book review tells of Cy A. Adler's opinions of the condition of the water of Lake Erie. He discussed phosphate pollution and its effects on water quality.

Antill, Julie - See: Jonathan W. Bulkley, No. 122.

Applegate, Vernon C. - See: David R. Wolfert, et al, No. 746.

75. Applegate, Vernon C. and Harry D. VanMeter. 1970. A brief history of commercial fishing in Lake Erie. U.S. Fish and Wildlife Service. Bureau of Commercial Fish. Millersburg, Mich. 28 p.

Salient features of the development of the industry from about 1815 to 1968, changes in fishing gears and methods, changes in the kinds and abundance of fishes caught, and the attendant effects of disappearing species on the stability of the fishery are described. The history and present status of the walleye, yellow perch, and eight other fishes, still taken in commercial quantities, are presented in more detail and are considered in the context of their effect on the current moribund state of the U.S. fishery. Past and present contributions of Lake Erie's tributaries and northerly connecting waters to the fishery are outlined. briefly. The "outlook" for the fishery under present conditions of selective overfishing for high-value species, excessive pollution, ineffective and uncoordinated regulation, and antiquated methods of handling, processing, and marketing fish are discussed, and possible solutions to these problems are suggested.

76. Arno, N. 1972. Overview of the problems in the Great Lakes of the United States Corps of Engineers. In: Proceedings of the First Federal Conference on the Great Lakes. Interagency Committee on Marine Science and Engineering for the Federal Council for Science and Technology. pp. 103-113.

Article states that Congress showed particular concern about serious conditions on Lake Erie in the Amendment to the Federal Water Pollution Control Act (Law 92-500, 1972). As a result of these Acts, the Corps of Engineers was given the responsibility for the "Lake Erie Demonstration Program" in which the Secretary of the Army, acting through the Chief of Engineers, is directed to design and develop a demonstration waste-water management program for the rehabilitation and environmental repair of Lake Erie. Five million dollars is authorized to carry out the program. This study will require close cooperation with federal, state and local agencies and departments.

77. Arnold, Dean E. 1969. The ecological decline of Lake Erie. N.Y. Fish. and Game J. 16(1): 27-45.

Changes in Lake Erie due to natural processes and the activities of man are discussed with respect to geology, hydrology, pollution, chemistry, plankton, benthos and fisheries. In all of these areas, it is shown that many changes have taken place and that the rate of change has accelerated in recent years. Most of these changes are harmful to the lake's value as a resource for man and as a habitat orf its natural fauna. Several proposed ideas for reversing this trend are reviewed.

78. Arvill, Robert. 1967. Man and environment--crisis and the strategy of choice. Baltimore, Md. 332 p.

This article gives special attention to the pollution of lakes and rivers which are open sewers loaded with refuse from municipalities and industries. Lake Erie is cited in its closing of recreational areas because of the pollution problem. (CCIW)

Ayers, John C. - See: James T. Wilson, No. 743.

79. Ayers, John C. 1961. Great Lakes research division. Univ. Mich. Great Lakes Res. Div. Proc. 4th Conf. Great Lakes Res. Pub. 7:205-211.

The Great Lakes research institute was established at the University of Michigan in 1945 to study the Great Lakes. Its objectives are: 1) To contribute by every means at its disposal to increase understanding of all aspects of the Great Lakes region. 2) To cooperate with other organizations on campus, within the state, and outside the state in the conduct of mutually beneficial research on the Great Lakes and their tributary waters. 3) To make available the results of Great Lakes investigations and to make special efforts to place them in the hands of those concerned with practical operations. 4) To serve in general, as a center for Great Lakes information and research. 5) To implement the teaching and research program of the University of Michigan. Included is a list of publications and current projects. (RL)

80. Baily, Dickson. 1971. Report on the Erie and Superior communities project. Ont., Canada. 493 p.

The scope and objectives of these studies are to investigate the problem of the municipality as a water pollution control agent. The major concern of the study was present-municipal policy and local perceptions of that policy. The findings lead to future projections. (CCIW)

81. Baldwin, Norman S. 1963. Closing in on a silent killer . The N.Y. State Conservationist. Albany, N.Y. 17(3):30-32.

Documented findings of a lamprey found by a commercial fisherman is commented upon in this article. Study methods and treatment for the lamprey population are given in this article. (SM)

82. Baldwin, Norman S. 1964. Sea lamprey in the Great Lakes. Canadian Audubon. Ottawa, Ont. 26(5): 142-147.

The article reports the catching of the first lamprey at Port Crewe on Lake Erie. An effect was seen in later years through commercial and sport fishery reports. Projections and research done on the lamprey are given. (SM)

83. Ballert, Albert G. 1961. The seaway era begins: Great Lakes overseas trade and shipping. Univ. Mich. Great Lakes Res. Div. Proc. 4th Conf. on Great Lakes Res. Pub. 7:177-181.

In the Great Lakes region many actions have been completed recently or are in process to provide for the efficient and economical development of world waterborne commerce. At least a dozen lake ports have constructed entirely new cargo terminals, and expansions and improvements have taken place at essentially all ports engaged in overseas trade. Measures also have been taken to improve manual and mechanical operations at the docks and to increase the harbor depths in adjacent waters. In concert with these port development programs is the federal project for deepening the channels connecting the Great Lakes. Completion in 1962 will provide 27-foot channels throughout the lakes system. Full benefits from this project will come as channels in the various harbors are improved to accommodate deeper draft ocean and lake vessels. (RL)

84. Barr, C. F. and A. S. Loucks. 1962. How to get conservation help on the back forty or a guide to government agencies. The N.Y. State Conservationist. Albany, N.Y. 17(2):14-17.

This article provides a translation of available government agencies and how they could be of use to the consumer. Figures of aid and practices of the agencies are also given. A listing of agencies for aid with land problems according to county are also given. (SM)

85. Barr, J. R. 1968. Water quality control practices of the Great Lakes. (Canadian section). In: Proceedings of the Great Lakes Water Resources Conf. The Engineering Institute of Canada and The American Society of Engineers. pp. 393-418.

This article consists of a report on Canadian policies of water quality control, especially concerning pollution problems in Lake Erie.

86. Bangham, Ralph V. 1927. Diseases of fish in Ohio hatcheries. Trans. Am. Fish Soc. 57:223-230.

The conditions discussed in this paper are the result of a survey of the hatcheries in Ohio for the Division of Fish and Game. Ohio has ten inland hatcheries, two now under construction. The fish hatched are usually large and small-mouthed bass, blue gills, and catfish. The breeders for the bass and catfish are obtained from Lake Erie. The article summarizes the practices which do the most damage to fish.

87. Barbalas, Louis. (Ed.) 1973. Directory and project forecast. Great Lakes, 1973. Lake Survey Center. NOAA. Detroit. 280 p.

Directory of research projects concerning Lake Erie.

88. Barry, James P. 1972. The fate of the Great Lakes, a portrait of the Great Lakes. Becker Book House. Grand Rapids, Mich. 192 p.

This book presents a comprehensive and current portrait of the Great Lakes and also explores the future possibilities for the Great Lakes and their impact upon the lives of Canadians and U.S. citizens. The text not only emphasizes ecological concerns, but also such topics as navigation, shipping and ship building, commercial and sports fishing, production, power, and recreation.

89. Barton, James L. 1851. Commerce of the Great Lakes and Erie Canal, its character, and showing property benefits flowing from cheapening the expenses of carrying on the internal trade of the country. Buffalo, N.Y. 51 p.

This publication discusses the commerce and trade of Buffalo. Market values, goods, arriving as imports as well as exports are also given. (BECPL)

90. Barton, Thomas, K. P. Warner, and J. William Wenrich. 1970. The Susquehanna communication participation study. Univ. Mich. Environmental Simulation Lab. Clearinghouse, Springfield, Va. Contract DACW 73-69-C0026. 128 p.

The Susquehanna Communication-Participation Study represents a ground-breaking effort to undertake broad public involvement in a water resources planning study. The public involvement activities centered upon establishing a program of linked contacts between agency planners and local residents. The first step was the identification of local opinion leaders who were then interviewed, supplied information about the study, and involved in community workshops to discuss the proposed plans. It was intended that these individuals should become the focal point for community participation. Following the workshops, a series of public forums were held for all interested citizens in several communities of the study area. Interviews and questionnaires were used throughout the study to evaluate changes in attitudes and the effectiveness of the techniques used. In general, the findings indicate that the workshops were successful in improving the understanding of attitudes and objectives between the agency planners and local representatives. Other means of disseminating information to the public were also identified and ranked as to their effectiveness. The study showed the need for developing a basis for communications and public participation which includes confidence and trust in the planning process, common perceptions of water problems, and involvement of participants in planning activities. (CE)

91. Bauer, Earl. 1971. Bethlehem Steel Corporation. In: ECHO Issues. Environmental Clearinghouse Organization. Buffalo, N.Y. 2(2):1.

This article discusses Bethlehem Steel's role in stopping pollution that involves the disposal of a pickling solution discharged into Lake Erie and Smokes Creek. Discussion is also made of a contract entered into by the City of Buffalo on usefulness of the spent acid.

92. Beall, Irl V. 1974. East Indian of Detroit. Inland Seas. 30(1):20-28.

This article gives the history of the East Indian, a ship used by Ford Motor Company on the Great Lakes in the 1920's. It was later sunk during World War II. (CCIW)

Beaulieu, A. - See: T. R. Lee, No. 341.

93. Beeton, Alfred M. 1961. Environmental changes in Lake Erie. Trans. Amer. Fish. Soc. 90(2):153-159.

Reference to Lake Erie's environmental changes due to increasing human population. Fish which formerly dominated the commercial catch are scarce, while low quality fish are plentiful.

94. Beeton, Alfred M. 1969. Changes in the environment and biota of the Great Lakes. In: Eutrophication: Causes, Consequences, Correctives. National Acad. Sci. Printing and Publishing Office. Washington, D. C. pp. 175-177.

Lake Erie has produced and continues to produce about fifty million pounds of fish per year, about 50% of the total Great Lakes production. The lake herring fishery collapsed after 1925. Sauger declined in 1920. The walleye was becoming more abundant. By 1940, whitefish, yellow perch, walleye, sheephead, carp, and suckers dominated the commercial fishery. In the past 25 years, blue pike, lake herring, sauger, and white fish have almost disappeared from the Lake. Graphs illustrate the changing fishery catches of Lake Erie.

95. Beeton, Alfred M. 1970. Statement on pollution and euthrophication of the Great Lakes. Univ. Wisconsin. Center for Great Lakes Studies. Milwaukee, Wis. Special Rept. 11. 35 p.

Lake Erie continues to produce about 50 million pounds of fish per year, about 50% of the total Great Lakes production. The species composition of the catch has changed markedly. The major species, in order of importance in the 1899 catch, were lake herring (ciscoe), blue pike, carp, yellow perch, sauger, whitefish, and walleye. The present (1968) fishery in order of importance, consists of yellow perch, smelt, sheephead, carp, white bass, catfish, and walleye. Tables include population of the Great Lakes Area, and various fish catches for Lake Erie.

96. Beeton, Alfred M. 1971. Man's effect on the Great Lakes. In: Charles R. Goldman (Ed.). Environmental quality and water development. Univ. Calif. Davis, Calif. 2(14):1-57.

The changes that have occurred in the Great Lakes are a striking example of the misuse of one of the major resources of North America. Dramatic changes in the biota and increased production of Lake Erie are cited and the dire consequence of pollution. This report cites the value of Lake Erie as a major resource to Canada and the U.S. of unestimated value for transportation, regional settlement, and the development of huge industries and large metropolitan areas. (CCIW)

97. Beeton, Alfred M. and David C. Chandler. 1963. The St. Lawrence Great Lakes. In: D. G. Frey. (Ed.) Limnology in North America. Univ. Wis. Press. Madison, Wis. pp. 535-558.

History of hatcheries and fishery commissions that have directly affected Lake Erie and its fisheries.

98. Beeton, Alfred M. and H. B. Rosenberg. 1968. Studies and research needed in regulation of the Great Lakes. In: Proceedings of the Great Lakes Water Res. Conf. The Engineering Institute of Canada and the American Soc. of Civil Eng. pp. 311-342.

This study emphasizes the need for a multi-disciplinary approach to future problem solving in the Great Lakes area. Economic and industrial aspects of Lake Erie are mentioned.

99. Belford, Richard A. 1972. Steamer Amasa Stone remembered. Inland Seas. 28(4):281-286.

This article is the story of the Amasa Stone, a steamer launched in 1905 which cruised the Great Lakes for the next sixty years. (CCIW)

Benson, Dirck. - See: Lee W. DeGraff, et al, No. 172.

100. Berry, A. E. 1962. Policy and coordination, pollution control in the Great Lakes. Great Lakes Res. Div. Proc. 5th Conf. Great Lakes Res. Pub. 9: 186-191.

The value of the Great Lakes to Ontario, as to other adjacent lands, is closely related to our economic and human welfare. Recognition of this great asset is steadily increasing.

The Great Lakes contain waters of inestimable value to the U.S. and Canada. These waters can be used for many purposes, and it is essential that we consider them for domestic consumption, industrial purposes, agricultural, recreation, power, fish and wildlife, transportation, etc. There is a vast volume of water passing through this waterway and modern engineering skill makes it possible to deliver this water to distant inland points to serve in their development and welfare.

Effective use of the Great Lakes is predicted, in most instances, on a program of pollution control.

Pollution can render water useless for many purposes. The problem is to recognize this situation and to develop aggressive steps to prevent destruction of this resource before it is too late. Included in this report is a description of some of the agencies dealing with pollution. (RL)

Bieber, G. F. - See: F. J. Little Jr., et al, No. 344.

101. Bingham, Robert. 1931. The cradle of the queen city, a history of Buffalo to the incorporation of the city. Buffalo Historical Soc. Buffalo, N.Y. 504 p.

This book gives an account of the founding of the Buffalo region, the indigenous cultures, early trade and the founding companies besides the commercial trade vessel. The documents change from village to city. (SM)

102. Bishop, Bruce. 1970. Public participation in water resources planning. U.S. Army Engineer Institute for Water Resources. Alexander, Va. 106 p.

Public concern over the use of the nation's natural resources has led to increased citizen participation in the public works planning process. This report focuses on the developments of water resources in relation to the role of the planner in communicating and interacting with the publics in planning. It describes the institutional and behavioral aspects of planning as a process of social change,

offers a descriptive model of the planning process, and with this as a framework, discusses methods and approaches for developing public participation in planning studies. Six public participation program objectives are set forth to guide the organization of citizen involvement in planning studies. Initially, the planners should identify concerned local interests and establish working relationships with them in order to legitimize the study. A number of methods for working with the public are described, including information campaigns, sample surveys, group advocacy, informal contact with local interests, community workshops, citizens' committees, special task forces, public inquiries, and public hearings. The use of a factor profile is discussed as a method for presenting, discussing and evaluating the socail, environmental and community effects, together with the economic effects of alternative planning proposals. (CE)

103. Bligh, E. G. 1970. Mercury contamination in fish. In: A Summary of the Material Presented at the Twentieth Annual Institute for Public Health Inspectors. Winnipeg, Man. 1970. pp. 10-19.

This report gives a discussion of mercury contamination in fish which eventually may affect a population. Lake Erie is mentioned in regard to this as containing fish with an usually high rate of mercury.

104. Bligh, E. G. 1971. Environmental factors affecting the utilization of Great Lakes fish as human food. In: Limnos 4(1):13-16.

Pollution of the waters of Lake Erie has resulted in the contamination of the fish caught. These various toxins render the fish unsafe for human consumption. Therefore, the Great Lakes fish used as human food is hampered by pesticides and mercury contamination.

105. Blum, J. L. 1965. Interactions between Buffalo River and Lake Erie. Univ. Mich. Great Lakes Res. Div. Proc. 8th Conf. Great Lakes Res. Pub. 13:25-28.

Reference to Buffalo River - Lake Erie. Pollution from steel, refining and chemical industry is severe. The river is lined on both banks by industry or abandoned buildings and is an eyesore at many points. The river empties into Lake Erie close to a major North American resource--the Niagara River--therefore, pollution of the Buffalo River is significant.

106. Borchardt, J. A. 1969. Eutrophication - causes and effects. J. Am. Water Works Assoc. 61(6): 272-275.

Lake Erie is undergoing eutrophication at an accelerated rate due to man's influence. Game fish are giving way to rough fish - carp, suckers, sheepshead, and less desirable fish. It is hoped that further research into pollution abatement and application of present knowledge will slow down the eutrophication of Lake Erie.

107. Bowman, Edgar W. 1974. Lake Erie bottom trawl explorations, 1962-66. NOAA Technical Report NMFS SSRF-674. 21 p.

A gradual change in Lake Erie fisheries has led to the commercial extinction of many highly prized species (e.g., lake herring, blue pike). This article documents the fishery population in Lake Erie between 1962-66 and offers a baseline for future comparison studies.

Brown, D. F. - See: F. J. Little, Jr., et al, No. 344.

Brown, E. H. - See: W. B. Mead, No. 364.

108. Brown, F. R. 1972. Engineering and research to support the Corp's mission in the Great Lakes. In: Proc. of the First Federal Conf. on the Great Lakes. Interagency Committee on Marine Science and Engineering for the Federal Council for Science and Technology. Washington, D. C. pp. 120-130.

Reference to proposed offshore jetport at Cleveland, Ohio. Feasibility research is being sponsored by the Lake Erie Regional Transport Authority funded with an FAA grant in the amount of $ 800,000 and local matching funds of $ 400,000.

Bruce, J. P. - See: A. T. Prince, No. 361, 362.

109. Bruce, J. P. 1972. 1972 . . . The year of Great Lakes cooperation. In: Canada Centre for Inland Waters, Collected Reprints Vol. 5. Reprinted from: Canadian Res. and Develop. 5(4):21-22.

Reviews the projected results of the Canada-U.S. Agreement on the Great Lakes Water Quality. This agreement was based, in part, on previous studies on Lake Erie.

110. Buck, George S. 1932. Buffalo city of progress. In: Otto Retter. Pictorial Buffalo and Niagara Falls and surroundings. Buffalo, N. Y. pp. 38-49.

The illustrations contained here give Buffalo's developmental progress and future projections.

111. Buckley, J. L. and T. T. Davies. 1972. The Environmental Protection Agency's role in Great Lakes research. In: Proc. of the First Federal Conf. on the Great Lakes. Interagency Committee on Marine Science and Engineering for the Council for Science and Technology. Washington, D. C. pp. 78-81.

Article states that enforcement conferences were called at the request of states and required the state and federal agencies responsible for pollution control to meet, analyze the problem in a specific area, hear testimony from waste dischargers, establish control requirements, and set dates for compliance.

112. Buckley, W. T. 1932. Buffalo, convention and tourist city. In: Otto Retter. Pictorial Buffalo and Niagara Falls and surroundings. Buffalo, N.Y. pp. 50-63.

These photographs conceptualize tourist attractions and various conventions held in Buffalo.

113. Buffalo Sewer Authority. 1940. First Annual Report for 1938-39. Buffalo, N.Y. 68 p.

This report is the first for the Buffalo Sewer Authority. It includes fiscal items such as personnel, budget, sewage treatment works and its experimentations and organization in cooperation with other City Departments.

114. Buffalo Sewer Authority. 1941. Second Annual Report for 1939-40. Buffalo, N.Y. 79 p.

The Buffalo Sewer Authority is divided into several departments: administrative, sewer, sewage treatment and cooperating city departments, all of which are reported on in this article. This years' operation may be considered the first normal year of operation. Progress in establishing of equipment and regular schedules were made.

115. Buffalo Sewer Authority. 1942. 3rd Annual Report for 1940-1941. Buffalo, N.Y. 85 p.

Functioning during the outbreak of the war, the sewage authority report includes progress and factual data for the year on law, purchasing, department of audit and control, common council, bond and reserve funds. Additional progress was made in maintenance, including substitution of different materials and adjustment to equipment for prolonged life. Boundary waters were kept free from pollution to the satisfaction of the State Department of Health and the neighboring communities.

116. Buffalo Sewer Authority. 1943. 4th Annual Report for 1941-1942. Buffalo, N.Y. 75 p.

This article mentions a change in personnel and changes due to war conditions. Under the appropriate headings, it summarized explanations on operations as it relates to the government of the City of Buffalo. Protection from sewage and bacterial pollution was afforded to the boundary waters. Quantities of sewage and sludge disposed of increased. Again, the war caused a turnover of personnel. Steps were taken for safeguarding against possible sabotage or bomb damage from air raids.

117. Buffalo Sewer Authority. 1944. 5th Annual Report for 1942-1943. Buffalo, N.Y. 70 p.

This report cites operational procedures which are close in proximity to the government of the City of Buffalo. Reports on assessment, public works, water treating, audit and control, and treasury are made. This report on operation of the sewage treatment was made under wartime conditions. Pollution standards have been met for the protection of public health. Restrictions in purchasing and strong efforts for upkeep and management were made because of the war.

118. Buffalo Sewer Authority. 1945. 6th Annual Report for 1943-1944. Buffalo, N.Y. 73 p.

This report includes fiscal statements which include sewer rents, budget, audit and control, operating and analytical data. Part II of this report mentions the results of the sewage treatment works on Bird Island Pier. Treatment of all sewage (domestic and industrial) was made according to N.Y. State Dept. of Health standards.

119. Buffalo Sewer Authority. 1946. 7th Annual Report for 1944-1945. Buffalo, N.Y. 71 p.

This report gives a summation of progress and duties by the Buffalo Sewer Authority. During the entire seventh year of operation the Sewage Treatment Works functioned without interruption to produce a sterile effluent for discharge into the Niagara River. Although some process units were idle awaiting delayed critical replacement parts, plant capacity was sufficient to afford effective treatment. There was marked improvement in terms of personnel turnover and the caliber of new employees was higher. At the end of the year the plant was staffed with nearly a full complement of required persons. Minor changes made to the treatment processes have aided in improving routine operations, mention of which is made in this report.

120. Buffalo Sewer Authority. 1947. 8th Annual Rept. for 1945-1946. Buffalo, N.Y. 77 p.

This report included a history of the Buffalo Sewer Authority, the General Manager's report, Administrative Department reports, the Sewage Treatment Department, the Sewers Department and the Audit Report. Following the cessation of war and the beginning of the return to normal conditions of domestic industrial production, the Authority believed that it should recreate its efforts to bring about abatement of pollution of border waters of the city of Buffalo. It appeared at the close of the war that conditions in the Buffalo River might actually be worse than they had been in 1938 before the abatement program got underway. The Authority enlisted the cooperation not only of the industries but also of the State Health and Conservation Departments.

121. Buffalo Sewer Authority. 1948. 9th Annual Rept. for 1946-1947. Buffalo, N.Y. 89 p.

This report is divided into various sections of which include a history, general manager's summary, administrative accomplishments, sewer department, sewage treatment and an audit for the year 1946-47. Of special interest is a project evolved from studies to abate the pollution of the waters of the Buffalo River. Details on operations including costs and other factual data are given.

122. Bulkey, Jonathan W. and Julie Antill. 1970. Regional versus local sewage systems: a political case study. Internat. Assoc. Great Lakes Res. Proc. 13th Conf. Great Lakes Res. pp. 552-555.

The purpose of this paper is to examine the nature and characteristics of the political forces operative in the enhancement of water quality at both the interstate and intra-state level. The Southeastern Region of Michigan is chosen as the area of primary interest in the implementation of plans and programs for water quality enhancement. The political aspects of the implementation of the Michigan Bond Issue for Water Pollution Control, which are identified in this study, will be utilized to validate a computer model which has been designed to simulate political interactions in a competitive resource allocation problem. Through systematic investigation of the political forces interacting in this specific resource allocation problem, it is anticipated that one will gain additional insights into the role of the political process with regard to problem definition.

123. Bulkley, Jonathan W. and A. P. Mathews. 1973. Water quality relationships in the Great Lakes: Analysis of a survey questionnaire. Internat. Assoc. Great Lakes Res. pp. 872-883.

The maintenance and improvement of water and shoreline quality ultimately requires that the various governmental units responsible for quality be able to perceive the nature of factors influencing water and shoreline quality and the cause and effect relationships among these factors. A questionnaire survey conducted among 650 governmental units in the Great Lakes area has identified the levels of water quality in the respective areas. The perceived factors contributing to the destruction of water resources and possible solutions to the problem of deteriorating water quality.

One-way frequency distributions obtained, based on the 300 responses to the questionnaires, indicate that the water quality is medium or lower in 92% of the cases, while it is low or very low in 35% of the cases. Inadequate municipal sewage treatment and inadequate industrial effluent treatment were identified to be the most common factors causing the destruction of water resources. The primary agencies responsible for the maintenance of water quality in the local areas were reported to be the state and provincial agencies.

Analysis of two-variable relationships have been made with

a view to link the chain of casual factors influencing water quality in the Great Lakes. Water quality is found to vary with the type of land use and population density, decreasing with increasing degree of industrialization and decreasing with increasing population density. A causal sequence model in which population density appears as the intervening variable between land use and water quality is proposed and this seems to correlate with the data.

124. Bunz, John H. 1971. N.Y. State Conservation Council. Echo Issues. Environmental Clearinghouse Organization. Buffalo, N.Y. 1(7):3.

Counties along Lake Erie in N.Y. State are represented in the article with mention of reports on conservation matters. Assessment of varied pollutional problems within their respected regions are aired at committee meetings. The council then works with legislators on bills of interest interest. A breakdown of areas of concern is given.

125. Burke, Dick. 1967. X marks the spot ... if you're lucky. Buffalo. Buffalo, N.Y. 42(3):15-17.

This article mentions the treasures of the Great Lakes and discusses modern treasure hunting techniques. (BU)

126. Burke, Dick. 1969. Underwater drifter. Buffalo. Buffalo, N.Y. 44(4):31-33.

A diver describes his experiences in Lake Erie including exploring the wreck of the W. C. Richardson, which sunk in 1909. (BU)

127. Burkholder, James Arthur. 1973. Natural resources management in the Great Lakes Basin. Great Lakes Management Problem Series. N.Y.State Sea Grant Program. Albany, N.Y. 172 p.

This report mentions various aspects of pollution in Lake Erie and the actions of different agencies to control it.

128. Burkholder, Paul R. 1960. Distribution of some chemical values in Lake Erie. In: Limnological Survey of eastern and central Lake Erie, 1928-29. U. S. Fish and Wildlife Service, Spec. Sci. Rept. Fish. 334:71-109.

In the course of the general biological survey of Lake Erie, an inquiry into certain chemical conditions of the waters was made for the purpose of determining the natural lake conditions and the extent to which these may have been affected by domestic sewage and industrial wastes from the various cities and harbors along the shores. During the summer of 1928, analyses were made upon samples of water taken from some 20 different stations occupied monthly by the U.S. Fisheries Steamer Shearwater in that part of the lake east from a line connecting Long Point and the Pennsylvania-N.Y. state line. In the second season, 1929, operations were extended to cover practically the entire lake and analyses were carries out monthly on samples collected from about 60 stations in the open lake and from many harbor waters.

Busch, Lawrence - See: Joseph Francis, No. 223.

129. Cain, S. A. 1968. Conflicts of recreation and other uses of the Great Lakes. In: Proceedings of Great Lakes Resources Conf. The Engineering Institute of Canada. The American Soc. of Eng. pp. 121-144.

This paper discusses the history of the development of fishing, agriculture and industrialization in the Great Lakes area, with special emphasis on the lesson to be learned by the polluted state of Lake Erie.

130. Campbell, N. J. and R. K. Kane. 1967. Federal limnological research program on Lake Erie and Lake Ontario. In: Canada Centre for Inland Waters. Collected Reprints, Vol. 2, 1969. Reprinted from: Water for Peace. Washington, U.S. Government Printing Office. 4:627-630.

Due to the joint directives issued by the governments of Canada and the U.S. to the International Joint Commission, the Canadian federal dept. of Energy, Mines and Resources and National Health and Welfare, and the Fisheries Research Board, a comprehensive program of research and field investigations of pollution problems in Lake Erie was began.

131. Canada. 1956. Great Lakes sea lamprey investigation. In: Annual Report of the Fisheries Research Board of Canada, 1955-1956 for the fiscal year ending March 31. Ottawa, Ont. pp. 73-76.

This article deals with devising a method to control the sea lamprey. Lake Erie is quoted upon as never being plentiful in regards to the sea lamprey. The sea lamprey predates on lake trout which is of great economic consequence. (SM)

132. Canada. 1957. Great Lakes sea lamprey investigation. Annual Report of the Fisheries Research Board of Canada, 1956-1957 for the fiscal year ending March 31. Ottawa, Ont. pp. 75-79.

This article discusses measures taken to control the sea lamprey by a federal-provincial committee in the Great Lakes region. (SM)

133. Canada. 1958. Annual report of the Fisheries Research Board of Canada for the fiscal year ended March 31, 1958. Ottawa, Ont. pp. 163-165.

Reference to the commercial fishing industry and problems created by a low quality fish (smelt). (SM)

134. Canada. 1961. Annual report of the Fisheries Research Board of Canada for the fiscal year ended March 31, 1961. Ottawa, Ont. pp. 71-82.

Controls for the sea lamprey are set according to the agreement between the U.S. and Canada are stressed. (SM)

135. Canada. 1962. Annual Report of the Fisheries Research Board of Canada, 1961-1962, for the fiscal year ended March 31. Ottawa, Ont. pp. 83-93.

The biological station at London concerns itself this year freshwater fisheries problems. The contracted agreement between the U.S. and Canada is stamping out the lamprey is discussed. (SM)

136. Canada. 1963. Annual Report of the Fisheries Research Board of Canada, 1962-1963 for the fiscal year ended March 31. Ottawa, Ont. pp. 65-73.

This article reports the contractual arrangement between the Fisheries Board of Canada and the Great Lakes Fisheries. The biological station at London, Ontario carried out work on sea lampreys in the Canadian waters of the Great Lakes during 1962. The lamprey has proven deadly impact on desired fish for both fishing for sport and commercial purposes. (SM)

137. Canada. 1969. Annual report 1969, Fisheries Research Board of Canada. Ottawa, Ont. pp. 8.

Reference to eutrophication of Lake Erie due to sewage wastes. (SM)

138. Canada. 1971. Winter navigation studies, Detroit River, Lake St. Clair, St. Clair River, winter of 1970-1971. Ministry of Transport. Canadian Marine Transportation Administration. 14 p.

Report on the winter closing of the navigation season on the Detroit River, Lake St. Clair, St. Clair River. (CCIW)

139. Canada. 1971. Winter navigation studies, Lake Erie, winter of 1970-1971. Ministry of Transport, Canadian Marine Transportation Administration. 22 p.

Report on the winter closing of the navigation season on Lake Erie. Duties and responsibilities of the Canadian icebreaker, N. B. McLean, were discussed. It was concluded that most inland vessels could have operated through the first two weeks in January, 1971, and possibly to the end of January with assistance from an icebreaker. (CCIW)

140. Canada Centre for Inland Waters. 1971. Canada Centre for Inland Waters--1970. Dept. Fish and Forestry. Burlington, Ont. 53 p.

Mentioned in this report are the progress of Fisheries Research Board, Water Quality Division and the Resource Research Centre. Public relations, planning and building are also stressed.

141. Canada Centre for Inland Waters. 1972. Canada Centre for Inland Waters--1972. Dept. Environment. Burlington, Ont. 125 p.

Contained in this report is a social science research section which is responsible for assessing, the sociological, geographical, legal, institutional and economic aspects of human activities related to water quality and water quantity management. Included are reports on fisheries and production, changing technology, and public relations and information services.

142. Canadian Audubon Society. 1969. Editorial: Yet another warning. Canadian Audubon. Ottawa, Ont. 31(2):35.

The article questions the need for oil drilling in Lake Erie which has been proposed by oil concerns in the province of Ontario. Because of Lake Erie's present struggling condition, the author states the risk of an oil spill is too great to allow drilling.

143. Canadian Dept. of Municipal Affairs. 1970. Ontario population statistics. Community Planning Branch. Toronto, Ont. 153 p.

A population survey and census is given according to district municipalities. It is given for future developmental planning. It is a useful source of basic data on trends and change. (CCIW)

144. Canada's Royal Commission on Canadian Economic Prospects. 1957. Final Report to the Royal Commission on Canada's economic prospects. Ottawa, Ont. 509 p.

Lake Erie is mentioned as part of the framework for future development of Canada's economic potentialities, economic growth and analyses of problems likely to occur. (CCIW)

145. Carlson, G. T. and N. P. Persoage. 1967. Development and coordination of basic hydrologic data for international joint commission study of the Great Lakes. Internat. Assoc. Great Lakes Res. Proc. 10th Conf. Great Lakes Res. pp. 413-419.

Article describes regulation studies of the Great Lakes undertaken by the International Joint Commission. (Canada-U.S.)

146. Carr, John F. 1972. The role of the International Association for Great Lakes Research (IAGLR) in research of the Great Lakes. In: Proc.of the First Federal Conf. of the Great Lakes. Interagency Committee on Marine Science and Engineering for the Federal Council on Science and Technology. Washington, D. C. pp. 324-329.

The article discusses the role of IAGLR in Great Lakes research.

147. Caruso, John Anthony. 1961. The Great Lakes Frontier. The Bobbs-Merrill Company, Inc. New York, N.Y. 432 p.

This book presents a history of early American and pre-American settlement of the Great Lakes Basin, with special emphasis on the Ohio Section. (BU)

148. Casper, V. L. 1965. A phytoplankton bloom in Western Lake Erie. Univ. Mich. Great Lakes Res. Div. Proc. 8th Conf. Great Lakes Res. Pub. 13:29-35.

Cleveland citizens, billboards, and local newspapers state that Lake Erie is dying with reference to swimming, commercial and sport fishing.

Catant, C. C. - See: T. R. Jaske, et al, No. 309.

149. Chamberlain, Stanley G. 1970. Application of statistical decision theory to Great Lakes Management. Proc. 13th Conf. Great Lakes Res. Internat. Assoc. Great Lakes Res. pp. 145-148.

Effective management seeks to produce decisions which maximize objectives while minimizing cost. A methodology by which the pertinent factors can be combinded in such a way that the consequences of alternate decisions became transparent is provided by the Statistical Decision Theory (SDT). The framework of SDT is briefly discussed and a simple illustration of the application to a water quality problem is given.

Chandler, David C. - See: Alfred M. Beeton, No. 97.

150. Chiappetta, Jerry. 1968. Great Lakes, great mess. Audubon. New York, N.Y. pp. 30-45.

Pollution and water quality are two monuments which remain resilient in regard to the Great Lakes, especially Lake Erie--"the Dead Sea". Industry and its role as a major pollutor are centered on here along with municipalities and their lack of quality sewage treatment. Fisheries and market values are equated to pollution impact on various species of fish within the Great Lakes.

Cho, H. K. - See: J. P. Coakley, No. 153.

151. Christie, J. W. 1968. Possible influences of fishing in the decline of Great Lake Fish Stocks. Proc. 11th Conf. Great Lakes Res. Internat. Assoc. Great Lakes Res. pp. 31-38.

The policy of liberalized fish management which has been in effect in the Great Lakes is assessed in the light of the seriously depreciated condition of many of the premium stocks, and with reference to recent information on the over-fishing problem. It is suggested that year class irregularity may result from excessive fishing pressure and that the rebound of a stock is not necessarily to be expected after a collapse. It is proposed that in situations where environmental change is not necessarily to be involved, production difficulties should be dealt with by means of restrictive experimental management.

152. Clark, Frank N. 1885. Results of planting whitefish in Lake Erie. Trans. Am. Fish. Cult. Assoc. 14:40-50.

This year an increase in the catch of whitefish was noted and attributed to the planting of young fish from hatcheries. A table shows the number of fry planted in the lake by years, including private reports of catches from commercial fisheries and individuals. (BU)

Clark, R. H. - See: A. T. Prince, No. 563.

Clevenger, R. F. - See: J. W. MacLaren, No. 352.

153. Coakley, J. P. and H. K. Cho. 1972. Shore erosion in Western Lake Erie. Internat. Assoc. Great Lakes Res. Proc. 15th Annual Conf. Great Lakes Res. pp. 344-360.

Erosion along the shoreline of western Lake Erie from Wheatley to the Detroit River was investigated by measuring strand line positional changes on aerial photographs taken in 1931, 1947, and 1970. With the exception of the portions west to Colchester, around Kingsville, and the northwestern shore of Point Pelee, erosion is confined to the western tip and along the eastern side.

In addition to the aerial photograph evidence, which can be regarded as indicative of general, long-term developments, detailed ground investigations were carried out along the shore from Point Pelee westward to Colchester Point. Data on wind and wave parameters, longshore drift, beach materials and beach profiles were collected over a two-month period at

six shore stations. Wave refraction diagrams were also constructed on the basis of the predominant wave regime.

Longshore drift, consistently eastward to southeastward in the area from Colchester to Point Pelee, showed reversals in direction at the tip of Point Pelee. Also on the western side of the tip of the Point, local erosion far exceeded figures obtained by aerial photograph comparison, with recession measuring almost 4 m. during the three-month survey period.

Rising water levels since glaciation of the area is believed to be responsible for most of the erosion in the bluff shorelines. In the case of Point Pelee erosion, however, alteration in supply of accretionary material through shoreline construction and dredging appear to be significant factors.

154. Coakley, J. P., W. Haras and N. Freedman. 1973. The effect of storm surge on beach erosion. Point Pelee. Internat. Assoc. Great Lakes Res. Proc. 16th Conf. Great Lakes Res. pp. 377-389.

The passage of a severe storm on November 14, 1972, caused considerable damage to properties situated on the east side of Point Pelee. Most of the destruction was due to the primary effects of three-meter high waves operating concurrently with elevated water levels further aggravated by the storm surge. Although water level gauges at Point were inundated by the storm surge, it was possible to interpolate the levels, which during the storm exceeded 60 cm. above the mean daily level.

Extensive erosion occurred along the approximately 10 km. of shoreline studies, with sand and gravel removed from the lower beach face and deposited up to 100 m. inland. An estimated 5.5 cubic meters per meter of beach were eroded from the beach. This westward migration of the beach bar on the east side with similar buildup on the west side, reflects the overall morphological trend of the Point Pelee landform over the past 200 years.

155. Cole, H. S. and Walter A. Lyons. 1972. The impact of the Great Lakes on the air quality of urban shoreline areas: some practical applications with regard to air pollution control policy and environment decision making. Internat. Assoc. Great Lakes Res. Proc. 15th Conf. Great Lakes Res. pp. 436-463.

Recent studies indicate that the air pollution problems of the urban Great Lakes shorelines are magnified by mesoscale effect of the lakes on dispersion. Deleterious lake effects are most pronounced during the warm season when stabilized lake air penetrates inland. Onshore flow associated with lake breeze and easterly gradient winds occurs on about 60% of warm season days in the Chicago-Milwaukee area. Several mesoscale regimes promote adverse disperion phenomena including mixing depth reduction, plume trapping, continuous fumigation and/or recycling of pollutants. During stable onshore flow, lowest mixing depths occur nearest the shoreline where emissions and people are numerous. Heavy concentration of automobile traffic near the lake may result in pollutant build-up and photo-chemical smog during stable onshore flow with bright sunshine. Under the same conditions lake-induced fumigation causes excessive pollutant concentration inland from coal-fired shoreline power plants. Trapping of low level plumes is most serious at night or with overcast skies.

The study finds that six pollution control agencies need to incorporate these adverse phenomena in the design of dispersion models and in formulating regulations. Evidence supports the need to incorporate these adverse phenomena in the design of dispersion models and in formulating regulations. Evidence supports the need for reduction of automobile traffic near shorelines. Lake airports and lake freeways will adversely affect shoreline air quality.

156. Collins, H. C. 1974. Power alternatives. In: Echo Issues. Buffalo Museum of Science. Buffalo, N.Y. 4(8):10-11.

This article discusses power plants and their relation to the public and the environment and the economics involved. (SM)

157. Cone, B. W., S. E. Goldstone and G. L. Nehmon. 1971. Socio-economic analysis. In: F. A. Butriso, C. J. Toulhill and I. L. Whitman. (Eds.) Resource Management in the Great Lakes Basin. Health and Co. Lexington, Mass. pp. 29-46.

This article discussed what programs should be carried out in the Great Lakes Basin, and how they could be financed. The attempt of the authors was to avoid consideration of institutions and agencies, but rather to be more goal

orientated. A table shows cost benefit summary of alternative programs for improving water quality of Lake Erie, and maps show polluted beaches located on Lake Erie, and areas of primary responsibility for pollution of Lake Erie, and construction costs for FWQA recommendations for municipal immediate needs. (BECPL)

158. Connelly, D. S. 1974. Presque Isle. Inland Seas. 30(1):35-46.

The Presque Isle is a tug/barge which represents the culmination of a series of developments in shipping on the Great Lakes. This article presents the developments that led up to the construction of such a vessel. (CCIW)

159. Cornell Aeronautical Lab., Inc. 1972. Assessment of the environmental effects accompanying upland disposal of polluted harbor dredgings, Fairport Harbor, Ohio. (Appendix A-Supporting data and circulations). Cornell Aeronautical Lab., Inc. Tech. Rept. Cal. No. NC-5191-M-1. 42 p.

This article mentions the effects on the environment caused by the harbor dredgings of Fairport Harbor. Various sites are discussed along with the present ownership (local industries) unless they are bought outright by county or village government and converted to recreational use. Problems to contend with and future projections are given.

160. Cornell Aeronautical Lab, Inc. 1972. Assessment of the environmental effects accompanying upland disposal of polluted harbor dredgings, Ashtabula Harbor, Ohio. (Appendix A-Supporting data and calculations). Cornell Aeronautical Lab., Inc. Tech. Rept. Cal. No. NC-5191-M-2. 25 p.

In this report mention is made of the ultimate use of a fill disposal area from harbor dredgings of Ashtabula Harbor. Industrial purposes, and park and recreational purposes and aesthetic appearance of the site are discussed.

161. Crawford, L.C. 1953. Hydrology of Lake Erie and tributaries. In: Lake Erie Pollution Survey, Final Rept. Ohio Dept. Nat. Resources. Div. Water. pp. 19-28.

Reference to recreation, water-borne traffic, industry and agriculture of Lake Erie and surrounding basin. (CCIW)

162. Crew, The. 1973. A cruise on Lake Erie, 1899. Inland Seas. 29(2):91-98.

The crew of the 30 ft. yacht, Lotus, describe a recreational cruise on Lake Erie. Included are their descriptions of fishing techniques (fish stakes) and the islands and recreational areas of Lake Erie. (CCIW)

163. Crow, Robert. 1972. Coastal zone power plants, environmental protection and regional economic growth. Research Foundation of State Univ. N.Y. Albany, N.Y. pp. 37-39.

The article relates to power and power plant siting to Buffalo and Lake Erie to use as a research site. besides this region as an economic model.

164. Cutler, N. L. 1929. The biological investigation of pollution in the Erie-Niagara watershed. In: A Biological Survey of the Erie-Niagara System. N.Y. Cons. Dept. Suppl. 18th Ann. Rept. 1928. pp. 134-139.

The biological investigations of the conditions of pollution of the Erie-Niagara watershed were divided into: (1) Lake Erie, Niagara River, and (2) streams. In a biological study of a lake bottom it is harder to define the three characteristic pollution zones that are usually found in stream studies, i.e. (a) zone of recent pollution, (b) septic zone, (c) zone of recovery. In an open body of water such as Lake Erie, a septic zone is never developed due to the rapid dispersion of the polluting substance though areas confined, as by a breakwater, may approach this condition.

165. Dappert, A. F. 1964. New York pollution control policy and Lake Erie. Industrial Water & Wastes. 9(1):29-31.

Water quality standards are outlined in this report under the classification of the N.Y.S. portion of Lake Erie. (BL)

166. Darling, Fraser F. and John F. Milton. 1966. Future environments of North America, transformation of a continent. Garden City, N.Y. 767 p.

Ecologists, regional planners, economists, jurists and conservations probe the pressures on North America and explore the possibilities for solution. (CCIW)

Davies, T. T. - See: J. L. Buckley, No. 11.

167. Davies, T. T. and N. A. Thomas. 1972. Great Lakes programs for the Grosse Ile Lab. In: Proc. of the First Federal Conf. on the Great Lakes. Interagency Committee on Marine Science and Engineering for the Federal Council for Science and Technology, Washington, D. C. pp. 82-88.

Table of enforcement and international activities on the Great Lakes (Lake Erie listed).

168. Davis, C. C. 1953. Cleveland Harbor industrial pollution study. In: Ohio Dept. Nat. Res. (Ed.). Lake Erie Pollution Survey. Final Rept. Div. Water. Cleveland, Ohio. pp. 170-188.

In the Cleveland area, the major portion of the industrial effluents are dumped into the Cuyahoga River, though other portions are carried through municipal sewage disposal plants, and are dumped after treatment into Lake Erie at several points. The present report deals primarily with Cuyahoga River effluents, though other effluents also have their effect.

169. Davis, Richard M., Darryl L. Heesel and Gary S. Stacey. 1972. Urban policy and political institutions for water quality management on Lake Erie. Battelle Columbus Lab. Columbus, Ohio. 65 p.

This publication deals with the management of water quality for Lake Erie which looms as a major challenge to society particularly to governments al all levels if the lake is to survive from severe pollution and eutrophication. The major barrier to this is the inadequate public policies and political institutions. The preliminary finding derived from this project suggests that the public choice theory has potential application to the analysis of complex systems such as the management of the water quality. (CCIW)

170. Davis, R. A. Jr., E. Seibel, and W. T. Fox. 1973. Coastal erosion in eastern Lake Michigan--Causes and Effects. Internat. Assoc. Great Lakes Res. Proc. 16th Conf. Great Lakes Res. pp. 404-412.

Coastal erosion has caused many millions of dollars in property loss and damage along the Great Lakes during the past five years (1968-1973). Particularly severe shoreline retreat has taken place in Lakes Erie, Huron and Michigan. Although regulatory measures, including state and local zoning ordinances are eminent, the details of coastal erosion at a particular location are not thoroughly understood.

The combination of rising lake level and storm activity facilitate erosion and provide a seasonal pattern. The most extensive losses are in fall and a less damaging period of erosion occurs after ice breaks up in spring. In addition to the above-mentioned variables, such factors as man-made structures, location and depth of longshore sand bars, shoreline configuration and orientation, fetch and wind direction must be considered as contributing factors to the erosion problem.

Synoptic data indicate that environmental variables, such as weather, waves and longshore currents, show comparable values for at least several kilometers along the coast during any single storm period. This uniform activity is commonly not reflected in the erosion rates, in that it is not unusual for significant differences to take place across distances of a kilometer or so. All indications strongly suggest that man-made structures and longshore sand bars play a dominant role in determining the local rate of coastal erosion.

171. DeCooke, B. G. 1968. Great Lakes Regulation. Internat. Assoc. Great Lakes Res. Proc. 11th Conf. Great Lakes Res. pp. 627-639.

This article mentions the effects of lake levels on navigation, and power interests.

172. DeGraff, Lee W., Donald D. Foley and Dirck Benson. 1961. Distribution and mortality of canvasbacks banded in N.Y. Fish and Game J. 8(2):69-87.

Reference to the canvasback duck and its rating as a sporting bird and table delicacy. Tables presented showing hunter kill of canvasbacks at Dunkirk Harbor, N.Y. (SM)

173. Doan, Kenneth H. 1941. Relation of sauger catch to turbidity in Lake Erie. Ohio J. Sci. 41(6):449-452.

The author feels that an important factor relating to the catch of sauger is the turbidity which may effect the eggs and fry of the fish by protecting them form preditors and providing food. (BU)

174. Doan, Kenneth H. 1942. Some meteorological and limnological conditions as factors in the abundance of certain fishes in Lake Erie. Ecol. Mono. 12:294-314.

Reference to the importance of the fisheries in Lake Erie with regard to Great Lakes industry. Lake Erie yields more fish than any other Great Lake. (SM)

175. Doan, Kenneth H. 1944. The winter fishery in Western Lake Erie, with a census of the 1942 catch. Ohio J. Sci. 44(1):69-74.

In the island region of western Lake Erie, a hook and line fishery operates on a commercial basis during the period of a year when the lake is covered with ice in that vicinity. The center of this fishery is Put-in-Bay on South Bass Island. No nets are employed in this winter fishery.

The fish captured are of high quality and the catch is of sufficient magnitude to be of importance in the regional economy, although the quantity is but a small fraction of the annual yield of the whole lake. A creel census was placed in operation during the winter of 1942, and, when compared with returns of hook and line fishermen in other water areas, the yield was high. (BU)

176. Doan, Kenneth H. 1945. Catch of Stizostedion vitreum in relation to changes in lake level in Western Lake Erie during the winter of 1943. Am. Midland Nat. 33(2):455-459.

About the island archipelago in western Lake Erie there is a hook and line fishery through the ice. Fishermen are able to operate for about two months during most seasons, and in recent years have shipped to market an average of nearly 50,000 pounds of fish each winter.

A season's total catch depends upon the nature and extent of the ice cover, which governs the length of the fishing season, upon the number of fishermen, and upon the availability

of fish. The latter is in part dependent upon the absolute number of fish present upon the grounds, and in part upon factors which modify contacts between fish and fishermen, such as water current. The present paper offers the results of a measure of the catch, and the probable nature of changes in catch owing to fluctuations in lake level.

177. Dobson, H. H. and M. Gilbertson. 1971. Oxygen depletion in the hypolimnion off the Central Basin of Lake Erie, 1929-1970. Internat. Assoc. Great Lakes Res. Proc. 14th Conf. Great Lakes Res. pp. 743-748.

Lake Erie is undergoing widespread environmental modification due to human influence around the lake shore.

178. Downing, S. W. 1923. Are we maintaining the supply of whitefish in Lake Erie? Trans. Am. Fish. Soc. 53:62-64.

The author questions why the take of white fish in Western Lake Erie is decreasing when the fry seen in the eastern end has been many. He suggests pollution as a cause. (CCIW).

179. Doxiadis, C. A. 1966. Emergence and growth of an urban region, The Developing Urban Detroit Area, 1966-1970. Detroit Edison Co. Detroit, Mich. Vol. I. 356 p.

The primary aim of these studies had been to analyze the various phenomena associated with ekistic development within the Urban Detroit Area. However, phenomena within this area are conditioned by what happens within the Great Lakes area, which, in turn, is influenced by corresponding phenomena within all of North America. Moreover, during the course of the study it was found necessary to examine the process for formation and the state of advancement of a major urban complex with megalopolitan characteristics emerging in the Great Lakes area. (BU)

180. Doxiadis, C. A. 1966. Emergence and growth of an urban region, the developing urban Detroit area, 1966-1970. Detroit Edison Co. Detroit, Mich. Vol. 2. 408 p.

The major contents of Vol. Two can be summarized as:

Selection of the proper frame of space and time of the study.

Analysis of the present situation and the present trends of development in the Urban Detroit Area.

Realization of the need for the study of other development patters.

Selection of goals for the Urban Detroit Area of the future.

Conception of a system of alternatives for the future, including those based on present trends and those based on new development patterns.

Analysis and evaluation of the above alternatives on the basis of the IDEA method.

Elimination of the weaker alternatives and selection of the best. (BU)

181. Doxiadis, C. A. 1966. Emergence and growth of an urban region, the developing Detroit Area, 1966-1970. Detroit Edison Co. Detroit, Mich. Vol. 3. 399 p.

This volume contains the concept of a plan which it is believed can lead to a coordination of public and private efforts for a better development of UDA. It contains many aspects: from the definition of the problems to the elaboration of the best possible alternative for the future, to the concept of a comprehensive plan, and to a process which could lead to its implementation. It also contains the main findings of the third phase of the research project as well as some parts of the analysis, the problems and alternatives, which were not published before, but which are indispensable for a full understanding of the concept-plan and the process for its implementation. It further provides an outline of the work done in the past to provide a picture of the whole effort which led to these conclusions. (BU)

182. Dreisziger, N. F. 1972. The Great Lakes in U.S.-Canadian relations: the first stock-taking. Inland Seas. 28(4):259-271.

The problems of management of the international waters of the U.S. and Canada have been handled in the past by the International Joint Commission, which had its origins in the International Waterways Commission. This article presents a history of the IWC and its early accomplishments. (CCIW)

Drobny, N. L. - See: T. R. Jaske, et al, No. 309.

183. Dunn, Walter S. 1972. History of Erie County, 1870-1970. Buffalo and Erie County Historical Society. Buffalo, N.Y. 452 p.

This book is a collection of essays concerning the history of the county for a hundred years. Several topics that were given great concern in this study were those on education, economics, politics, and agricultural concerns. Growth and development along with future projection may be noted here. Also, various historical stages are dealt with in concern with economic growth and changes in technology. (SM)

184. Dwivedi, O. P. 1973. Public attitudes toward pollution in the Big Otter Creek Drainage Basin, Ontario. Internat. Assoc. Great Lakes Res. Proc. 16th Conf. Great Lakes Res. pp. 900-911.

A survey of the residents of the Big Otter Creek Drainage Basin, which is predominantly a rural area, was conducted to assess their awareness, concern and knowledge of environmental concerns with issues such as unemployment, welfare, educational costs, medical services and recreational facilities. They were particularly concerned about water pollution in their areas. Questions were asked to determine perceptions of the sources of water pollution and the amount of additional taxes respondents would be willing to pay each year to improve the environmental quality. Finally, respondents were asked to express their feelings about public participation in environmental policy making and to indicate which level of government was to be held generally responsible for action against pollution.

Dworski, Leonard B. - See: Gordon F. McCallum, No. 358.

185. Dworski, Leonard B. (Ed.) 1973. A proposal for improving the management of the Great Lakes of the U.S. and Canada. Canada-United States Univ. Seminar. Water Res. and Marine Sci. Center. Cornell Univ. Ithaca, N.Y. 76 p.

This article contains the findings and recommendations made at the Canada-U.S. Univ. Seminar. It was pointed out that the Water and related resources of the Great Lakes are extensive, but nonetheless finite. Resource use in the past has been determined by the politically strong, rather than in the best interest of those that will be affected. The International Joint Commission has been the first step toward a more effective regional approach to resource management.

The problems concerning Lake Erie are included in terms of management and international cooperation. These include water quality, pollution, urbanization, and industrial development.

186. Dymond, J. R. 1956. Artificial propagation in the management of the Great Lakes Fisheries. Trans. Am. Fish. Soc. 86:384-391.

No positive evidence has been found to suggest that artificial propagation has ever been successful in significantly increasing the yield of a native species in the Great Lakes.

The possible contribution of artificial propagation to the populations of Great Lakes fish has been investigated in three ways: By looking for correlations between the numbers of fry planted and the size of the commercial catch in the years when the resulting individuals would have entered the fishery in the greatest numbers; through experiments in which fry are planted only in alternate years and the relative strengths of year classes in appropriate number of years later determined; through experiments in which marked lake trout fingerlings are planted and the number subsequently caught recorded. Neither of the two types of experiment has been carried on long enough to yield decisive results.

From a consideration of the history of some unusually successful year classes and some unusually unsuccessful year classes it is concluded that the size of a year class is determined by conditions affecting hatching and survival rather than by the size of the spawning stock, which is usually adequate to produce large populations if environmental conditions are favorable. Far too much confidence has been placed in the planting of hatchery-reared fish as a means of maintaining or increasing fish populations. (BU)

187. Eagle, George H. 1963. New dimensions in water pollution control. In: Safeguarding the Nation's Water Resources. The Ohio State Univ. Nat. Res. Institute Seminars. pp. 1-16.

There was virtually no sewage treatment on Lake Erie in 1950, with the exception of Cleveland and some of its suburbs, and Toledo. This article discusses the need for water recycling to prevent severe pollution problems in Ohio.

188. Eagle, George H. 1963. Ohio pollution control policy and Lake Erie. Industrial Water & Wastes. 8(5):19-21.

The pollution control policies in Ohio, as they relate to Lake Erie are presented. Lists of entirely new and older industrial wastes treatment plants in the Lake Erie area are given. (BL)

189. Eastman, P. W. 1974. Discharges to intermittant streams. In: Echo Issues. Buffalo Museum of Science. Buffalo, N.Y. 4(7):1-9.

Discharges into streams in the Erie County area are discussed along with pollution on the public.

Economic Council - See: George E. Peeva, No. 548.

190. Eckstein, Otto. 1958. Water resource development, the economics of project evaluation. Harvard Univ. Press. Cambridge, Mass. 300 p.

This book is an economic analysis of the procedures used by the federal government to justify and evaluate public works in the field of water resource development. The measures of benefits and costs that have been devised for projects in the fields of flood control, irrigation, navigation and electric power are described and examined from the point of view of the theory of welfare economics. The major sources of bias are identified and suggestions are made to improve the evaluation practices. (CCIW)

191. Ellis, William D. The Cuyahoga. 1966. Holt Rinehart and Winston, N.Y. 302 p.

Concerns the Cuyahoga River and surrounding area with regard to early settlement, population figures, economic development and influence especially on the city of Cleveland, Ohio. The major industries supported by the river are described. (BECPL)

192. Emerson, George D. 1916. The Perry's victory centenary. N.Y. State Dept. Albany, N.Y. 308 p.

This publication details political and economic foundings after the Civil War. Ships of commercial and war fame are listed by the N.Y. State Commission. (SM)

193. Embody, G. C. 1929. Stocking policy for the streams, lakes and ponds of the Erie-Niagara watershed exclusive of Lake Erie. In: A Biological Survey of the Erie-Niagara System. N.Y. Cons. Dept. Supp. 18th Ann. Rept. 1928. pp. 19-38.

This article may be used in association with fish populations versus the angler or so-called recreational fisherman interested in rate of growth and patterns of growth.

194. Engineering News-Record. 1965. HEW, State agree on Lake Erie cleanup. Eng. News-Record. June 24. p. 20.

This article is a brief summary of the conclusions of the 1965 conference in Detroit to discuss pollution in the Detroit River, and the Michigan waters of Lake Erie. It was agreed that these waters should come under the jurisdiction of the Federal Water Pollution Control Act.

195. Erie County Dept. of Parks and Recreation. 1963. Bureau of Forestry. Buffalo, N.Y. 40 p.

This article describes and discusses the Erie County parks open and available to the public. Improvements in facilities and resource planning accomplishments are given. (BECPL)

196. Erie County Environmental Management Council. 1973. The state of the environment--1972. The Erie County Environmental Management Council. 74 p.

A report on the state of the environment for Erie County, N.Y. Fund allocations are listed for pollution abatement programs for various towns. Programs and legislation are related directly to Lake Erie or its tributaries.

197. Erie County Regional Planning Board. 1973. Atlas of regional plans and programs. Governor Island, N.Y. pp. A 1 - N 6.

This Atlas will be the principal file for all adopted regional plans and programs depicted within each section indicate the future policy for the development of utility systems, parks, highways, and other facilities necessary to accommodate the region's population.

The plans described in this Atlas have been prepared in order to meet new various Federal requirements stipulated by legislation. They are used by the Regional Planning Board as the basis for reviewing and making comment upon specific State and Federal aid programs for this region, submitted by elegible grant applicants, including local, State and Federal governmental units and authorities.

In reviewing this Atlas, the lay citizen can measure his needs and requirements in relation to the proposals presented in each plan and thus determine his concurrence in identifying and meeting regional development goals. The community official can review his community's needs in relation to overall regional needs. The elected State and Federal representatives can interpret these plans as a "needs list" upon which to base programs. The various State and Federal governmental agencies will have, in simplified format, the needs, objectives, plans and programs upon which Federal and State funds will be distributed in a coordinated manner.

198. Erie-Niagara Basin Regional Water Resources Planning Board. 1969. Erie-Niagara Basin comprehensive water resources plan. Main Rept. 235 p.

The report presents a comprehensive plan for water resources management and development in the Erie-Niagara Basin. It summarizes investigations which identified available resources and needs and opportunities for development.

The report (1) formulates the alternatives available to meet the needs for municipal and industrial water supply, water quality management, irrigated agriculture, water-oriented recreation, fish and wildlife enhancement, flood plain management and other functions and (2) integrates

these alternatives into a coordinated development program for the period, 1970 to 2020, with emphasis on the early action (1970-1980) phase of the program.

199. Erie and Niagara Counties Regional Planning Board. 1970. Annual Report 1970. Grand Island, N.Y. 35 p.

This report includes the accomplishments of various committees in the Erie and Niagara Counties Regional Planning Board; the Goal and Objectives Committee, the Natural Resources Committee, the Housing Committee, the Utilities Committee, the Transportation Committee, the Storm Drainage Study Technical Advisory Committee, the Solid Waste Management Technical Advisory Committee, and the International Environment Study Technical Advisory Committee. The accomplishments of 1970 are also listed in chronological order. Projections for the future are given, and Federal Grant Programs are reviewed.

200. Erie and Niagara Counties Regional Planning Board. 1970. Planning Board presents regional growth concepts. Newsletter. Grand Island, N.Y. 1(6,7):4 p.

Regional planning in Erie and Niagara Counties, New York is relatively new, organized to meet the requirements of congress to efficiently allocate federal aid to municipal governments for transportation, housing, water and sewer facilities, parks, open spaces, and recreation areas. Such concepts as growth trends, developmental factors and use are outlined for this area.

201. Erie and Niagara Counties Regional Planning Board. 1970. Preliminary concept plans and regional development goals. Grand Island, N.Y. 64 p.

In 1969, the Erie and Niagara Counties Regional Planning Board completed its first year program of planning studies on the two county metropolitan area. These studies are now finished and their findings and conclusions are contained in a series of reports recently published by the board.

The analysis was based on the following materials:

Background Studies Summary Charts; Goals and Planning Objectives Charts; Alternate Concept Plan Charts; Development Factor Map; and Four Alternative Growth Concept Plan Maps.

The analysis of these materials is contained in the following background studies summary charts: Population; Economy; Geophysical Features; Existing Land Use; Transportation; Recreation; and Utilities.

Each of the above factors was examined according to the following stages of the analytical process: Patterns; Trends; and Implications.

202. Erie and Niagara Counties Regional Planning Board. 1971. Annual Report 1971. Grand Island, N.Y. 35 p.

This report includes the accomplishments of various committees in the Erie and Niagara Counties planning board; the Goals and Objectives Committee, the Natural Resources Committee, the Housing Committee, the Utilities Committee, the Transportation Committee, the Storm Drainage Study Technical Advisory Committee, the Solid Waste Management Technical Advisory Committee, and the International Environment Study Technical Advisory Committee. The accomplishments of 1971 are also listed in chronological order. Projections for the future are given and Federal Grant Programs are reviewed.

203. Erie-Niagara Counties Regional Planning Board. 1971. Technical report on housing in the Erie-Niagara region, 3rd year study. Grand Island, N.Y. 236 p.

This report focuses on the housing problems of low income households in the Erie-Niagara region. The recommendations are made by various groups comprised of public agencies at federal, state and local levels; private organizations such as realtors and developers.

The report analyzes the conditions and solutions for low income families in this situation. Several suggestions concerning possible solutions are explained in great depth.

Economic and sociological aspects of the problem are carefully reviewed for their implications and usefulness with regard to solutions. (BECPL)

204. Erie and Niagara Counties Regional Planning Board. 1972. Annual Report 1972. Grand Island, N.Y. 24 p.

This report includes the accomplishments of various committees in the Erie and Niagara Counties Regional Planning Board; the Goal and Objectives Committee, the Natural Resources Committee, the Housing Committee, the Utilities Committee, the Transportation Committee, the Storm Drainage Study Technical Advisory Committee, the International Environment Study Technical Advisory Committee, the Solid Waste Management Technical Advisory Committee and the Federal Water Quality Administration Technical Advisory Committee. The accomplishments of 1972 are also listed in chronological order. Projections for the future are given, and Federal Grant Programs are reviewed.

205. Erie and Niagara Counties Regional Planning Board. 1972. Stream classification and quality standards for water pollution control. Newsletter. Grand Island, N.Y. 3(7, 8, 9):5 p.

Streams in Erie County are classified in one of four classifications, from "A" to "D". Each has a specific standard that in-stream waters must conform to, A, being pure enough to drink, and D being suited to industrial and agricultural use. Tables outline the best use of water, approved treatment, and a map shows the location and classification of streams in Erie County. A form for public opinion of their system is included.

206. Erie-Niagara Counties Regional Planning Board. 1972. Technical report on housing in the Erie-Niagara region, 3rd year study. Grand Island, N.Y. 137 p.

The goals and objectives of the regional housing program are aimed toward improving the housing stock. The study provides insights into the various elements of the housing market including the building industry besides community factors such as land use, and building controls. Programs are listed here which would improve neighborhood and environmental factors. (BECPL)

207. Erie and Niagara Counties Regional Planning Board. 1973. Environmental assessment statement for the Regional Water Quality Management Study. Grand Island, N.Y. 276 p.

This report includes information concerning all areas in Erie County. The first section contains an overview consisting of Population Projections, Economic Trends, Developmental Patterns, and Land Use, Initial Environment Study, Regional Land Use Concept Plan, Regional Water Supply Plan, Regional Sanitary Sewage Plan and Program, Regional Recreational and Open Space Plan and Program, Regional Recreational and Open Space Plan and Program, Regional Storm Dranage Management Plan, Stream Classification-Water Quality Standards, and Regional Water Quality Management Study.

Section IV includes description of the following Erie County areas in terms of: Summary of Alternate Sewage Plans, Description of the Environmental Affected, Summary of Environmental Impacts, Adverse Environmental Effects which cannot be substantially avoided, Relationship between Local Short-term Uses of Man's Environment and the Maintenance and enhancement of Long-term Productivity, Irreversible and Irretrievable Commitments of Resources.

1. Tonawanda Creek Watershed
2. Two Mile Creek Watershed, Scajaquada Creek Watershed
3. Grand Island Watershed

Section V is an environmental assessment of the Lake Erie East End Basin. These include Summary of the Alternate Sanitary Sewage Plans, Description of the Environment Affected. Summary of Environmental Impacts, Adverse Environmental Effects Which Cannot Be Substantially Avoided, Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity, and Irreversible and Irretrievable Commitments of Resources. The following areas are included in this section: Buffalo River Watershed, Smoke Creek-Rush Creek Watershed, Eighteen Mile Creek Watershed, Pike Creek-Big Sister Creek, Delaware Creek, Muddy Creek Watershed and Cattaraugus Creek Watershed.

208. Erie and Niagara Counties Regional Planning Board. 1973. Governing land use. Newsletter. Grand Island, N.Y. 4(10, 11, 12):4 p.

Land use planning is as important as efforts on water and air pollution. Private as well as public areas should be developmentally supervised. This article is based on "Governing Land Use", an editorial in the Tonawanda News, concerning President Nixon's statement on land use.

209. Erie and Niagara Counties Regional Planning Board. 1973. Planning Board presents revised regional land vs. concept plan. Newsletter. Grand Island, N.Y. 5(1):5 p.

The revised Land Use Concept Plan and Regional Development Goals and Objectives are presented in the Newsletter. The goals and Objectives not only cover land use, but also include utilities, transportation, recreation, and economic objectives. This action by the Regional Planning Board will assure that this region and all its municipalities continue to be certified to receive money through numerous federal money programs.

210. Erie and Niagara Counties Regional Planning Board. 1973. Regional Board projects population to year, 2000. Newsletter. Grand Island, N.Y. 4(7, 8, 9):5 p.

A Regional Planning Board report (Regional Population Projections, 1970-1990) provides population projections from 1970 to the 2000. This report outlines the result of a Board study to revise old projections, based on the results of the 1970 U.S. Census. The report shows population estimates for both Erie and Niagara Counties as well as each city, town and village within the region. The centerfold of this Newsletter shows these population projections for each municipality beginning with the 1970 census and progressing to the year, 2000, in five year intervals. The report also contains valuable information regarding projections for the region's labor force, age and sex groupings.

211. Erie and Niagara Counties Regional Planning Board. 1973. Regional Storm Drainage Management Plan. Grand Island, N.Y. 435 p.

The purpose of this Regional Storm Drainage Management to provide recommended solutions to drainage problems common to Erie and Niagara Counties, N.Y. Regional guidelines for implementation of the recommended plan are presented to assist governmental agencies and their administrators. Fifteen sub-regional areas, undergoing a rapid urbanization are investigated in detail; specific recommendations, both structural and non-structural, are made to alleviate and prevent flooding and drainage problems. Legal and Administrative actions required to obtain financing for plan implementation are defined.

212. Erie and Niagara Counties Regional Planning Board. 1974. Regional Recreation and Open Space Plan and Program-current revision. Newsletter. Grand Island, N.Y. 5(3):5 p.

The adoption of the Regional Recreation and Open Space Plan and Program by the Erie and Niagara Counties Regional Planning Board constitutes the basis for federal and state funds for parks, and for recreation and open space within Erie and Niagara Counties.

Ewing, Ben - See: Dale D. Meredith, No. 366.

213. Farley, John L. 1956. The role of the Great Lakes Fishery Commission in the solution of Great Lakes problems. Trans. Am. Fish. Soc. 86:424-429.

The commercial catch in Lake Erie, is about equal to that of all species in the other four Lakes. The smelt is believed to be a key member of the shallow-water communities of fishes, because it is competitive with other species. All of these species fluctuate to an extraordinary degree. The fluctuations make fishing in these areas acutely unstable, more so than is true of most fisheries in other areas. The causes of these fluctuations are not understood, and thus they cannot be predicted.

Scientists suggested that the most pressing problems of the Great Lakes fall into three general categories: finding means of restoring the lake trout as the sea lamprey control program gains in effect; learning the causes of natural fluctuations in abundance of the several species so as to predict and perhaps even control fluctuations; determining the reaction between fishing intensities and yields to form a scientific basis for regulating of fishing rates which will maintain maximum sustained yields.

214. Ferris, Theodore N. Jr. 1973. Island Ho! The story of a boat line. Inland Seas. 29(1):27-32.

This article discusses the problems of living on an island and the history of transportation facilities available to and from Kelley's Island. (CCIW)

215. Fish, Charles J. (Ed.) Preliminary report on the cooperative survey of Lake Erie, season of 1928. Bull. Buffalo Soc. of Nat. Sci. 14(3):220p.

The present report contains a preliminary statement on the results of a three months' survey of eastern Lake Erie to determine the cause or causes for the decline in the fishery. The work was carried on under the joint auspices of the U.S. Bureau of Fisheries, the N.Y. State Cons. Dept., the Ontario Dept. of Game and Fisheries, the Health Dept. of the City of Buffalo, and the Buffalo Society of Natural Sciences. These five organizations pooled resources, personnel, and equipment to function as a single unit, thus avoiding duplication of effort and offering the best possible opportunity for a through correlated investigation of all the necessary phases of the problem. (SM)

216. Fish, Charles J. 1929. A preliminary report on the joint survey of Lake Erie. In: A Biological Survey of the Erie-Niagara System. N.Y. Cons. Dept. Suppl. 18th Ann. Rept. (1928). pp. 19-38.

The present report contains a brief summary of some of the results of a three months' survey of eastern Lake Erie, carried on under the joint auspices of the U.S. Bureau of Fisheries, the N.Y. State Cons. Dept., the Ontario Dept. of Game and Fisheries, the Health Dept. of the City of Buffalo and the Buffalo Society of Natural Sciences. The object of the investigation was to determine if possible the cause or causes for the decline in the fisheries in the lake.

217. Fish, Marie Poland. 1929. Contributions of the early life histories of Lake Erie fishes. In: A Biological Survey of the Erie-Niagara System. N.Y. Cons. Dept. Suppl. 18th Ann. Rept. 1928. pp. 76-95.

This report discusses records of distribution and development of the commercially important fish of Lake Erie.

218. Fish, Marie Poland. 1929. Contributions of the early life histories of Lake Erie fishes. In: Preliminary report on the cooperative survey of Lake Erie, season of 1928. Buffalo Soc. Nat. Sci. Bull. 14(3):136-187.

This article probes the relationship between fish and man and probes the possible effects of overfishing Lake Erie.

Fisher, Ann - See: Norman Starler, No. 628.

219. Flemming, Roy F. 1972. Last trip of the Bruce Mines. Nov., 1854. Inland Seas. 28(4):287-291.

This article presents a history of the Bruce Mines, a Great Lakes ore-carrying ship which sunk on its last voyage.

220. Flemming, Roy F. 1973. Burning of the steamship, Erie, August, 1841. Inland Seas. 29(3):177-181.

Ship fires on the Great Lakes seem to have begun on Lake Erie in the 19th century. This article presents a history of the ship, Erie, and others which burned on the lake. (CCIW)

221. Foell, Eric J. 1974. The age and growth of freshwater drum (Aplodinitus grunniens Rafinesque) from Lake Erie near Cleveland, Ohio. M.S. Thesis, John Carroll Univ. Cleveland, Ohio. pp. 11-21.

This is a report to study the growth and condition of freshwater drum in a severely polluted area off the coast of Cleveland, Ohio. It is suggested that the environment has benefited this species, causing an increase to the dismay of commercial fishermen. The author feels that this species could be put to better use on the commercial market rather than wasted.

Foley, Donald D. - See: Lee W. DeGraff, No. 172.

222. Forbes, James E. 1970. Environmental deterioration and declining species. Conservationist. 25(1):21-26.

Refers to the decline of blue pike in Lake Erie due to the deterioration of the physical, chemical, and biological environment. (SM)

Fox, W. T. - See: R. A. Davis Jr., et al, No. 170.

223. Francis, Joseph and Lawrence Busch. 1973. Water recreational activities in N.Y. State and the effect on associated industries. New York's Life and Sci. Bull., Social Sci. pp. 1-14.

Two types of recreational activity will be considered in this report, recreational, boating and its associated industries. In discussing boating associated industries, building, repair, and replacer boat dealerships are mentioned. Future projections have been made.

Freeman, N. - See: J. P. Coakley, No. 154.

224. Frenette, Roger E. Dec., 1971. A water quality strategy for the Great Lakes. Cornell Univ. Water Resources and Marine Sci. Center. Tech. Rept. 34. 221 p.

The management of water quality is viewed within a broader social context. That is, as one of many modern-day services that, when successfully provided, would help ease the increasing stresses on the urban citizen and result in a small step in restoring credibility to government.

The strategy is developed through a traditional planning framework which includes problem identification and description, value and goal development, alternative identification and evaluation and choice. The strategy is, in essence, a design developed from synthesized physical, economic, legal and institutional data and information that are timely and pertinent to the problem at hand. Basic objectives are developed as are planning premises that the strategy is designed to meet.

225. Frick, Harold C. 1965. Economic aspects of the Great Lakes Fisheries of Ontario. Fisheries Research Board of Canada. Bull. 149. 159 p.

This report covers some of the economic aspects of Ontario Fisheries, including those on Lake Erie. Such things as unit fishing costs, market demand, regulation, etc. are mentioned.

226. Frohman, Charles E. 1973. The Spirit of the Lakes. Inland Seas. 29(2):110-112.

The Spirit of the Lakes and Boatmen's magazine was published in 1849 by Rev. R. H. Leonard in an attempt to improve the moral character of boatmen and canal drivers. (CCIW)

227. Frost, S. L. 1964. Plans for implementing recreation and resource programs in the Ohio Dept. of Nat. Resources. The Ohio State Univ. Nat. Res. Seminar 1963-1964. pp. 115-145.

This section is a report from the Ohio Dept. of Natural Resources concerning recreational planning. Included are future plans for recreational facilities, costs and improvements, and a map shows approved recreational projects.

Gedney, Richard - See: Herman Mark, No. 356.

228. Gertler, L. O. 1972. Regional planning in Canada. Harvest Houst. Montreal, Quebec. 186 p.

This book deals with man's theory on regional planning dotted with encounters of social problems such as rapid urbanization, environmental struggles, impact on agricultural land and resource use and development. The area dealt with is the most urbanized part of Ontario, the Canadian heartland which borders Lake Erie as an important economic region. (CCIW)

Gilbertson, M. - See: H. H. Dobson, No. 177.

229. Gladwell, G. S. 1972. A program of cooperative water resources research and training. In: Proc. of the First Federal Conf. on the Great Lakes. Interagency Committee on Marine Science and Engineering for the Federal Council for Science and Technology. Washington, D. C. pp. 69-77.

The Office of Water Resources Research (OWRR) notes legislation that affects federal and non-federal research programs concerning the Great Lakes with a reference to Lake Erie.

230. Glazier, Alice Ennice. 1946. Buffalo, Your City. Foster and Stuart Pub. Co. 255 p.

This book highlights the economic development of Buffalo with a historical background and the founding of utilities and the beginnings of political involvements and duties. (SM)

231. Goldman, Charles R. 1971. Environmental quality and water development. Univ. of Calif. Davis, Calif. Vol. 1 and 2. 597 p., 579 p.

The purpose of this study is to bring together within a single report an evaluation of the causes of conflict between environmental quality and water associated development in the U.S. The history of water development is surveyed along with American values and attitudes toward

the environment. The report suggests methods of balancing human values against cost benefit analysis. Recommendations focus on improved evaluation and planning of water development. (CCIW)

Goldstone, S. E. - See: B. W. Cone, et al, No. 157.

232. Goldstone, S. E., M. H. Karr, Vincent Ostrom and Elinor Ostrom. 1971. Institutional Analysis. In: F. A. Butrico, C. J. Toulhill, and I. L. Whitman (Eds.). Resource Management on the Great Lakes Basin. Health and Co. Lexington, Mass. pp. 47-67.

The Great Lakes represents a classic example of common pool resource offering the possibility of many joint and alternative benefits if users can avoid some of the typical dynamics engendered by the very nature of this resource system. This article offers some suggestions for an institutional analysis.

233. Gotaas, Harold. 1969. Outwitting the patient: The human use of lake pollution. Bull. of the Atomic Scientists. p. 8-10.

In commenting on the October, 1968, Dept. of the Interior report on "badly polluted Lake Erie," then Secretary Stewart Udall referred to pollution as a "patient assassin which chokes its victims ever so slowly and silently." The report calls for an immediate start in spending $1.1 billion to control municipal pollution and $285 million for curbing industrial contamination of Lake Erie. The most serious problem that the report singles out is the accelerated aging of the lake brough about by nutrients in sewage and some industrial wastes that act as fertilizer to spur algal growths. To reverse this trend, the Federal Water Pollution Control Administration recommends drastic reduction in the load of phosphorus discharged into the lake.

Harold B. Gotaas, civil and sanitary engineer, and Dean of the Technological Institute at Northwestern Univ., challenges some aspects of the emphasis on nutrient removal in current antipollution programs. Alternate approaches such as seeding desirable fish and re-establishing commercial fishing on the Great Lakes, he maintains, may offer more promising and less costly ways to restore biological balance in the Lakes.

234. Great Lakes Basin Commission. 1968. Comprehensive framework study (type 1), plan of study. Great Lakes Basin Commission. Ann Arbor, Mich. 1:317 p.

The Great Lakes Basin Commission is the principal agency for the coordination of Federal, State, interstate, local and nongovernmental plans for the development of water and related land resources in the Great Lakes Basin. The study reviews water resource development plans as they apply to the Great Lakes Basin. Lake areas are not treated individually, but the programs affect the Lake Erie Basin.

235. Great Lakes Basin Commission. 1969. Annual Report for the fiscal year ending June 30, 1969. Great Lakes Basin Commission. Ann Arbor, Mich. 27 p.

This publication is a coordinated effort by several states to deal those problems related to navigation, flood control, water pollution, lake levels and other phases of water management which could not be solved by one state. A long range study of the Maumee River Basin is proposed upon by various state requests. Lake Erie studies are mentioned in the requests. Lake Erie studies are mentioned in the context of a proposal, part of a series of case studies in "Multiple Uses of the Coastal Zone". This is a comparative study of Lake Erie and Lake Superior. Discussion was also made of conducting a comprehensive framework study, establishing priorities for data collection, investigation, planning and construction of projects, initiating a practicability study relative to a proposed limnological systems analysis for the Great Lakes, coordinating ongoing planning activities, and developing guidelines for the Comprehensive Coordinated Joint Plan.

236. Great Lakes Basin Commission. 1969. Great Lakes Institutions: A survey of institutions concerned with the water and related resources in the Great Lakes Basin. Ann Arbor, Mich. 58 p.

This publication is an aid for the planning and management of the Great Lakes water system. It provides a list of institutions and their programs which are involved with the regulation of the Great Lakes. Lake Erie is influenced by most of these institutions. (BECPL)

237. Great Lakes Basin Commission. 1971. Annual Rept. for the year ending June 30, 1971. Great Lakes Basin Commission. Ann Arbor, Mich. 21 p.

Lake Erie and its developmental procedures are given according to states surrounding it. This annual report is divided into appendices which include: water supply (municipal, industrial and rural) water quality, fish, commercial navigation, power, shore use, irrigation, wildlife, economic and demographic studies, law and policies, outdoor recreation and plan formulation with Lake Erie included in general mention of the Great Lakes. Of special note is the Maumee River Basin Study, made with budget mention and political endorsements.

238. Great Lakes Commission. 1971-1972. Report to the states. Ann Arbor, Mich. 53 p.

The years, 1971 and 1972, were exceptionally active ones on essentially all fronts concerned with programs for sound. utilization and development of the waters of the Great Lakes basin and for those directed toward obtaining fuller protection and understanding of these waters and their borderlands. To achieve or advance toward the desired objectives required the concerted efforts of a large number of individuals as well as of many organizations and agencies. The Great Lakes Commission, through its committees and staff, has participated directly in many of the undertakings and has kept its member states and committees and other interested parties appraised of the progress being made in all of the Great Lakes-related programs.

The REPORT TO THE STATES, 1971-1972, presents information about the Great Lakes Commission's programs and activities undertaken on behalf of the eight member states in the discharge of their responsibilities for the further development and protection of the water resources of the Great Lakes. The Commission has worked toward this objective by its continuing surveillance and appraisal of existing and new Great Lakes area developments and proposals, through Commission meeting for the exchange and coordination of the views and plans of the states, by special studies, analyses and information services and through presentations of the recommendations and proposals of the states, based on the aforementioned actions, in meetings and hearings of federal agencies and legislative committees concerning current Great Lakes developments.

239. Great Lakes Commission. 1966. Water quality management in the Great Lakes States and Ontario. Great Lakes Commission. Ann Arbor, Mich. 58 p.

This report includes a description of the Federal Water Pollution Control Act of 1965, and also statements from the States on the Great Lakes and Ontario concerning their efforts to control pollution.

240. Great Lakes Commission. 1971. For the record... A statistical profile of the Great Lakes. Great Lakes News Letter. Ann Arbor, Mich. 15(6):7.

A table gives statistical information on the Great Lakes, including Lake Erie commerce (net tons) which was 5,295,722 for June 1971, 4,603,427 for July 1971, 20,379,911 for Jan. - July 1971, and 20, 456,225 for Jan. - July 1970.

241. Great Lakes Commission. 1973. Current port developments. Great Lakes News Letter. Ann Arbor, Mich. 17(6):2.

Erie, Pa. approved an ordinance establishing a port authority. Operation of the port is funded by the state allocation which was been $250,000 a year, and funds derived from city owned leased property.

242. Great Lakes Commission. 1973. For the record... A statistical profile of the Great Lakes. Great Lakes News Letter. Ann Arbor, Mich. 17(3):6.

A table gives statistical information on the Great Lakes including Lake Erie commerce (net tons) which was 1,694,946 for December 1972, 2,517,089 for December 1971, 38,000,979 for the 1972 season, and 37,731,310 for the 1971 season.

243. Great Lakes Commission. 1973. For the record... A statistical profile of the Great Lakes. Great Lakes News Letter. Ann Arbor, Mich. 17(5):7.

A table gives statistical information on the Great Lakes including Lake Erie commerce (net tons) which was 3,806,642 for April 1973, 4,581,176 for May 1973, 9,313,767 for Jan. - May 1973, and 9,052,813 for Jan. - May 1972.

244. Great Lakes Commission. 1973. For the record... A statistical profile of the Great Lakes. Great Lakes News Letter. Ann Arbor, Mich. 17(6):7.

A table gives statistical information on the Great Lakes including Lake Erie commerce (net tons) which was 4,247,729 for July 1973, 16,849,615 for Jan.-July 1973, and 17,969,042 for Jan.-July 1972.

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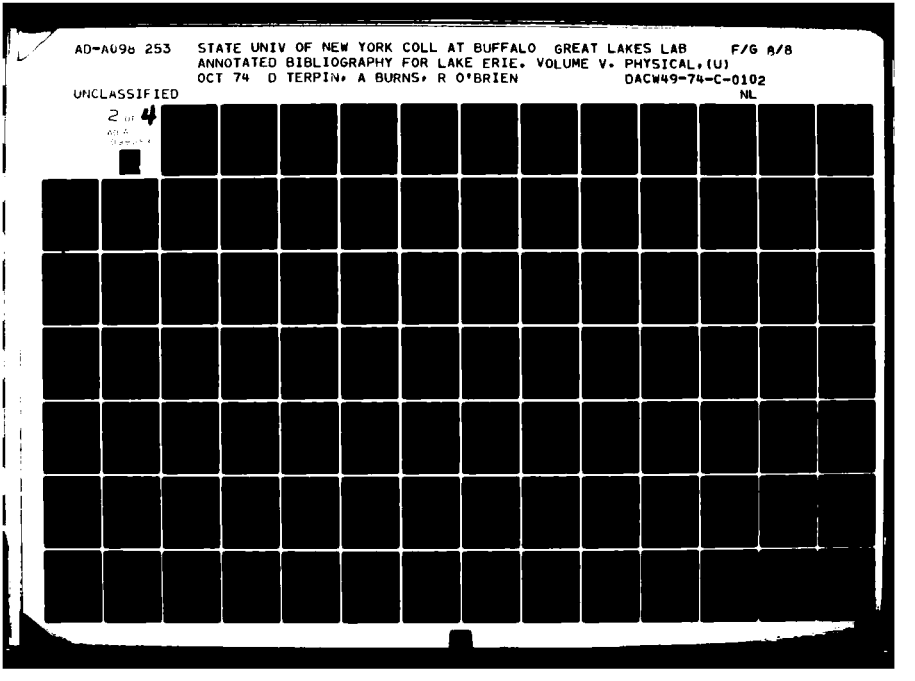

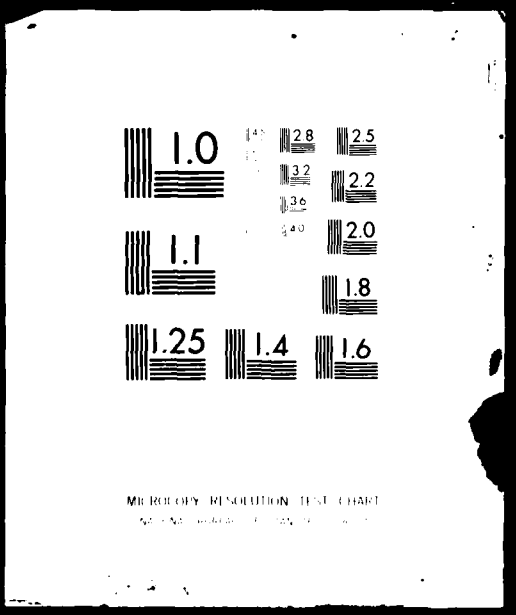

245. Great Lakes Commission. 1973. For the record... A statistical profile of the Great Lakes. Great Lakes News Letter. Ann Arbor, Mich. 18(1):7.

A table gives statistical information on the Great Lakes including Lake Erie commerce (net tons) which was 3,842,367 for August 1973, 3,931,991 for Sept., 1973, 24,623,973 for Jan.-Sept. 1973 and 27,234,544 for Jan.-Sept. 1972.

246. Great Lakes Commission. 1973. FY 1974 Great Lakes Basin projects: budget and program amounts. Great Lakes Newsletter. Ann Arbor, Mich. 17(3):2-3.

Budget proposals in this year included funds for work in flood control allotted to the Rouge River, Mich., and the Cuyahoga River, Ohio, and navigation funds allocated to Lorain Harbor, Ohio. The following table shows the budget request and the program amount.

PROJECT	BUDGET	PROGRAM
Lorain Harbor, Ohio	$1,067,000	$1,067,000
Rouge River, Mich.	$4,200,000	$4,750,000
Cuyahoga River, Ohio	$ 100,000	$ 165,000

247. Great Lakes Commission. 1973. Great Lakes public works appropriation for FY 1974. Great Lakes News Letter. Ann Arbor, Mich. 17(6):3

Public law 93-97 is concerned with appropriations for water related public works; included are some 12.4 million dollars for 35 projects in the Great Lakes Basin, including $1,167,000 for Lorain Harbor, Ohio, $100,000 for the Cuyahoga River, Ohio, and $330,000 for beach erosion control in Michigan, N.Y., and Ohio.

248. Great Lakes Commission. 1973. Lakes and Seaway grain trade at record levels. Great Lakes News Letter. Ann Arbor, Mich. 17(6):4-5.

Grain shipments form the Great Lakes ports for the 1973 season surpassed the previous high. Total shipments for Toledo, Ohio and Huron, Ohio, in millions of bushels, were as follows:

PORT	TOTAL SHIPMENTS 1973	1972	1970	DIRECT OVERSEAS 1973	1972
Toledo, Ohio-	23.8	37.2	30.8	10.5	24.4
Huron, Ohio-	0.7	1.3	--	--	0.2

Also included were general statistics on U.S. ports.

249. Great Lakes Commission. 1973. Lake Erie gas fields provide half of Ontario's 1972 production. Great Lakes News Letter. Ann Arbor, Mich. 17(3):6.

Natural gas wells located in Ontario's waters of Lake Erie produced an estimated 6,247.3 million cubic feet in 1972, a record in annual output.

250. Great Lakes Commission. 1973. Ohio Regulations for waste disposal from watercraft operation on Lake Erie. Great Lakes News Letter. Ann Arbor, Mich. 17(6):6.

The section of Ohio's Watercraft Law enacted in 1970 which applies to waste disposal of boats 65 ft. or less in length operation on Lake Erie became effective July 1, 1973. This law requires all toilet-equipped watercraft to have sewage disposal system approved by the Ohio Environmental Protection Agency.

251. Great Lakes Commission. 1973. Operation Foresight provides defense against flooding in many lakeshore communities. Great Lakes News Letter. Ann Arbor, Mich. 18(1):4.

"Operation Foresight" was organized by the Army Corps of Engineers to aid Great Lakes communities in providing temporary protection against flood damage. This includes a dike construction program.

252. Great Lakes Commission. 1973. Shipbuilding projects adding substantially to U.S. lake fleet cargo capacity. Great Lakes News Letter. Ann Arbor, Mich. 17(5):4.

U.S. Great Lakes shipyard construction projects for 1973 will increase the carrying capacity of the lake fleet by approximately 150,000 gross tons. The bulk carriers added on Lake Erie ports are listed below.

VESSEL NAME	COMPANY	SHIPYARD	CAPACITY
William P. Roesch	Kinsman, Marine	Lorain	19,500
Roger M. Kyes	American Steamship	Toledo	26,200
Paul Thayer	Kinsman Marine	Lorain	19,500
(Hull 102-barge)	Litton Gr. Lakes	Erie	53,000

253. Great Lakes Commission. 1973. Some new movements in the Lakes coal trade. Great Lakes Newsletter. Ann Arbor, Mich. 17(5):3.

A new development occurred in the lakes coal trade with the first overseas import of these fuel in mid-June. The cargo was carried from W. Germany to the Bethlehem Steel plant near Buffalo, N.Y. aboard the British vessel, Vancouver Trader. A second cargo arrived at the end of the month.

254. Great Lakes Commission. 1974. Anglers set new state records in four Great Lakes during 1973. Great Lakes News Letter. Ann Arbor, Mich. 18(3):6.

Lake Erie accounted for a new Pennsylvania species record with the landing of a 34 1/2 inch chinook salmon weighing 16 pounds, 2 ounces, a 28 3/4 inch coho (6 pounds 4 ounces) and a 33 1/3 inch rainbow trout weighing 10 1/4 pounds, as recorded in the Pennsylvania state fish records.

255. Great Lakes Commission. 1974. 1974 Fish stocking in the Great Lakes scheduled to exceed 22 million. Great Lakes News Letter. Ann Arbor, Mich. 18(4):5.

Under Michigan's Metro Fishing Plan, chinook smelts and young steelheads were released in the upper Detroit River and Western Lake Erie.

256. Great Lakes Commission. 1974. For the record... A statistical profile of the Great Lakes. Great Lakes News Letter. Ann Arbor, Mich. 18(3):7.

A table gives statistical information on the Great Lakes including Lake Erie commerce (net tons) which was 2,297,582 for December 1973; 1,694,946 for December 1972; 34,100,929 for the 1973 season, and 3,800,979 for the 1972 season.

257. Great Lakes Commission. 1974. For the record... A statistical profile of the Great Lakes. Great Lakes News Letter. Ann Arbor, Mich. 18(4):7.

A table gives statistical information on the Great Lakes including Lake Erie commerce (net tons) which was 929,530 in March 1974; 1,040,036 in Jan.-March 1974; and 925,919 in Jan.-March 1973. Also included is a table which gives the first overseas vessel calls for the 1973 season.

258. Great Lakes Research Institute and the Institute on Man and Science. 1971. The Lake Erie Congress, First Session. The Great Lakes Research Institute, Erie, Pa. pp. 1-38, A-1 to E-1.

This report consists of recommendations for the economic, aesthetic and physical improvements of Lake Erie.

259. Great Lakes-St. Lawrence Seaway Winter Navigation Board. 1972. Winter Navigation Seminar. Great Lakes-St. Lawrence Seaway Winter Navigation Board. Detroit, Mich. Proc. 238 p.

This volume contains the minuted of a two day seminar in which various government agencies and industries and other interested parties discussed different aspects of winter navigation on the Great Lakes and St. Lawrence Seaway. Economic data pertaining to commercial shipping is included.

260. Great Lakes-St. Lawrence Seaway Winter Navigation Board. 1973. First annual report of the Great Lakes-St. Lawrence Seaway Winter Navigation Board. Detroit, Mich. 100 p.

This is the first of three year end reports to be prepared on demonstrated activities to facilitate commercial vessel operation into the winter months on the Great Lakes and St. Lawrence Seaway. This study shows that engineering feasible measures can provide an extension of the navigation season which is environmentally and economically acceptable.

261. Greater Cleveland Growth Association. 1971. The Lake Erie International Jetport project. Cleveland, Ohio. 30 p.

Report on the proposed offshore (Lake Erie) international jetport near Cleveland, Ohio. The author states that the jetport will revitalize the economic life of the whole region. The plan calls for a new lakefront for Cleveland, with parks, recreational beaches, harbors, and new residential and commercial facilities. The jetport can create 40,000 jobs and another 30,000 in the surrounding area. Projected costs reviewed and recommendations made. (CCIW)

262. Great Cleveland Growth Association. 1971. A new approach to the Cleveland/Northeastern Ohio region, the Lake Erie International jetport project. Cleveland, Ohio. 214 p.

This report presents the results of a study sponsored by the Cleveland Growth Association to evaluate the feasibility of an international jetport in Lake Erie adjacent to Cleveland, Ohio. The study consists of the reports of four committees: environmental, engineering, finance, and legal and governmental affairs.

An international jetport in Cleveland would affect not only the economy of the City of Cleveland, but a much wider area as well. For the purpose of these studies, three economic regions have been defined and the relationship of the jetport to these regions will be discussed. These regions are: The Cleveland Standard Metropolitan Statistical Area (SMSA); the sixteen-county Northeast Ohio region; and a region extending in a 200 mile radius from Cleveland.

The proposed Jetport in Lake Erie is expected to accommodate 46,000,000 passengers by 1996. The impact on the existing and proposed transportation system was analyzed, and the required improvements, with probable cost ranges were recommended.

263. Greeley, John R. 1928. Fishes of the Erie-Niagara Watershed. In: A Biological Survey of the Erie-Niagara System. N.Y. Cons. Dept. Suppl. 18th Ann. Rept. 1928. pp. 150-163.

This article postulates of the 116 species found in Lake Erie, 36 are economically important and are used either in commercial fisheries or by sport fishermen. Regulations set forth by N.Y. State are mentioned here also. Stocking measures are also given in here also. Stocking measures

are also given in order of species stocked. The problem of conservation is considered both an interstate and international one. The following suggestions are made:

1. If it is proved by analysis of full statistics of catches that a desirable species is decreasing with or without artificial propagation, give this species protection during the spawning season.

2. Such areas as are proved to be spawning grounds of fish or rearing areas for young fish should be kept free from pollution.

3. All conservation measures as to fishing seasons, size limits, method of capture and the like should be based on careful study and should be adopted for the entire area by joint action.

264. Greeley, John R. 1956. The lamprey in N.Y. waters. Conservationist. 11(1):18-21.

Reference to Lake Erie, the most productive of the Great Lakes, and the sea lamprey. Article states that the commercial fisheries of Erie have not been affected by the introduction of the lamprey through the Welland canal. (SM)

265. Greeley, John R. 1961. Our stake in the Great Lakes fisheries. The N.Y. State Conservationist. Albany, N.Y. 16(3):14-16.

This article presents Lake Erie as a phenomenal bonanza; a resource of great value in recreational and commercial fishing. Discussion is made of the different varieties of fish and changes in population. Stabilization and projections are discussed. (SM)

266. Green, Fred W. 1968. Green's Great Lakes and Seaway Directory, Inc. 1908-1968 Edition. Cleveland, Ohio. 240 p.

This directory describes the facilities available on the Great Lakes, including the major ports: Buffalo, Lorain, Toledo, Erie, and Cleveland, and others. Addresses of companies are given as well as statistical information concerning tonnage, types of cargo, distances, maps of ports, ore and coal exchange, corn exchange, and advertisements from various companies concerned with Great Lakes commercial shipping. Included also are various vessels,

the country of their origin, the types of cargo that they handle, and the amounts handled in previous years up to and including 1968.

267. Green, Seth. 1876. Propagation of fish. Trans. Am. Fish. Cult. Assoc. 5:8-13.

A plan to place 8,000,000 whitefish in Lake Erie is mentioned. It is felt that Lake Erie would be restocked in four years if this were done. (BU)

268. Greene, J. J. 1970. Keys to a Continent: The Great Lakes Dept. of Energy, Mines and Res. Ottawa, Ont. 29 p.

This article describes the history of the Great Lakes and mentions some of the developments in Lake Erie concerning commercial fishing and Canadian-U.S. legislation.

269. Gross, Richard. Undated. A program for the Great Lakes. Environmental Quality News. pp. 11, 111.

The article deals partially with Lake Erie and the involvement of government agencies, citizenry and industrial leaders and their interaction in regards to planning, development and protecting the resources on the Great Lakes under the Sea Grant Program.

270. Gunn, William W. H. 1963. Bird finding in Ontario--Part I. Canadian Audubon. Toronto, Ont. 25(5):159-166.

This article provides a guide to areas for bird watching and camping. Emphasis is on species of birds and their location. Bird sanctuaries and national parks along the northern shore of Lake Erie are listed. (SM)

271. Gunn, William W. H. 1964. Bird finding in Ontario--Part II. Canadian Audubon. Toronto, Ont. 26(1):18-23.

A review of parks and bird sanctuaries that are excellent bird watching areas. Emphasis is on species of birds and their location. (SM)

272. Hale, Katherine. 1937. This is Ontario. Toronto, Ont. 241 p.

Segments of this book discuss the ports of call on Lake Erie and the sights of economics in full swing at this point in time. Descriptions of areas on route to certain destinations are given. (SM)

273. Hall, Albert G. 1961. Small game season 1961, big game season 1961. The N. Y. State Conservationist. Albany, N. Y. 16(2):12-14.

In this article all counties of New York are delineated with general hunting regulations given. The counties bordering Lake Erie can be noted. (SM)

274. Hall, Charles M. 1955. Buffalo, a world port. Buffalo, N. Y. Buffalo. 30(7):40-41.

Buffalo, long one of the great inland ports of the world is rapidly preparing to become a world port with the opening of the St. Lawrence Seaway. A city survey, recently completed, resulted in recommending a $26,900,000 program of harbor development. (BU)

275. Hall, Charles M. 1958. A salute to the U. S. Corps of Engineers. Buffalo, N. Y. Buffalo. 33(4):13-17.

The Army Corps of Engineers, Buffalo District belong to the North Central Engineering Division, which is responsible for the area from Sandusky, Ohio to Messena, N. Y. Specific projects on Lake Erie carried out by the Buffalo District include the Beach Erosion Project at Presque Isle, Pa. At present, (1958) they are working on enlarging the Buffalo Harbor. (BU)

Haras, W. - See: J. P. Coakley, et al, No. 154.

276. Harris, Wayne M. 1971. The greatest hazard. Echo Issues. Environmental Clearing House Organization. Buffalo, N. Y. 1(5):1,2.

This article deals with a nuclear pollutant released from the Cattaraugus Creek area. These lethal dosages of radioactivity are shielded by 3 physical barriers to prevent reaching the public. Utilities and government versus public responsibility toward these hazardous conditions produced by man within the environment are cited.

Hartman, Wilbur L. - See: H. A. Regier, No. 571.

277. Hartman, Wilbur L. 1970. Resource crisis in Lake Erie. The Explorer. 12(1):6-11.

Traces the history of Lake Erie's increasing pollution-sources and degree. Also follows the history of the effects of pollution, especially the impact on commercial quality fish. Graphs and illustrations show the decline of quality fish and the rise of trash fish.

278. Hartman, Wilbur L. 1973. Effects of exploration, envirionmental changes, and new species on the fish habitats and resources of Lake Erie. Great Lakes Fishery Commission, Tech. Rept. 22, pp19-34.

This article shows the variations in catch of available resources of fish dating from the early 1800's until now by commercial fisheries on Lake Erie in relation to their depletion and in some cases, extinction.

279. Harward, Marion. 1970. Canada Centre for Inland Waters. Canadian Audubon. Toronto, Ont. 32(3):92-94.

This article discusses the role and responsibilities of the Canada Centre for Inland Waters (CCIW). Specific reference to the Centre and research done on Lake Erie pollution are given. (SM)

280. Haskins, Caryl P. 1972. Great Lakes water treaty signed. Science. 176(4033):390.

Reference to Great Lakes Water Quality Agreement; a joint Canada-U. S. pact designed to protect and resuscitate a shared environmental resource. The agreement calls for the reduction of pollution in Lake Erie and the other Great Lakes.

281. Haskins, Robert F. 1969. Case study: U. S. Army Corps of Engineers Great Lakes dredging controversy. Univ.of Wis., Madison. 36p.

The U. S. Army Corps of Engineers, through the Rivers and Harbors Acts, has been delegated the responsibility, by Congress, for improving and maintaining harbors and waterways on the Great Lakes. The need for maintenance dredging arises primarily because the harbors of the Great Lakes are located predominantly at the mouths of rivers flowing into the lakes. Over the past few years, the Great Lakes region has experienced a tremendous growth in population and industrialization. Along with the growth, the waters flowing through the harbors have received increasing pollution loads. In the past, these pollutional loads received various degrees of partial treatment or no treatment at all. As a result, most, but not all, of the material dredged at the commer-

cially more important harbors have been contaminated by pollutants from municipal, industrial, or agricultural sources.

282. Hatcher, Harlan. 1945. Lake Erie. Bobbs-Merrill Co., New York. 416 p.

Concerns the history of Lake Erie from the early 1700's. Settlement of the Erie Basin, development of waterborne commerce, growth of cities, and economic development of the area surrounding Lake Erie are discussed. History of canals dug, storms, shipping hazards and their influence on trade are mentioned. Fishery fluctuations are reported and shoreline destruction due to natural causes is described. (BECPL)

283. Hatcher, Harlan and Erich A. Walter. 1963. A pictorial history of the Great Lakes. Crown Publishers Inc., N. Y. 344 p.

This book is an illustrated account of the discoverers, pioneers, founders of cities, builders, merchants, industrial and railroad giants, bridge and canal engineers, political and social leaders; all the people who made the land are covered as well as the ships, farms, locks, canals, railroads, the ports and the cities.

284. Havighurst, Walter. 1943. The long ships passing, the story of the Great Lakes. MacMillan Co. New York, N. Y. 291 p.

This entire book is devoted to the historical founding of the Great Lakes commerce and development. Various produce and the beginning seaports are named. (SM)

285. Henderson, James M. 1969. Critical review and synthesis. In: Proceedings of the Fourth Symposium of Water Resources Research, Ohio State Univ. pp. 111-115.

Various economic models are reviewed which project the values of economic models into the future in order to gain knowledge about the potential effects of deteriorating water quality upon economic activity within the Lake Erie region. Pollution is an economic problem to a large degree. There would be no pollution if its avoidance were not costly.

286. Hendrickson, John F. 1972. A review of the role of the International Joint Commission in the Great Lakes. In: Proceedings of the First Federal Conference on the Great Lakes. Interagency Committee on Marine

Science and Engineering for the Federal Council for Science and Technology. Washington, D. C. pp.315-319.

The International Joint Commission and its role in Canada/U. S. relations concerning environmental control of international waters. Niagara River and Lake Erie are discussed with reference to water quality, pollution control, health hazards, property damage, etc. The Boundary Waters Treaty (1909) made provisions for the rights and responsibilities of Canada and U. S. concerning international waters.

287. Hennigan, P. E. 1962. The looming water crisis. The N. Y. State Conservationist. Albany, N. Y. 17(2):12-13.

This article deals with water as treasure. Lake Erie and the metropolitan areas are mentioned with their competition for water use. (SM)

Hessel, Darryl L. - See: Richard M. Davis, et al, No. 169.

288. Hester, F. E. 1972. Great Lakes alternative futures and impact on research. In: Proceedings of the First Federal Conference on the Great Lakes. Interagency Committee on Marine Science and Engineering for the Federal Council for Science and Technology. Washington, D. C. pp. 39-43.

Reference to Lake Erie illustrates a need for regional water quality protection plans encompassing all of the Great Lakes rather than state wide or even lake wide programs.

289. Higgins, Elmer. 1928. Cooperative fishery investigations in Lake Erie. Sci. Mon. 27:301-306.

States that the chief value of the fisheries of Lake Erie is economic. A valuable source of food and a valuable source of profit to the producers and distributers in the fishing industry. Sport fishing is mentioned. The article stresses the need for state and federal funds along with cooperative efforts to maintain quality fish in the lake.

290. Hile, Ralph. 1962. Collection and analysis of commercial fishery statistics in the Great Lakes. Great Lakes Fishery Commission, Tech. Rept. 5. 31 p.

Contains statistics concerning fish catch and a reference to modifications of fishery regulations in Lake Erie, where many size limits have been lowered or eliminated and regulations on

mesh size eased or dropped altogether.

291. Hill, Gladwin. 1965. The great and dirty lakes. Saturday Review. 48:32-35.

Lake Erie's pollution problem is a preview of what awaits all the lakes if pollution is not stopped. Municipal and industrial wastes from the upper Great Lakes help contaminate Lake Erie, along with the urban areas on Erie's shore (Detroit, Toledo, Erie, Cleveland, Buffalo). State and federal pollution control programs are reviewed.

292. Hiney, Robert A. 1969. Optimum regulation of the levles of the Great Lakes. Internat. Assoc. Great Lakes Res. Proc. 12th Conf. Great Lakes Res. pp. 449-467.

The article mentions Lake Erie in relation to property, navigation, and power on a comparative analytic basis in regard to evaluating losses in these areas according to lake level regulation.

Horst, T. J. - See: F. J. Little Jr., et al, No. 344.

293. Horton, John Theodore. 1947. History of Northwestern New York. Lewis Historical Pub. Inc. New York, N. Y. 1:604 p.

This is the first of 3 volumes which gives historical background and growth patterns of Erie County and the adjacent counties on Lake Erie. Details are given on everything from government to agriculture, education, recreation and industry. (SM)

294. Horton, John Theodore. 1947. History of Northwestern New York. Lewis Historical Pub. Inc. New York, N. Y. 2:599 p.

This volume not only gives historical growth but also a political history, industrial development, emminent people of the region, and also city and township growth patterns. (SM)

295. Horton, John Theodore. 1947. History of Northewstern New York. Lewis Historical Pub. Inc. New York, N. Y. 3: 504 p.

This entire book is devoted to the prominent controllers of economic functions within Erie, Niagara, Wyoming, Genesee and Orleans counties. Prominent individuals of the area are listed along with companies that dominate the area. Historical data along with economic progress is given. (SM)

296. Houghton, Frederick. 1908. Indian village camp and burial sites on the Niagara Frontier. In: Buffalo Soc. of Nat. Sci. Bull. 1909. Buffalo, N. Y. 9(3):261-274.

This article gives the account of the indigenous peoples who occupied Erie at the very beginnings of settlement and urban growth. (SM)

297. Hullar, Ted. 1971. Land and greenspace-our human need. Echo Issues. Environmental Clearing House Organization. Buffalo, N. Y. 1(8):1-2.

Land space is vital to a thriving population. Use of land as a refuge and as a springboard for exploitation is stated within this article. Land problems such as urban sprawl, highways and industrial facilities apply in major cities. Among these expanding cities are the Buffalo and Niagara Falls metropolitan areas screened from their precious natural resource-Lake Erie. An approach and position by the Sierra Club is given on specific issues with commentary. (SM)

298. Hunker, Henry L. 1973. Some thoughts on the "best location in the nation." Internat. Assoc. Great Lakes Res. Proc. 16th Conf. on Great Lakes Res. pp. 920-925.

This paper argues that significant changes are occurring within the Great Lakes Region that have implication for resource use and for the region's future well-being. Specifically, certain resources associated with the historical development of the region have experienced changes in value reflecting the changing society. In brief, the paper notes the changing set of values that have impact upon the regions and future of the Great Lakes and the changing economic activities that have important consequences on resources. A reappraisal of the productive factors and environmental conditions that affect regional growth is in order. A product of such reappraisal would lead to re-evaluation of the potential environmental implications inherent in these conditions. This obviously is only an exploratory statement: it seeks to raise questions; it provides relatively few answers.

299. Hutchison, Jay G. 1973. Lake Erie diary: an intimate look by canoe. Limnos. 5(4):18-21.

This is the personal observations of the author as he traveled on Lake Erie by canoe. Comments about water quality, sediment,

euthrophication, and the animal life are included. The author concluded that Lake Erie is not dead, but seriously ailing.

300. International Joint Commission. 1970. Pollution of Lake Erie, Lake Ontario, and the international section of the St. Lawrence River. I.J.C. Washington, D. C. 174 p.

This article deals in depth with pollution in Lake Erie, including the political and economic aspects.

301. International Joint Commission. 1971. Pollution of Lake Erie, Lake Ontario, and the international section of the St. Lawrence River. I.J.C. Washington, D. C. 105 p.

Lakes Erie and Ontario, being the smallest of the Great Lakes, are more sensitive and responsive to pollution pressures brought about by the activities of man. The report investigates pollution problems and their sources (municipalities, industries, commercial vessels, pleasure crafts, oil drilling operations). The effects of pollutants on the environment are reviewed along with jurisdictional and legal problems. Remedial measures are proposed to control further deterioration of Lake Erie. (CCIW)

302. International Joint Commission. 1973. Great Lakes water quality annual report to the International Joint Commission. Great Lakes Water Quality Board. Washington, D. C. 315 p.

A general description of the present water quality of the various bodies of water in the Great Lakes drainage system permits an evaluation of compliance with the objectives set forth in the Great Lakes Water Quality Agreement. The various lakes and connecting channels are described in turn in hydrologic sequence beginning with Lake Superior. The descriptive material for each body provides a summary of the water quality parameters and highlights of waste loading and areas of non-compliance. A complete compendium of water quality and data on direct discharge of waste load is provided as a separate appendix to the report and is available upon request.

303. International Lake Erie Water Pollution Board. 1969. Potential oil pollution incidents from oil and gas well activities in Lake Erie. I. J. C. Washington, D. C. 163 p.

The potential for incidents of oil pollution in Lake Erie, includes, but can by no means be limited to oil and gas well

exploration and development. Other potential sources which pose possibly greater threats are the significant tonnages of oil in ship's fuel bunkers, industrial spills, and the continuing discharge of oils in municipal and industrial effluents. Oil and gas well explorations have been conducted in the Canadian waters of Lake Erie since 1913 without serious pollution incident. It is recognized, however, that if drilling is extensive, accidents may result. To minimize pollution from this source and its effects, comprehensive oil and gas well drilling regulations providing lake-wide compatability and including effective pollution control provisions and surveillance are required. In addition, emergency standby arrangements are required to protect Lake Erie's valuable resources from the effect of spills of oil or other hazardous materials.

304. International Lake Erie Water Pollution Board and the International Lake Ontario-St. Lawrence River Water Pollution Board. 1969. Pollution of Lake Erie, Lake Ontario, and the international section of the St. Lawrence River. I.J.C. Washington, D.C. Vol. 1. Summary. 150 p.

This report is a study of pollution of Lake Erie, including the costs of pollution, both recreational and industrial.

305. International Lake Erie Water Pollution Board and the International Lake Ontario-St. Lawrence River Water Pollution Board. 1969. Pollution of Lake Erie, Lake Ontario, and the international section of the St. Lawrence River. I.J.C. Washington, D.C. Vol. 2. Lake Erie. 316 p.

This article discusses some of the uses of Lake Erie including the commercial fishing, economic, recreational and social aspects.

International Lake Ontario-St. Lawrence River Water Pollution Board - See: International Lake Erie Water Pollution Board, Volumes 1 and 2. No. 304, 305.

306. International Waterways Commission. 1910. Report of the International Waterways Commission on the regulation of Lake Erie with a discussion of the regulation of the Great Lakes system. Washington, D.C. 169 p.

The report defines the duties of the International Waterways Commission in reference to the regulation of Lake Erie. The emphasis is on regulation of Erie's water level with a review of waterborne traffic, transportation, proposed engineering projects, and a discussion of the advantages and disadvantages of lake level regulation. Effects of such a program on the

low-lying shores of Lake Erie are presented. (BECPL)

307. International Waterways Commission. 1915. Report of the International Waterways Commission upon the international boundary between the Dominion of Canada and the United States through the St. Lawrence River and the Great Lakes. Ottawa, Ont. 886 p.

This report describes the United States/Canada boundary, which goes through the center of Lake Erie, including the exact geographical measurements of the line. (BECPL)

The Institute on Man and Science - See: The Great Lakes Research Institute, No. 258.

308. Jackson, John N. 1967. Recreational development and the Lake Erie shore. Niagara Regional Development Council. St. Catherines, Ont. 240 p.

A comprehensive study concerned with recreation, and in particular with recreation along the Ontario shoreline of Lake Erie from Fort Erie to Port Dover. Its purpose is to achieve responsible action by government to remedy a sad and deteriorating situation. The author hopes to influence a wider audience of those persons interested in the present condition and future form of our living environment, because the problems described are symptomatic of a more extensive area. (CCIW)

309. Jaske, T. R., C. E. Raines, N. L. Drobny, W. A. Reardon and C. C. Catant. 1971. Technical-economic analysis. In: F. A. Butrico, C. J. Touhill and I. L. Whitman. (Eds), Resource Management in the Great Lakes Basin. Heath and Co. Lexington, Mass. pp. 10-18.

This article describes mathematical models to simulate methods of resource utilization in the Great Lakes Basin. (BECPL)

310. Jobes, Frank W. 1952. Age, growth, and production of yellow perch in Lake Erie. U.S. Dept. Interior. Washington, D.C. Fish. Bull. 70. 266 p.

The annual production of yellow perch from the United States waters of Lake Erie fluctuated about an average of 3 million pounds in the early (1885-99) period of the fishery. The average declined to about 2 million pounds in 1900-1927, increased to over 7-1/2 million pounds in 1928-35, and fell to about 2-1/2 million pounds in 1936-47. There was a definite tendency for the variability in annual production to increase in each succeeding period except the most recent one (1936-47). The trend in average annual production from the Ontario waters was similar to

that in United States waters only in the last two periods, 1928-35 and 1926-47. The factors of fishing intensity (increases in the number of nets, and improvements in nets, boats, and methods of lifting gear), changes in fishery laws and the administration of the laws, and abundance were considered in evaluating both the long- and short-period trends in the annual production of Lake Erie yellow perch.

311. Johnson, Edwin L. 1968. Economics of water quality management. J. Am. Water Works Assoc. 60(10): 1122-1128.

This article makes reference to Lake Erie concerning the preservation of the lake's recreational facilities.

Kane, R. K. - See: N. J. Campbell, No. 130.

Karr, M. H. - See: S. E. Goldstone, et al, No. 232.

312. Keller, Myrl. 1965. The winter fishery of South Bass Island with a census or the 1963 catch. Ohio J. Sci. 65(6):327-334.

The winter hook and line fishery of the South Bass Island area has contributed phenomenal catches to the angler over the years. This fishery operates on a sport and commercial basis. From 1900 to the early fifties the fishery operated primarily on a commercial basis and was of sufficient magnitude to be of importance to the regional economy.

313. Kennedy, W. A. 1956. Current fisheries research by Canadians on the Great Lakes. Trans. Am. Fish. Soc. 86:419-423.

The author mentions that the lamprey has been studied in Lake Erie by examining the commercial fish catch through joint effort of the U. S. and Canada.

314. Kesser, William N. 1932. Buffalo, leader in industry . In: Otto Retter (Ed.), Pictorial Buffalo and Niagara Falls and Surroundings. Buffalo, N.Y. pp. 204-231.

Of economic interest here are population growth, power production, resources and transportation. (SM)

315. Kettaneh, Anthony. (Ed.). 1971. Troubled waters, Lake Erie 1971. Social Technology Systems, Inc. Prepared for The Lake Erie Congress. Great Lakes Res. Inst. Erie, Penn. pp. 12-49, 58-84, 89-121.

Section 1 consists of an interview with 4 biologists. Specific statements were made on human influence on Lake Erie's ecosystem. Man-made pollutants (esp. industrial and agricultural) have decreased commercial value of fish. Statements were also made on water quality and public health. Public education was considered a necessary factor to instigate more pollution controls for Lake Erie. Cost limitations of pollution control programs are given. Legal and political (Canada/U.S.) difficulties are discussed (eg. litigations against polluting companies and Supreme Court decisions). Section 2 consists of pesticide contamination and the effect on fish for commercial use. Accelerated eutrophication of Lake Erie has placed restrictions on recreation and commercial and sport fishing. The increased bacteria level also restricts lake use (especially recreational). Institutional, economic and political factors affecting Lake Erie pollution abatement are summarized.

316. Kisicki, Donald R. 1973. Environmental management of the Great Lakes international boundary areas. Great Lakes Management Problems Series. New York Sea Grant Program. Albany, N.Y. 301 p.

This report evaluates and discusses the governmental structures of the United States and Canada on the northeastern end of Lake Erie.

317. Korkigian, Ira M. 1970. Physical factors of Lake Erie. In: The Environmental Problems of the Lake Erie Basin. Carroll Business Bull. Cleveland, Ohio. 10(1):7-10.

The article emphasizes that Lake Erie is aging and the process is being accelerated by man's damage already done. Man should admit his guilt and begin to correct the abuse of Lake Erie.

318. Kuh, P. G. 1966. Cleaning up the Great Lakes: How to do the job. Univ. Mich. Great Lakes Res. Div. Proc. 9th Conf. Great Lakes Res. Pub. 15: 446-450.

Two aspects of the Federal program for water pollution abatement are emphasized-enforcement and comprehensive water quality programs - and the ways in which they work together. With proper leadership and with widespread support from the community, this joint effort promises to make the Great Lakes a sensational demonstration ground of farsighted management to preserve water resources. A brief history is given of the legislation enacted to provide Federal assistance for the task of finding, developing and maintaining suitable water quality throughout the United States. The enforcement provisions of the Water Quality Act of 1965, which

amends the Federal Water Pollution Contorl Act are explained. The four enforcement actions on the Great Lakes are sketched: one on the Michigan waters of Lake Erie, one on the Cleveland of Lake Erie, one on the Buffalo area of Lake Erie and one on the southern end of Lake Michigan. New solutions pioneered in the Great Lakes cases have been criteria for maximum allowable concentrations of pollutants that damage water quality.

319. Lamar, William. 1953. Chemical and physical quality examination. In: Lake Erie Pollution Survey, Final Report. Ohio Dept. Nat. Resources. Div. Water. pp. 81-123.

Chemical and physical studies are necessary to evaluate water conditions and to propose remedies. Such information is valuable to the general public who are interested in clean water, recreation, hunting, fishing, wildlife, and to the chemist, engineer, hydrologist, and industrialist. The article mentions the economic benefits that can be realized from a well managed unpolluted water resource. (CCIW)

320. Lampe, Lois. 1950. The origin and development of the the Ohio State University with special reference to biological sciences. Ohio J. Sci. 50(5):201-204.

This article describes the many departments of the Ohio State University, including the Franz Theodore Stone Institute of Hydrobiology, located at Put-In-Bay, Ohio. (BU)

321. Landis, Henry. 1968. Legal control in Canada of pollution in the Great Lakes Drainage Basin. In: Proc. of Great Lakes Water Resources Conf. Eng. Inst. Canada and Am. Soc. Eng. Toronto, Ont. pp. 155-200.

The author feels that the most complete constitutional basis for legal control in the field of water management for the Great Lakes Basin, with regard to prevention and abatement of pollution, should be provincial, rather than federal since the legal controls in and for the Great Lakes Basin affects primarily only the people of the province of Ontario.

322. Lane R. K. 1970. Waste heat inputs to the Great Lakes of North America. Proc. Internat. Water Conserv. Conf. 1970. Jonkoping, Sweden. pp. 6/43-6/54.

The Canada Centre for Inland Waters is a recently established

federal centre for studies of Canadian inland waters, in particular, the many and varied lakes of Canada. One of our first tasks has been to appraise the existing and potential effects of thermal inputs to the Great Lakes under conditions now,and as they many be expected to be by the year 2000. The Great Lakes Basin is a centre of existing and developing industrial and urban growth in North America. By 2000, a population in excess of 50 million is anticipated in the Great Lakes Basin. Concern about the effects of this growth upon the already deteriorated water quality of the Great Lakes has prompted much discussion and planning by governments in both the U. S. and Canada, particularly in connection with eutrophication.

323. Langford, G. B. 1961. The Canadian Great Lakes research program. Univ. of Mich. Great Lakes Res. Div. Proc. 4th Conf. Great Lakes Res. Pub. 7:199-201.

Research work needed in the Great Lakes is of the same magnitude as of the oceans because the lake waters must be studied and surveyed in greater detail than the oceans. All the work done on the lakes must be done on a continuing basis for not only must the many processes causing changes be understood, but corrective measures must be devised and implemented. The work in the Great Lakes requires ships, shore establishments, equipment, and personnel comparable to oceanographic work. This article discusses some of the work of this nature done at the Great Lakes Institute of Canada. (RL)

324. Langford, G. B. 1964. The Great Lakes study group. Univ. Mich. Great Lakes Res. Div. Proc. 7th Conf. Great Lakes Res. Div. Pub. 11: 15-18.

The article describes the Great Lakes Study Group and the cooperative organizations which are involved with the environmental problems of the Great Lakes. The group was originally known as the Lake Erie Study Group because its first concern was to deal with the plan of the U. S. Public Health Service for their operations in Lake Erie.

Langlois, Marina Holmes - See: Thomas Huxley Langlois, No. 332.

325. Langlois, Thomas H. 1945. Ohio's fish program-a guide for best use of the buckeye state's renewable resources of fishes. Ohio Dept. of Agriculture. Div. Cons. and Nat. Resources. Columbus, Ohio. pp. 5-40.

This article discusses problems confronting the promotion and

and management of quality fish in Lake Erie. Problems include regulation of differences among states (Ontario Province), commercial reluctance to comply with regulations, state and federal financial limitations, and pollution control.

326. Langlois. Thomas H. 1949. The biological station of the Ohio State University. Ohio State Univ. The Franz Theodore Stone Library. Put-in-Bay, Ohio. 64 p.

This booklet presents a history of the biological station of the Ohio State University including its past and present directors, and the type of work that is done there at the time of publication(1949).

327. Langlois, Thomas H. 1953. Biological studies of the Lake Erie pollution survey. In: Lake Erie Pollution Survey, Final Report. Ohio Dept. Nat. Resources. Div. Water. pp. 124-188.

This article is a report on the biological system of Western Lake Erie. Industrial pollution is responsible for the decline of recreational facilities, sport fishing, and the scenic beauty of Lake Erie especially near its tributaries. Human health is threatened by the combined effects of municipal and industrial pollutants dumped into Lake Erie and its tributaries. (CCIW)

328. Langlois, Thomas H. 1954. The Western End of Lake Erie and its Ecology. J. W. Edward, Inc. Ann Arbor, Mich. 479 p.

This book gives an in-depth study of Lake Erie and its environmental pressures. It discusses to a great length the fisheries of Lake Erie and their recreational and commercial value. (SM)

329. Langlois, Thomas H. 1964. Lake Erie: Progress towards disaster. In: J. R. Dymond. (Ed.), Fish and Wildlife. Longmans Canada Limited. Toronto, Ont. 9 p.

The conversion of water areas to land and land areas to water, has adversely affected the economy of the Lake Erie region. Proposals are made that would facilitate shore-line stabilization, fish management, and lake transportation.

330. Langlois, Thomas H. 1965. Early Lake Erie survey. Explorer. Cleveland, Ohio. 7(1): 24-25.

This article depicts a group of travelers across Lake Erie during the 1750's. Recommendations for farmers and settlement are given by French engineers. (SM)

331. Langlois, Thomas H. 1967. Lake Erie despoiled. Echoes. Colombus, Ohio. 6(9): 1-3.

Reference is made to urbanization around Lake Erie and domestic-industrial waste products which are promoting lake eutrophication. Lake Erie at its prime produced more tons of commercial fish than all other Great Lakes combined.

332. Langlois, Thomas H. and Marina Holmes Langlois. 1948. South Bass Island and islanders. Ohio State Univ. The Franz Theodore Stone Laboratory. 139 p.

Methods have been developed for promoting the welfare of young bass in a rearing pond, as an aggregation, by avoiding the conditions which lead to predatism. Methods have been developed also for making analyses of bass populations so as to discover the nature of the social organization present at any time a sample is taken, and a system of making post-seasonal analysis was evolved as a means of checking the effectiveness of the methods used in promoting the group welfare. This study of the human population on South Bass Island is an attempt to apply this system of analysis to people. It involves a study of the history of past relationships of the people to their complete environment, including each other, and it considers the relationships found at the present time. Since this study parallels an earlier study of bass, a resume of the fish report is presented first.

333. Laning, Paul F. 1972. Sandusky and Cleveland-railroad rivals in the 1850's. Inland Seas. 28(3):189-195.

Sandusky and Cleveland both were important ports on Lake Erie which competed for the flow of passenger and freight traffic from Dunkirk and Buffalo. This article presents a history of the railroad development in these areas. (CCIW)

Lawhead, Harley F. - See: Charles F. MacNish, No. 353.
Thomas M. Paterson, No. 544.

334. Lawrence, W. Mason. 1954. The Great Lakes fisheries. The Conservationist. 9(3): 12-13.

The importance of the Treaty on Great Lakes Fisheries, signed by U. S. and Canada (1954), was discussed. The treaty provides for joint action by the two countries in fishery research and control of the sea lamprey. Lake Erie is a noted food producer; in 1952, the New York waters of the lake yielded over 500,000 pounds of fish valued at $170,000 wholesale. (SM)

335. Lawrie, A. H. 1970. The sea lamprey in the Great Lakes. Trans. Am. Fish. Soc. 99(4):766-775.

The introduction of the sea lamprey to Lake Erie through the Welland Canal, has led to the collapse of the lake trout which was the mainstay of the fisheries.

336. League of Women Voters. 1966. Lake Erie; requiem or reprieve. Buffalo, N. Y. 50 p.

Emphasis is made on the decline of Lake Erie as a natural resource due to man-made pollutants. The Lake Erie region is an agricultural, industrial, commercial and recreational center. Reports on the demands for water quality requirements, wastes from the land, navigational wastes, and federal and state clean up programs are included. Resort, recreation, and wildlife resources have diminished due to the degradation of Lake Erie. (BECPL)

337. League of Women Voters. 1971. Communication from Lake Erie Basin Committee. ECHO Issues. Buffalo, N.Y. 1(4):3.

This article discusses the passage of funds for renovation and use by the Great Lakes Laboratory situated at the eastern end of Lake Erie. The value of the laboratory facilities to the geographic region is emphasized.

338. Lee, T. R. 1971. Perception of goals in the management of water quality of the Great Lakes. Inland Waters Branch. Dept. Env. Burlington, Ont. pp. 121-124.

Management of resources has changed from concern over economic growth to an interest in maintaining and bettering the quality of the lakes. This article discusses this concept in terms of current resource management of the Great Lakes, including pollution legislation on Lake Erie.

339. Lee, T. R. 1971. Water use in the Great Lakes Basin. Canadian Geographical J. 82(6):200-205.

This article draws attention to the most important fresh water resource in America; the Great Lakes. Plentiful use is made of the water by the urban industrial system in both Canada and the U. S. Importance is placed on management of the lake and its water use. (SM)

340. Lee, T. R. 1972. Water use, water quality and regional economic development in Ontario. In: Canada Centre for Inland Waters, Collected Reprints Vol. 5. Reprinted from: Conf. Papers. Oceanology Internat. 72. Brighton, England. pp. 447-451.

This paper discusses the management problems of the Great Lakes. Emphasis is made on the Province of Ontario and its increasing water resource demands due to population and economic activities. It can be anticipated that Lake Erie, the weakest link in the Great Lake system, will receive increased waste loadings from industry and population. Also reviewed are environmental agencies and their programs for pollution abatement.

341. Lee, T. R. and A. Beaulieu. 1971. A water use map of the Great Lakes Basin. Internat. Assoc. Great Lakes Res. Proc. 14th Conf. Great Lakes Res. pp. 677-680.

There is a great paucity of information on the social and economic role of the water resource. The water use map of the Great Lakes is an attempt to bring together and put into meaningful form a large variety of information on water use from myriad fragmentary sources. The map has been constructed to emphasize the man-water interface. The detailed phenomena shown on the map are all water use phenomena. Significant characteristics of the water resource and social and economic system are shown either by marginal notations or surrogates. The water related activities depicted include waste loads, shoreline use, fisheries, irrigation, thermal loadings and electricity generation. The map is an attempt ot represent the spatial context within which water use problems are contained in the Great Lakes Basin; in essence, the nature of the interaction between the human society in the basin and the water resource.

342. Leopold, Luna B. 1970. Discussion and summary. In: The Environmental Problems of the Lake Erie Basin. Carroll Business Bull. Cleveland, Ohio. 10(1):23-32.

The article consists of proceedings of a panel discussion regarding the pollution of Lake Erie. Topics include: Social and political awareness of the public, pollution from industry, agriculture, municipalities, overfishing, decrease in quality fish catch, and inadequacy of waste treatment plants. Panel members advocate zoning, local education of the public and individual citizen in an effort to reverse the degradation of Lake Erie.

343. Lewis, Donald W. 1969. Some factors associated with the decline of the Lake Erie commercial fishing industry in Ohio. Internat. Assoc. Great Lakes Res. Proc. 12th Conf. Great Lakes Res. pp. 834-841.

The Lake Erie commercial fishing industry in Ohio has been in a state of decline for much of its recent history. The most

useful available indicator of the industry's health, the real value of its catch, reveals that the slide toward depression began in 1943. Factors associated with the decline are economic and, political, as well as biological in nature. Lake Erie's fish populations are dominated by low value species which are poorly suited to the industry's traditional methods. Ohio fishermen compete for the fishery resources of Lake Erie with the commercial fishing industry of Ontario which enjoys substantial labor cost, efficiency, and regulatory advantages, as well as a large and growing sport fishery. The industry suffers form technological stagnation and its industrial structure is dominated by small firms which are not well equipped to overcome its problems. The industry's traditional markets have been successfully invaded by attractively merchandised marine fishery products and fresh-water fish imported from Canada.

344. Little, F. J. Jr., G. F. Bieber, T. J. Horst and D. F. Brown. 1973. Possible accelerated eutrophication thresholds in the Great Lakes relative to human population density. Internat. Assoc. Great Lakes Res. Proc. 16 Conf. Great Lakes Res. pp. 926-933.

Great Lakes data of the 1800's through the mid 1960's were examined using elementary correlation, regression and simple observation. Data included populations, available chemical variables (chloride, total dissolved solids, sulfate and calcium) and fisheries (more sensitive, i.e. trout, whitefish and cisco). Population/km^2 at mean depth yields: (1) highly significant ($r=0.94$, 0.84, 0.87, 0.74, respectively) and more consitent results than population with respect to surface area or volume, (2) a suggestive and significant all- lakes (less Superior) model closely matched by Erie only and (3) inspectionally apparent lower value data "tails" suggesting inflection regions and slope changes, herein designated accelerated eutrophication thresholds(AET). Additionally, AET's presumed on inspection of fishery records agree well as to concentration level among themselves and originally suggested AET's. Lumped and averaged fishery chemoconcentration AET estimates and separate subregressions yield a lumped "95% confident interval" mean AET estimate of 157 ± 41 people resident in a given drainage basin/km^2 at- mean- depth of that lake basin. It is inferred that such conservative variables may well provide better predictors(reflectors) than those currently of primary interest. Should later work substantiate it, this coherent and reasonable image may prove highly significant and contribute strongly toward real ecological engineering.

345. Loeb, Howard A. 1954. Experimental carp control. The N.Y. State Conservationist. 9(1): 10-11.

Reference is made to commercial fishing on Lake Erie and the carp. The economic advantages and disadvantages of an abundant carp population are discussed. (SM)

Long Michael T. - See: Robert L. Schueler, No. 593.

Loucks, A. S. - See: C. F. Barr, No. 84.

346. Luck, Alan. 1967. Lake Erie: a study in research geography. Univ. Oklahoma. Norman, Oklahoma. M. A. Thesis. 79 p.

The article describes economic impact of pollution on commercial fisheries, recreation, municipal water supply, waste disposal, industry, navigation, commerce, tourism, and political boundaries. Discussion of the commercial fisherman linked to his job and the available fish species suitable to market are also given. Recreation and tourists have been cited due to the effect of pollution on them. In addition sewage accumulation and municipal water supply and disposal and population demands are mentioned in regards to water usage. Sewage collection and treatment has been the target of action by local health boards and state legislation. Industry as well recognizes that pollution abatement is necessary, either on its own accord or under government pressure. Commercial navigation units have also been subject to discussion here on their role as an increasing source of pollution.

347. Lydell, Dwight. 1922. Brief notes on fish culture in Michigan. Trans. Am. Fish. Soc. 52:184.

Mention is made of the building of new hatcheries, one to be located in Detroit for the hatching of perch and walleyed pike. (CCIW)

348. Lyng, Thomas (Mrs.) 1971. Village East Aurora's commission for the conservation of the environment. ECHO Issues. Buffalo, N.Y. 1(9):2

The primary objective of the article is the set up and extension of a commission politically involved with wilderness sanctuaries, local health and water along with other occuring environmental problems.

Lyons, Walter A. - See: H. S. Cole, No. 155.

349. Lyon, Walter A. 1968. Water conflicts on Lake Erie. Proc. Great Lakes Water Resources Conf. Eng. Inst. Canada and Am. Soc. Eng. pp. 115-120.

This article describes the abuses of Lake Erie due to industrialization and offers suggestions to combat pollution.

350. MacElwee and Alfred H. Ritter. 1921. Economic Aspects of the Great Lakes-St. Lawrence Ship Channel. Ronald Press Co. New York, N. Y. 286 p.

This publication details improvement of the Great Lakes-St. Lawrence seaway system. At this particular period of time, there was a need for commerce to export and import materials along with the facilities for this to occur. Navigation conditions, length of season and improvements are discussed. Future projections are also made. (BECPL)

351. Mackay, W. R. 1968. Commercial navigation on the Great Lakes. Proc. of Great Lakes Water Resources Conf. Eng. Inst. Canada and Am. Soc. Eng. pp. 89-114.

This paper traces the history of commercial navigation and related developments on the Great Lakes, including specific references to Lake Erie.

352. MacLaren, J. W. , and R. F. Clevenger. 1968. New requirements in water resources management on the Great Lakes. Proc. Great Lakes Water Resources Conf. Eng. Inst. Canada and Am. Soc. Eng. pp. 361-389.

The paper refers to present conditions on Lake Erie and the other Great Lakes, including the complexity and inter-effect of the various uses of the resources. It also includes the type of action that will be required to introduce appropriate planning to permit the optimum development on both sides of the border.

353. MacNish, Charles F. and Harley F. Lawhead. 1968. History of the development of use of the Great Lakes and present problems. Proc. Great Lakes Water Resources Conf. Eng. Inst. Canada and Am. Soc. Eng. pp. 1-48.

This paper discusses the Great Lakes in terms of history, population, and land use area. Lake Erie and its surrounding areas are defined.

354. Management and Economics Research Foundation. 1969. A growth strategy for the Erie-Niagara area. Greater Buffalo Development Foundation. Buffalo, N. Y. 137 p.

The Erie-Niagara (E-N) area has a well established industrial complex with a considerable amount of science oriented industry. Since the resources of the area for such industry are extensive, there is a considerable potential for future development. This was undertaken to provide a basis for a program to develop that potential. Included in this report are many tables relating to educational and industrial aspects of this area. (BU)

355. Marion, A. W. 1950. Program, responsibilities, and problems of the new Ohio Department of Natural Resources. Ohio J. Sci. 50(4):152-163.

This article discusses the role of the Ohio Natural Resources Department, including its responsibility for engaging in projects and lending in co-operation with other agencies engaged in projects for the southern shore of Lake Erie from shore erosion. (BU)

356. Mark, Herman and Richard Gedney. 1972. NASA Great Lakes regional earth observations program. In: Proc. of the First Federal Conf. on the Great Lakes. Interagency Committee on Marine Science and Eng. for the Federal Council for Sci. and Tech. Washington, D. C. pp. 225-229.

The article refers to the Great Lakes shippers who depend on Lake Erie ice condition information provided by vessels such as the Coast Guard Breaker Ojibwa, based in Buffalo, N. Y.

Massaro, Janet - See: Bonnie Phillips, No. 550.

357. Mastin, Mary. 1970. Game fish and the parasite problem. Canadian Audubon. Toronto, Ont. 32(2):59-62.

The article describes parasites that attack fish and the need for the public to share the responsibility in parasite control. Parasites can be unwittingly spread by anglers who empty the remains of their bait can into the lake. (SM)

Mathews, A. P. - See: J. W. Bulkley, No. 123.

358. McCallum, Gordon E. and Leonard B. Dworski. 1964. Great Lakes development program -review and prospectives. Univ. Mich. Great Lakes Res. Div. Proc. 7th Conf. Great Lakes Res. Pub. 11:19-31.

This article discusses various programs for Great Lakes research and includes some of the projects concerning Lake Erie.

359. McCarthy, Richard M. 1971. Money and the environment. ECHO Issues. Buffalo, N.Y. 2(1):3

This article deals with pollution abatement and protection of natural resources. The peril of Lake Erie and the use of detergent phosphates in regard to destruction of water resources is mentioned. Cited here especially are political conflicts encountered in the passing or attempted passing of legislation on environmental protection.

360. McCullough, C. W. 1964. "Darts Dream" opened new era on water front. Buffalo. Buffalo, N.Y. 39(3):36.

This article presents a history of Buffalo's grain elevators, which began in the 1840's and grew to become the worlds largest concentration of grain storing facilities. Automation was introduced to grain housing by Joseph Dart, a Buffalo retail merchant. He built the first successful grain elevator in the world. (BU)

361. McKee, Russell. 1966. Great Lakes Country. Thomas Y. Crowell Co. New York, N.Y. 242 p.

This book deals with the Great Lakes as a valuable resource. A line of historical developments are given along with projections and growth. (SM)

362. McLaughlin, Allan J. 1911. Sewage pollution of interstate and international waters. Hygienic Lab. Bull. 77. Washington, D. C. 169 p.

Emphasis is on the examination of the waters of Lake Erie and its tributaries that are potential sources of typhoid fever. Cities and towns along the shore are reviewed in reference to sewer systems, sources of pollution, potential health hazards and death due to typhoid fever. (BECPL)

363. McNaughton, S. J. 1970. Rising population: Its effect on environment. The N. Y. State Conservationist. 24(6):14-16.

Lake Erie is aging abnormally fast due to waste products from the large population surrounding its shore. Reference is made to the harmful effects of urbanization and industrialization on Lake Erie. (SM)

364. Mead, W. B. and E. H. Brown. 1962. The United States and Canada, A Regional Geography. Anchor Press. London, England. 367 p.

This book is a study of regional problems and the inhabitants. Urbanization and growth is the basic factor of this study. (CCIW)

365. Megerian, E. and R. L. Pentland. 1968. Simulation of Great Lakes Basin water supplies . J. Water Res. Detroit, Mich. 4(1):11-17.

The basic concept utilized in the simulation study is to evaluate statistically the recorded supplies to isolate the two components assumed to constitute the basin water supply: (1) that portion of the supply that is considered random owing to chance interaction of unpredictable meteorological elements, and (2) that portion of the supply that is the result of the persistence due to natural storage in the lakes, soil, bedrock, and snow over the drainage basin. In this study, consideration was also given to the relationship between supplies in neighboring basins. These factors were used to formulate mathematical models for simulation of supplies to all of the Great Lakes simultaneously. Extensive statistical tests have been used to ensure that the statistical parameters and the time series characteristics of the simulated data resemble those of the recorded data.

366. Meredith, Dale and Ben Ewing. 1969. Systems approach to the evaluation of benefits from improved Great Lakes water quality. Internat. Assoc. Great Lakes Res. Proc. 12th Conf. Great Lakes Res. pp. 843-869.

A systems approach to the evaluation of benefits that would accrue due to an improvement in the quality of the water in the Great Lakes is outlined. The basic approach for analysis of municipal and industrial water supply, recreational use, and commercial fishing involves following a change in water quality through a sequence of interrelationships to arrive at an estimate of annual benefits. The difficulties encountered in determining the benefits are discussed. A mathematical model which can be solved to determine the benefits for a change in water quality when the level of water quality before and after the improvement is known is presented in the appendix. The model is applicable to all uses.

367. Merrow, A. S. 1970. Bethlehem Steel's waste water management program at the Lackawanna plant Internat. Assoc. Great Lakes Res. Proc. 13th Conf. Great Lakes Res. pp. 562-566.

The Bethlehem Steel Corporation has been concerned about the discharges of waste water to Lake Erie and instituted a program of flow measurement and analysis of waste streams from individual mill sewers in the 1950's. Realizing that improvements in

discharge quality would be necessary, a consulting firm was retained in 1965 to make a complete survey of the waste discharges from the plant and propose plans for treatment of all waste waters. The resulting recommendations were reviewed by the Lackawanna Pland Engineering and Fuel Departments and discussed with representatives from the New York State Health Department who were very cooperative in arriving at approved plans to cover treatment of all waste water discharges. This paper covers the development of the program, the engineering aspects, construction of the facilities and of the the first two treatment systems which have been placed in service.

368. Michalski, M. F. P. 1972. Phytoplankton conditions in the Nanticoke area of Lake Erie, 1969-1971. Ministry of the Environment. Toronto, Ont. Unnumbered.

A Lake Erie siting at Nanticoke has been proposed for development by various industries and power companies.

369. Michigan Department of Natural Resources. 1973. Flooding problems associated with current high levels of the Great Lakes. Mich. Dept. of Nat. Resources. Water Develop. Serv. Div. 47 p.

This report gives an overview of the Great Lakes high water flooding problem (1972-1973); its causes, effects solutions, and possible future alternatives. Specifically involved are the counties of Monroe and Wayne touching Lake Erie. Tables include: numbers of people evacuated, cost estimates of potential flood control projects, public and private dollars expended due to flooding, public and private property damage in dollars. Future legislation and taxation plans are reviewed.

Mihon, John P. - See: Fraser F. Darling, No. 166.

370. Mobil Inc. 1961. Mobil travel Guide, Great Lakes Area. Simon and Shuster, Inc. New York, N.Y. Unnumbered.

This book lists all recreation and historical facilities found along the Great Lakes region. (SM)

371. Moffett, James W. 1954. A research program: Chief of Great Lakes fishery investigations outlines research program for Lake Erie. The Fisherman. 22(1):7, 11, 12, 14.

States with fluctuating fish populations in Lake Erie have affected the economic positon of fishermen and, in turn, economic

fluctuations have been reflected in varying pressures for research of the fisheries. Problems discussed include dollar productivity (quality fish) versus biological productivity (trash fish).

372. Moore, Emmeline. 1929. Introduction-A biological survey of the Erie-Niagara System. In: A Biological Survey of the Erie-Niagara System. N. Y. Cons. Dept. Suppl. 18th Ann. Rept. 1928. pp. 95-106.

The report of the bioligical survey submitted herewith incorporates a series of papers bearing on the subject of the fisheries in the Erie-Niagara system. Three major lines of inquiry were pursued-the study of the deeper water at the eastern end of Lake Erie with special emphasis on factors limiting productivity; the investigation of the general shore conditions, including a study of the effects of pollution resulting from the highly industrialized centers on or near the water front, and an evaluation of the tributary streams and their headwaters in relation to a stocking policy. The Province of Ontario and the Federal Bureau of Fisheries of the U. S. detailed their representatives to join the survey staff. This initial effort in analyzing the Lake Erie problem should be the forerunner of more effective coordination of all agencies interested in the Great Lakes fishery.

373. Morganti, J. 1971. Conservation advisory councils. ECHO Issues. Buffalo, N.Y. 1(9):1-2.

This article discusses the establishment of environmental advisory councils by management through the county. This council would work in liason with the Department of Environmental Conservation. Special attention is given to the Erie County Environmental Management Council. Local legislation on this matter is also discussed.

374. Moseley, E. L. 1904. Formation of Sandusky Bay and Cedar Point. Thirteenth Ann. Rept. Ohio State Acad. Sci. 1904. Columbus, Ohio. Part 5, 4:179-183.

The article reviews some of the storms on Lake Erie with emphasis on the period 1857-1862, in which floods destroyed industries, bridges, ships, and the shoreline along the Sandusky Bay area. (SM)

375. Munter, Casimir J. 1960. Chemical observations on pollution. In: Charles J. Fish (Ed.) Limnological Survey of Eastern and Central Lake Erie, 1928-1929. U. S. Fish and Wildlife Serv. Spec. Sci. Rept. Fish. 334. pp. 171-182.

An important aspect of the Lake Erie investigations was a determination of the extent and concentration of pollution from sewage and industrial wastes. During the second summer, i.e. 1929, the boats Veto and Investigator, belonging to the Ohio State Division of Fish and Game were used for chemical investigations on the western end of the lake in the interims between the regular monthly cruises of the Shearwater. The data and discussion of the results of analyses made in this western area appear in another report dealing with the general investigations in that region (Wright 1955). The present paper deals chiefly with the work performed on the Shearwater during the summer of 1929, with some consideration also of the preliminary results of the first season's work in 1928.

376. Nagle, Roy. 1932. Buffalo, and its fascinating history. In: Otto Retter (Ed.), Pictorial Buffalo and Niagara Falls, and Surroundings'. Buffalo, N.Y. pp. 7-35.

This group of photographs traces the historical segments of Buffalo. (SM)

Nehmon, G. L. - See: B. W. Cone, et al, No. 157.

377. Neil, J. H. and G. E. Owen. 1964. Distribution, environmental requirements and significance of Cladophora in the Great Lakes. Univ. Mich. Great Lakes Res. Div. Proc. 7th Conf. Great Lakes Res. Pub. 11:113-122.

Excessive growths of Cladophora sp. along certain sections of the Great Lakes shoreline create serious nuisance conditions which affect the use of water for recreational, industrial and municipal Purposes. Information on the ecology of this algae was collected as part of a study directed towards the development of control measures. The presence of Cladophora sp. is dependent on a suitable substrate for attachment, water movement, adequate light, and nutrients in excess of those normally available in the waters of the upper Great Lakes. Lakes Ontario and Erie have sufficient inherent fertility to support marginal growths, but where local nutrient sources are available, production increases. Phosphorus applied to a location providing suitable physical conditions but devoid of Cladophora sp. resulted in the establishment of a sizeable area of growth. The results of attempts at control are also discussed.

378. New York Sea Grant Program. 1973. Managing our coastal zone. Proc. Conf. Coastal Zone Management. N.Y. Sea Grant Program. Albany, N.Y. pp. 9, 10, 29, 34, 42.

This report discusses coastal zone management problems in Lake Erie due to pollution and mentions the future of oil drilling in the lake.

379. New York State Atomic and Space Development Authority. 1971. Nuclear power siting program. Phase I, state wide survey. N. Y. State Atomic and Space Develop. Authority. 46 p.

In this report a state wide survey for the nuclear power siting project was completed. Of the areas considered most suitable is the shore of Lake Erie and the Niagara River within New York State except for the Buffalo-Niagara Falls area. There are eight recommended areas in the state.

380. New York State Conservation Commission. 1919. 8th Annual Report. Legislative Document 54. Division of Fish and Game-Bureau of Inland Fisheries. Albany, N. Y. pp. 62-65.

Pictured here is a catch of lake herring. Emphasis is placed on fish as a food and stresses regulations for commercial fishing. A listing of boats, nets, lines and licences appear on p. 190. Also included is a brief note on the quantity of lake herring taken from New York waters of Lake Erie. During the 1917 fishing season approximately 3,400,000 pounds of lake herring were taken by commercial fishermen. (BECPL)

381. New York State Conservation Commission. 1920. 9th Annual Report for the Year 1919. Legislative Document 83. Division of Fish and Game. Albany, N. Y. pp. 61-82.

Bureau of Inland Fisheries- During the 1918 fishing season, a total of 3,699, 472 pounds of fish were taken from New York waters of Lake Erie. The fish industry growth is indicated here.

Bureau of Fish Hatchery- The Dunkirk hatchery is cited here for production of species of Lake Erie and Great Lakes fish. (BECPL)

382. New York State Conservation Commission. 1920. 9th Annual Report for the Year 1919. Legislative Document 83. Division of Waters. Albany, N. Y. pp. 208-279.

Projects have been done in correlation with the Fish and Game Division for the Dunkirk hatchery. Supplementary statistics and approval of the Lake Erie water supply are found here. (BECPL)

383. New York State Conservation Commission. 1921. 10th Annual Report for the Year 1920. Legislative Document 95.

Division of Fish and Game. Albany, N. Y. pp. 105-125.

Bureau of Inland Fisheries reports the catch for Lake Erie this year was 4,335,935 lbs. worth $288,825.73.

Bureau of Fish Culture reports a discussion of cost and replenishing fisheries on Lake Erie. A protective law is cited here in response to a closed season of blues and pikeperch. (BECPL)

384. New York State Conservation Commission. 1921. 10th Annual Report for the Year 1920. Legislative Document 95. Division of Waters. Albany, N. Y. pp. 203-206.

Water power and regulation is being formulated for the Niagara-Erie region. (BECPL)

385. New York State Conservation Commission. 1921. 10th Annual Report for the Year 1920. Legislative Document 95. General Topics. Albany, N. Y. pp. 20-32.

Pollution of waters heads the list under which miscellaneous commentary appears on water as a resource, its regulation, and quality control investigation. (BECPL)

386. New York State Conservation Commission. 1922. 11th Annual Report for the Year 1921. Legislative Document 27. Division of Fish and Game. Albany, N. Y. pp. 81-89, 168.

The Bureau of Fish Hatchery reports improvements on the Dunkirk hatchery. Mention is made of its productivity, and of the various species of fry. (BECPL)

387. New York State Conservation Commission. 1923. 12th Annual Report for the Year 1922. Legislative Document 28. Division of Fish and Game. Albany, N. Y. pp. 103-113.

The Bureau of Inland Fisheries reports a catch of fish from Lake Erie waters totaled 2,480,231 lbs.

The Bureau of Fish Hatchery reports that the Dunkirk hatchery and work at the station during the past fiscal year has progressed. A fish distribution chart by stations from 1918-1922 can be seen on p. 120. (BECPL)

388. New York State Conservation Commission. 1923. 12th Annual Report for the Year 1922. Legislative Document 28. Division of Lands and Forests. Albany, N. Y. pp. 146-147.

Discussion is made here on the topic of building a public forest area on the Lake Erie watershed area. (BECPL)

389. New York State Conservation Commission. 1924. 13th Annual Report for the Year 1923. Legislative Document 30. Division of Fish and Game. Albany, N. Y. pp. 93-117.

The Bureau of Inland Fisheries reports the body of water which yielded the most fish in the state was Lake Erie. The report mentions a net take of 4,968,024 lbs., but not all figures are included in this report. The report also gives the amounts of the highest numbers per species.

The Bureau of Fish Culture confines Dunkirk fiscally to the propagation and distribution of fish by stations. (BECPL)

390. New York State Conservation Commission. 1925. 14th Annual Report for the year 1924. Legislative Document 29. Division of Fish and Game. Albany, N. Y. pp. 57-80.

The Bureau of Inland Fisheries reports the 1923 commercial fishing season. A total of 7,164,782 lbs.with a value of $462,442.00 were taken from New York waters of Lake Erie.

The Bureau of Fish Culture discusses Dunkirk in relation to the propagation of herring this fiscal year. Statistics of eggs are available along with production and distribution of fish. (BECPL)

391. New York State Conservation Commission. 1925. 14th Annual Report for the Year 1924. Legislative Document 29. Division of Lands and Forests. Albany, N. Y. pp. 127-141.

This document discusses recreational development and forest growth in areas off Lake Erie, in Erie County, N. Y. (BECPL)

392. New York State Conservation Commission. 1926. 15th Annual Report for the Year 1925. Legislative Document 28. Division of Fish and Game. Albany, N. Y. pp. 30-53.

The Bureau of Inland Fisheries reports the catch on Lake Erie totaled 8,324,433 lbs., valued at $390,371.90. Dunkirk is mentioned as a major contributer to the lake's wealth.

The Bureau of Fish Culture reports the Dunkirk hatchery specializes in the production of herring. Mention is made of improvements made to the hatchery. Fish distribution station statistics can be

found on p. 72. (BECPL)

393. New York State Conservation Commission. 1927. 16th Annual Report for the Year 1926. Legislative Document 29. Division of Fish and Game. Albany, N. Y. pp. 91-108.

The Bureau of Inland Fisheries and commercial fisheries report their worst year on Lake Erie; 4,011,681 lbs. were taken with a value of $277,068.00.

The Bureau of Fish Culture gives a progress report on the Dunkirk hatchery, along with a fish distribution table. (BECPL)

394. New York State Conservation Commission. 1927. 16th Annual Report for the Year 1926. Legislative Document 29. Division of Lands and Forests. Albany, N. Y. pp. 169-170.

Forestry listings are given in regard to the county and city communities off Lake Erie. (BECPL)

395. New York State Conservation Department. 1928. 17th Annual Report for the Year 1927. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 305-307.

The Bureau of Inland Fisheries reports on charts presented this year which indicate commercial fish catches; 2,629,232 lbs. valued at $162,994.

The Bureau of Fish Culture reports on the Dunkirk hatchery production for this year, figures are also given. (BECPL)

396. New York State Conservation Department. 1928. 17th Annual Report for the Year 1927. Legislative Document 38. Division of Lands and Forests. Albany, N. Y. pp. 200-212.

Forests are established and recorded in number of trees per county. They are located in areas around the lake. Finance is mentioned in amounts delegated per year for reforesting in the counties on Lake Erie. (BECPL)

397. New York State Conservation Department. 1928. 17th Annual Report for the Year 1927. Legislative Document 38. Division of Parks. Albany, N. Y. pp.68-120.

This report mentions the presiding officers of the parks commission in Erie County, N. Y. Included is the state reservation at Niagara;

with tourism, buildings and their construction and money appropriations for this area. The Erie region stresses aesthetic qualities and maintaing these qualities. A listing of the regional parks is also given. (BECPL)

398. New York State Conservation Department. 1928. 17th Annual Report for the Year 1927. Legislative Document 38. Division of Water Power and Control. Albany, N. Y. pp. 130-137.

Petitions on drainage ditches and the cost of this work is mentioned here. Power projects in the Lake Erie area in addition to price cost of items to taxation departments are reported. (BECPL)

399. New York State Conservation Department. 1929. 18th Annual Report for the Year 1928. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 239-290.

The Bureau of Inland Fisheries reports a catch of 1,320,151 lbs with a value of $160,949. A comparison of various years of catch and values is also presented.

The Bureau of Fish Culture lists the production of the Dunkirk hatchery herring used for recreational and industrial purposes.

Included in these pages is a map of the Lake Erie watershed area in a section entitled biological survey. The survey included the regional area of Erie-Niagara system, mentioning such items as pollution and the effects of a highly industrialized area. (BECPL)

400. New York State Conservation Department. 1929. 18th Annual Report for the Year 1928. Legislative Document 38. Divisions of Lands and Forests. Albany N. Y. pp. 136-140.

In discussion of reforesting the counties around Lake Erie, mention is made in regards to appropriations established this year. Community forests are also listed. (BECPL)

401. New York State Conservation Department. 1929. 18th Annual Report for the Year 1928. Legislative Document 38. Division of Parks. Albany, N. Y. pp. 342-345, 405, 410.

Park districts are listed here, including those in the Lake Erie region. Lake Erie Park statistics are given, in relation to its recreational value. (BECPL)

402. New York State Conservation Department. 1929. 18th Annual Report for the Year 1928. Legislative Document 38. Division of Water Power and Control. Albany, N. Y. pp. 305-317.

Finance charges are recorded for work done in the Niagara area. (BECPL)

403. New York State Conservation Department. 1930. 19th Annual Report for the Year 1929. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 260-279.

The Bureau of Inland Fisheries reports the Lake Erie catch as being valued at $142,390., for 1,046,715 pounds. A listing of boats licensed to operate is also given.

The Bureau of Fish Culture lists fish distribution stations and statistics from the Dunkirk hatchery. (BECPL)

404. New York State Conservation Department. 1930. 19th Annual Report for the Year 1929. Legislative Document 38. Division of Lands and Forests. Albany, N. Y. pp. 118-131.

Community forests are listed and their year of establishment is given including those in the Lake Erie region. (BECPL)

405. New York State Conservation Department. 1930. 19th Annual Report for the Year 1929. Legislative Document 38. Division of Parks. Albany, N. Y. pp. 373-389.

Discussion is made on the regional parks and statistics, including Lake Erie State Park. Financial statements are also given. (BECPL)

406. New York State Conservation Department. 1930. 19th Annual Report for the Year 1929. Legislative Document 38. Division of Water Power and Control. Albany, N.Y. pp. 315-347.

Drainage matters from Niagara County are discussed here. (BECPL)

407. New York State Conservation Department. 1931. 20th Annual Report for the Year 1930. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 277-294.

The Bureau of Inland Fisheries lists a poor year for Lake Erie with a catch of 691,424 lbs., valued at $91,868.

The Bureau of Fish Culture reports the fish distribution in Dunkirk

and on Lake Erie, also the volume of eggs produced. (BECPL)

408. New York State Conservation Department. 1931. 20th Annual Report for the Year 1930. Legislative Document 38. Division of Lands and Forests. Albany, N. Y. pp. 106-113.

County and state appropriations are listed including Erie along with publically owned lands, and community forests. (BECPL)

409. New York State Conservation Department. 1931. 20th Annual Report for the Year 1930. Legislative Document 38. Division of Parks. Albany, N. Y. pp. 356-451.

Listed here are regional areas of Lake Erie counties for park districts acreage along with officials who ran these parks. Lake Erie State Park and its finances are also cited. Erie County parks are discussed for aesthetic characteristics. (BECPL)

410. New York State Conservation Department. 1931. 20th Annual Report for the Year 1930. Legislative Document 38. Division of Water Power and Control. Albany, N. Y. pp. 333-334.

Discussion rests upon power in the Lake Erie-Niagara region. (BECPL)

411. New York State Conservation Department. 1932. 21st Annual Report for the Year 1931. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 254-275.

The Bureau of Inland Fisheries reports that commercial fishermen of Lake Erie have taken 966,385 lbs. of various species of fish at a value of $93,737.

A Great Lakes conference was called together this year in coercion with Canada to evaluate the decline of Lake Erie fisheries and to employ regulatory methods.

The Bureau of Fish Culture report mentions herring and pikeperch fry at the Dunkirk hatchery. (BECPL)

412. New York State Conservation Department. 1932. 21st Annual Report for the Year 1931. Legislative Document 38. Division of Lands and Forests. Albany, N. Y. pp. 79-201.

Cited are the New York counties surrounding Lake Erie which

purchased land and reforested. Each county had been mapped. Community forests are also cited by urban areas. (BECPL)

413. New York State Conservation Department. 1932. 21st Annual Report for the Year 1931. Legislative Document 38. Division of Parks. Albany, N. Y. pp. 294-307, 372-373.

Regional park districts are given with approximate acreage growth. The regions on the periphery of Lake Erie are given. Factors of Lake Erie State Park are also given. The financial statement of the Lake Erie County Park Commission, which is working on aesthetic improvements in the parks, is included. (BECPL)

414. New York State Conservation Department. 1932. 21st Annual Report for the Year 1931. Legislative Document 38. Division of Water Power and Control. Albany, N. Y. pp. 397-401.

The Niagara area is related here to supplying power. It is being regulated by the Federal Power Commission. (BECPL)

415. New York State Conservation Department. 1933. 22nd Annual Report for the Year 1932. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 205-277.

General report includes boats that were purchased for regulation purposes on Lake Erie.

The Bureau of Fish Culture reports on the fish distribution station at Dunkirk hatchery; figures are given.

The Bureau of Inland Fisheries reports on the Lake Erie catch of 1,306,733 lbs. with a value of $86,211.00 taken from New York waters.

A section is also given to the Lake Erie Conference. Discussions were held by the United States and Canada on Lake Erie conservation matters. Several rules were established. Meetings were held later in 1932, in Dunkirk and Toronto. (BECPL)

416. New York State Conservation Department. 1933. 22nd Annual Report for the Year 1932. Legislative Document 38. Division of Lands and Forests. Albany, N. Y. pp. 74-86.

County appropriations are given by county and state allotments. Progression of development is also given. (BECPL)

417. New York State Conservation Department. 1933. 22nd Annual

Report for the Year 1932. Legislative Document 38. Division of Parks. Albany, N. Y. pp. 346-356.

Regions of Lake Erie parks are given in acreage and development throughout the fiscal year. Special attention is given to Lake Erie State Park. Financial statements and allotments of funds are also made. (BECPL)

418. New York State Conservation Department. 1934. 33rd Annual Report for the Year 1933. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 194-256.

The Bureau of Fish Culture reports that in this year pikeperch eggs were shipped from Oneida Hatchery to Dunkirk Hatchery and the resulting fry were distributed into Western New York waters. This arrangement materially reduced the cost of distribution to this part of the state.

The Bureau of Inland Waters reports that in this year, 70 licenses were issued for a commercial catch of 805,644 pounds, and a value of $69,367.77. This was the smallest catch since 1911 because of the failure of ciscoe fisheries. New York State fishermen have a problem due to the fact that four other states border the lake and each has different rules with regard to equipment, and each requires a fishing license.

A report of a Lake Erie conference in which four states participated was given. Equipment regulation, jurisdiction, and permits were discussed.

The Bureau of Law Enforcement gives an account of the fleet boats patrolling Lake Erie for regulation of conservation laws for illegal methods used in commercial fishing.

The Bureau of Biological Survey reports surveys done on the Erie-Niagara Watershed area done for stocking policies. (BECPL)

419. New York State Conservation Department. 1934. 33rd Annual Report for the Year 1933. Legislative Document 38. Division of Lands and Forests. Albany, N. Y. pp. 172-176.

Tree distribution and reforestation statistics are given for public owned lands. Community forests and up to date reforestation is accounted for in the counties surrounding Lake Erie in New York State. (BECPL)

420. New York State Conservation Department. 1934. 33rd Annual

Report for the Year 1933. Legislative Document 38. Division of Parks. Albany, N. Y. p. 324.

This year only emergency relief funds were used to keep up Lake Erie State Park. (BECPL)

421. New York State Conservation Department. 1935. 24th Annual Report for the Year 1934. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 250-251, 259-260, 281.

The Bureau of Inland Fisheries reports that in this year, 61 licenses were issued for a catch of 522,415 pounds worth a commercial value of $50,429.73. This was the smallest catch in many years. Mention was made of new regulations dealing with the type of gear used and the length of the fishing season (1933) but the effects are not yet known.

Another Lake Erie conference was held, at which types of gear allowed and state and province regulation was discussed. Federal legislation was suggested.

The Bureau of Fish Culture reports on the output of ciscoes and pikeperch fry which was nearly tripled over the previous year. The ciscoe fry was evenly distributed between the waters of Lake Erie and Lake Ontario. (BECPL)

422. New York State Conservation Department. 1935. 24th Annual Report for the Year 1934. Legislative Document 38. Division of Parks. Albany, N. Y. p. 337.

Attendance of Lake Erie State Park was lower this year due to rumors of pollution and low water. No money for construction was available. (BECPL)

423. New York State Conservation Department. 1935. 25th Annual Report for the Year 1934. Legislative Document 38. Water Power and Control Commission. Albany, N. Y. p. 478.

An application for a preliminary permit for two years for diversion of water from Chautauqua Lake to Lake Erie for power purposes was filed. This development would consist of a combination canal and penstock route from the north end of Chautauqua Lake to Lake Erie, nine miles long. The application was denied. (BECPL)

424. New York State Conservation Department. 1936. 25th Annual Report for the Year 1935. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 275,

309, 310, 317-318.

The Bureau of Fish Culture reports that 58,500 eggs were equally divided between Lakes Erie and Ontario. Pikeperch and herring hatched.

The Bureau of Inland Fisheries reports this year the fishing season on Lake Erie was extended through December 20th. During this time, 41,000 pounds of blue pike were taken, with small quantities of other species. It was felt that in 10 years, the ciscoe will disappear from Lake Erie.

The department had made regulations regarding net size, however, an investigation showed that in Ohio, the nets were smaller than allowed. New York State felt that Ohio had broken an agreement made in good faith and therefore net regulations were useless.

The catch for 1934 was 573,488 pounds for a commercial value of $46,033.38.

No meeting of the Advisory Board on Lake Erie Fisheries was held, however, the department suggested that conservation with the United States and Canada concerning Lake Erie should begin.

425. New York State Conservation Department. 1936. 25th Annual Report for the Year 1935. Legislative Document 38 Division of Parks. Albany, N. Y. pp. 401-42

Construction of roads and jetties, and the planting of 300 small conifers highlighted the activity at Lake Erie State Park this year. (BECPL)

426. New York State Conservation Department. 1937. 26th Annual Report for the Year 1936. Division of Fish and Game. Albany, N. Y. p. 247, 281-282, 287.

The Bureau of Fish Culture reports that this year, pikeperch and lake herring were handled at the Dunkirk Hatchery. The pike eggs did not do as well as the herring due to shifting of ice in Lake Erie, causing a constant and great fluctuation in temperature.

The Bureau of Inland Fisheries reports that although the use of efficient bull nets was permitted in Lake Erie, the catch was smaller than in 1934. It it believed tha the N. Y. waters of Lake Erie are depleted of commercial fish. Thousands of dollars have been spent to restore the fish in Lake Erie. Some methods tried include enlarging mesh of nets, curtailing the fishing season, a abolishing bull nets, etc. New York State feels that some of the problem lies in the fact that Lake Erie falls in five different jurisdictions, including Canada.

The commercial catch for 1935 was 568,012 pounds, worth a value of $34,969.46. A table lists the species caught by pounds and value.

There was no meeting of the Advisory Committee on Lake Erie during 1935. (BECPL)

427. New York State Conservation Department. 1937. 26th Annual Report for the Year 1936. Legislative Document 38. Division of Parks. Albany, N. Y. pp. 372-373.

During the past season, relief forces planted about 200 small trees at Lake Erie State Park, and did a considerable amount of work cleaning and maintaining the beach. A table shows maintenance costs. (BECPL)

428. New York State Conservation Department. 1938. 27th Annual Report for the Year 1937. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 223-225, 257.

The Bureau of Fish Culture reports the output of lake herring fry from the Dunkirk Hatchery was smaller and the output of pikeperch fry was greater than last year. The pikeperch fry planted in Lake Erie produce good results, but it is felt that lake herring is not worth hatching.

The Bureau of Inland Fisheries report that the ciscoe fisheries were at an all time low this year. The other species did as well as previously. The catch was 684,436 pounds for a value of $39,055,184. (BECPL)

429. New York State Conservation Department. 1938. 27th Annual Report for the Year 1937. Legislative Document 38. Division of Parks. Albany, N. Y. p. 377.

Lake Erie State Park did the same as the previous year. (BECPL)

430. New York State Conservation Department. 1939. 28th Annual Report for the Year 1938. Legislative Document 38. Division of Fish and Game. Albany, N. Y. pp. 209, 233-234.

The Bureau of Inland Fisheries reports that in 1938, 39 licenses were issued for a catch of 2,055,585 pounds, worth $130,042.19 Tables include the catch for 1936 and 1937 by pounds and species. A graph shows the reported catch of bluepike, whitefish, perch, and ciscoes from Lake Erie for 1925-1937.

The Bureau of Fish Culture reports that the activities of the Dunkirk Hatchery this year was confined to pikeperch because of the lack of supply of herring and whitefish eggs from Lake Erie. (BECPL)

431. New York State Conservation Department. 1939. 28th Annual Report for the Year 1938. Legislative Document 38. Division of Parks. Albany, N. Y. p. 302.

In this year, attendance of Lake Erie State Park increased, however no construction work was done. (BECPL)

432. New York State Conservation Department. 1941. 30th Annual Report for the Year 1940. Legislative Document 37. Division of Fish and Game. Albany, N. Y. pp. 192, 205, 208-209.

The Bureau of Inland Fisheries report includes the number of licenses issued in 1940, and the commercial catch for that year which was 1,146,168 pounds worth $147,289.87. A table lists the various species caught by pounds and value for 1938 and 1939.

The Bureau of Fish Culture reports that this year , 430 quarts of pikeperch eggs were obtained from Oneida Lake and hatched in the Dunkirk Hatchery for stocking western New York waters. (BECPL)

433. New York State Conservation Department. 1941. 30th Annual Report for the Year 1940. Legislative Document 37. Division of Parks. Albany, N. Y. pp. 274-284.

Lake Erie State Park had improved attendance, and better water quality at the beach this year. (BECPL)

434. New York State Conservation Department. 1942. 31st Annual Report for the Year 1941. Legislative Document 32. Division of Fish and Game. Albany, N. Y. pp. 198, 203, 207.

The Bureau of Inland Fisheries reports that there was exceptionally small catch of bluepike and the Board of Inquiry for the Great Lakes Fishery continued in efforts to seek a solution for the serious problems of the Great Lakes. In 1941, 44 licenses were issued. The commercial catch was 599,588 pounds worth a value of $79,736.07. Tables include the catch for 1939 and 1940 by species and price. Mention was made that for the first time dipping for smelt was permitted in Lake Erie from sunset to 12:30 A. M. This is the first time an increase of smelt was noticed in Lake Erie.

The Bureau of Fish Culture reports that this year, the work at the Dunkirk Hatchery was confined to the hatching of pikeperch eggs for the stocking of western New York waters, as well as Lake Erie. (BECPL)

435. New York State Conservation Department. 1942. 31st Annual Report for the Year 1941. Legislative Document 32. Division of Parks. Albany, N. Y. pp. 286-288.

The attendance and revenue of Lake Erie State Park increased this year. A need for cabins was mentioned. A table of park maintenance costs is also given. (BECPL)

436. New York State Conservation Department. 1943. 32nd Annual Report for the Year 1942. Legislative Document 27. Division of Fish and Game. Albany, N. Y. pp. 178-179, 144, 152, 180-181.

The Bureau of Inland Fisheries reports 41 fishing licenses were issued in this year. The total commercial catch was 498,783 pounds worth $73,574.23. A table lists the various species caught by pounds and commercial value. Mention was made of a need for control of all New York State commercial fisheries at a national and interstate level.

The International Board of Inquiry for the Great Lakes Fisheries submitted this year a report to the U. S. Secretary of State and the Prime Minister of Canada which calls for a common investigation of the fisheries of the Great Lakes, regulations in management of fisheries, and studies of fish planting in the Great Lakes.

The Bureau of Biological Survey reports a field study of certain fisheries of Lake Erie and Lake Ontario was done under the joint direction of the Bureau of Biological Survey and the Bureau of Inland Fisheries. This was done especially to determine methods of increasing yield of fish through the adjustment of regulations.

The Bureau of Fish Culture reports the hatching of pikeperch eggs for Lake Erie and western New York waters constituted the majority of the fish culture operations at the Dunkirk hatchery. (BECPL)

437. New York State Conservation Department. 1943. 32nd Annual Report for the Year 1942. Legislative Document 27. Division of Parks. Albany, N. Y. pp. 250-251.

Lake Erie State Park had a decrease in attendance this year due to lessened automobile travel. No funds were available for

construction work in the park. (BECPL)

438. New York State Conservation Department. 1944. 33rd Annual Report for the Year 1943. Legislative Document 25. Division of Fish and Game. Albany, N. Y. pp. 120, 115, 120, 133-134.

The Bureau of Inland Fisheries reports that the catch for 1943 was 570,186 pounds for a commercial value of $92,743.91. A table shows the various species caught by pounds and the commercial values for 1941 and 1942.

The Bureau of Fish Culture reports the hatching of eggs has been discontinued in the Dunkirk Hatchery. Experimental netting was carried out in Lake Erie by the Conservation Department and commercial fisheries. This was done to pave the way for more productive commercial fishing for carp along the shores of Lake Erie. (BECPL)

439. New York State Conservation Department. 1944. 33rd Annual Report for the Year 1943. Legislative Document 25. Division of Parks. Albany, N. Y. pp. 188-191.

The financial aspects of the parks in the Buffalo area which border Lake Erie are mentioned. (BECPL)

440. New York State Conservation Department. 1944. 33rd Annual Report for the Year 1943. Legislative Document 25. Water Power and Control Commission. Albany, N. Y. p. 255.

Mention is made of an application for a project to divert water from Chautauqua Lake to Lake Erie. This is the same project which was turned down in 1935. (BECPL)

441. New York State Conservation Department. 1946. 34-35th Annual Report for the Years 1944-1945. Legislative Document 61. Division of Fish and Game. Albany, N. Y. pp. 161-162.

The Bureau of Inland Fisheries reports that in 1943 the commercial catch was 1,006,470 pounds, worth a value of $143,151.11. In 1944, a commercial catch of 623,659 pounds was recorded and worth a value of $153,164.45.

The Bureau of Fish Culture reports that due to labor shortages and other wartime restrictions, the hatching of fish and distribution of fry was discontinued at the Dunkirk Hatchery in 1942. (BECPL)

442. New York State Conservation Department. 1946. 34-35th Annual Report for the Years 1944-1945. Legislative Document 61. Division of Parks. Albany, N. Y. p. 217.

The use of Lake Erie State Park was limited because of government rationing of gasoline. Tables of maintenance costs are included. (BECPL)

443. New York State Conservation Department. 1946. 34-35th Annual Report for the Years 1944-1945. Legislative Document 61. Division of Water Power and Control. Albany, N. Y. pp. 282-283.

An application was made for a preliminary permit for the diversion of water from Chautauqua Lake to Lake Erie for power purposes. (BECPL)

444. New York State Conservation Department. 1950. 39th Annual Report for the Year 1949. Legislative Document 76. Division of Fish and Game. Albany, N. Y. pp. 113,120, 137,149.

The Bureau of Inland fisheries reports that in 1948, the commercial catch was 923,402 pounds worth a value of $164,320.79. A table shows the catches for 1947 and 1948 by species and value.

The Bureau of Fish Culture reports that the Dunkirk Hatchery has not been in active operation for the past few years. The unit is maintained so that it can be put into operation for fry production for stocking Lake Erie when need arises.

The Bureau of Fish and Wildlife Investigations report the upper end of Cattaraugus Creek has been stocked by the state hatcheries for years. In 1949, trout were clipped for identification in the future and a fall census was taken.

A stream map of western New York was made which shows known distribution of 100 species of fresh water fish. (BECPL)

445. New York State Conservation Department. 1950. 39th Annual Report for the Year 1949. Legislative Document 76. Division of Parks. Albany, N. Y. p. 210.

Lake Erie State Park has shown an increase of over 47% in revenue and approximately 8% in attendance over figures for 1948. (BECPL)

446. New York State Conservation Department. 1951. 40th Annual Report for the Year 1950. Legislative Document 48. Division of Fish and Game. Albany, N. Y. pp. 127, 160-161.

The Bureau of Inland Fisheries reports that this year there was an increase in the amount of gear issued and an increase in the catch of whitefish and bluepike. Tables show the catch of whitefish, bluepike, and ciscoes from 1913-25. The commercial catch for 1949 was 1,953,733 pounds worth a value of $349,637.45.

The Bureau of Fish Culture reports the Dunkirk Hatchery is still closed but is maintained for future use. (BECPL)

447. New York State Conservation Department. 1951. 40th Annual Report for the Year 1950. Legislative Document 48. Division of Parks. Albany, N. Y. p. 228.

Due to weather conditions, Lake Erie State Park had low attendance this year. Improvements of park facilities were made. (BECPL)

448. New York State Conservation Department. 1952. 41st Annual Report for the Year 1951. Legislative Document 78. Division of Fish and Game. Albany, N. Y. pp. 151, 162.

The Bureau of Inland Fisheries reports the commercial catch for 1950 was 385,091 pounds worth a value of $78,551.88. A table compares 1949 and 1950 commercial catches by species and pounds.

The Bureau of Fish Culture reports the Dunkirk Hatchery is not in operation but kept in good condition for future use. (BECPL)

449. New York State Conservation Department. 1952. 41st Annual Report for the Year 1951. Legislative Document 78. Division of Parks. Albany, N. Y. p. 230.

Attendance of Lake Erie State Park increased by 40% over the previous year and revenue increased by 100% due to recent improvements. (BECPL)

450. New York State Conservation Department. 1953. 42nd Annual Report for the Year 1952. Legislative Document 27. Division of Fish and Game. Albany, N. Y. pp. 152, 159-160, 162-163.

The Bureau of Fish Culture reports the Dunkirk Hatchery has been inactive but maintained for several years.

The Bureau of Inland Fisheries reports the fisheries of Lake Erie were discussed at a conference with representatives from Ontario, New York State, Pennsylvania, Michigan, Ohio and the U. S. Fish and Wildlife Service at Ohio. The discussion centered on marketing, regulations, harvesting, hatcheries, and research as a tool

of Lake Erie fisheries management. The catch for 1951 was 302,068 pounds with a commercial value of $90,967.55. A table gives the 1950-1951 commercial catches by species, pounds, and value. (BECPL)

451. New York State Conservation Department. 1953. 42nd Annual Report for the Year 1952. Legislative Document 27. Division of Parks. Albany, N. Y. p. 257.

Lake Erie State Park is becomming increasingly popular as a day use and camping area. Revenue was up for this year by 40% and attendance by 8%. Some new facilities were constructed. (BECPL)

452. New York State Conservation Department. 1954. 43rd Annual Report for the Year 1953. Legislative Document 47. Division of Fish and Game. Albany, N. Y. p. 156, 165.

The Division of Fish Culture reports the Dunkirk Hatchery has been inactive for the past several years but kept up.

The commercial catch for this year was 599,028 pounds worth $169,726.80 A table shows the 1951 and 1952 catches by species and pounds. This year showed an increase in the catch of whitefish. (BECPL)

453. New York State Conservation Department. 1954. 43rd Annual Report for the Year 1953. Legislative Document 47. Division of Parks. Albany, N. Y. p. 257.

Attendance at Lake Erie State Park was up and revenue increased by 27%. Bathing was especially popular. (BECPL)

454. New York State Conservation Department. 1955. 44th Annual Report for the Year 1954. Legislative Document 47. Division of Fish and Game. Albany, N. Y. pp. 128, 133-134.

The Bureau of Fish reports the collection of catch statistics on the commercial fisheries of Lake Erie was continued this year. The commercial catch was 693,733 pounds, worth $197,609. This was an increase over the previous year. A table shows the commercial catch for 1952 and 1953 by species in pounds and value. (BECPL)

455. New York State Conservation Department. 1955. 44th Annual Report for the Year 1954. Legislative Document 47. Division of Parks. Albany, N. Y. pp. 237-238.

Lake Erie State Park continued to grow with attendance increasing

and revenue up 29%. Bathing was decreased due to algal infestation and trailor facilities use increased, as well as camping facilities. The algae made the park water supply foul and masses collected on the Lake Erie beach that were difficult to remove. Construction of park facilities continued. (BECPL)

456. New York State Conservation Department. 1956. 45th Annual Report for the Year 1955. Legislative Document 88. Division of Fish and Game. Albany, N. Y. p. 106.

The Bureau of Fish reports the commercial catch for this year was 885,101 pounds worth $142,631. A smaller catch of whitefish was reported. No catch of ciscoes was reported. (BECPL)

457. New York State Conservation Department. 1956. 45th Annual Report for the Year 1955. Legislative Document 88. Division of Parks. Albany, N. Y. p. 184

Lake Erie State Park continued to increase in popularity. Attendance and revenue increased 10%. Bathing is at a definite decline, due to algae on Lake Erie beaches. (BECPL)

458. New York State Conservation Department. 1957. 46th Annual Report for the Year 1956. Legislative Document 114. Division of Fish and Game. Albany, N. Y. pp. 108-113.

The Bureau of Fish reports a catch of 1,846,638 lbs. from Lake Erie for 1955.

The Bureau of Game mentions fowl dependency on Lake Erie. (BECPL)

459. New York State Conservation Department. 1957. 46th Annual Report for the Year 1956. Legislative Document 114. Division of Lands and Forests. Albany, N. Y. pp. 67-68.

A county forestry program for 1956 is given, which includes Erie County, N. Y. (BECPL)

460. New York State Conservation Department. 1957. 46th Annual Report for the Year 1956. Legislative Document 114. Division of Parks. Albany, N. Y. pp. 187-196.

Lake Erie State Park's problems; attendance and revenue are discussed in this report. Evangola State park is mentioned in respect to its revamping and construction progress. (BECPL)

461. New York State Conservation Department. 1958. 47th Annual

Report for the Year 1957. Legislative Document 110. Division of Fish and Game. Albany, N. Y. p. 104, 111-112.

The Bureau of Fish reports that this year, a district program for the collection of statistics of Lake Erie commercial fisheries was carried out.

The reported commercial catch in Lake Erie for 1956 was 1,164,349 pounds worth a value of $177,866. This was a decrease from 1955. A table lists the various species by pounds and value for 1955 and 1956. (BECPL)

462. New York State Conservation Department. 1958. 47th Annual Report for the Year 1957. Legislative Document 110. Division of Parks. Albany, N. Y. p. 194.

Attendance and revenue resumed their upward climb this year, with fishing extremely popular. (BECPL)

463. New York State Conservation Department. 1959. 48th Annual Report for the Year 1958. Legislative Document 109. Division of Fish and Game. Albany, N. Y. pp. 94-127.

The commercial catch for Lake Erie was given at 695,429 pounds valued at $171,773. (BECPL)

464. New York State Conservation Department. 1959. 48th Annual Report for the Year 1958. Legislative Document 109. Division of Lands and Forests. Albany, N. Y. pp. 88-89.

Erie County conservation methods are given in relation to reforestation. (BECPL)

465. New York State Conservation Department. 1959. 48th Annual Report for the Year 1958. Legislative Document 109. Division of Parks. Albany, N. Y. pp. 185-186.

Statistics are given for attendance problems and renovation of New York State parks on Lake Erie. Evangola State Park is mentioned in particular. (BECPL)

466. New York State Conservation Department. 1962. 51st Annual Report for the Year 1961. Legislative Document 105. Division of Fish and Game. Albany, N. Y. pp. 91-101.

Under the Fish and Wildlife Management Act, land on the Lake Erie

front used for fish and game encountered problems. With landowners and the protective patrol working together, many of the problems of posting were resolved along with public abuse of resources.

The Bureau of Fish mentions reports on streams and lake improvements, newly constructed boat sites and the commercial catch for Lake Erie, which was 331,675 pounds valued at $49,348. (BECPL)

467. New York State Conservation Department. 1962. 51st Annual Report for the Year 1961. Legislative Document 105. Division of Parks. Albany, N. Y. pp. 152-157.

This report discusses the activities of region-one(Niagara-Erie County) parks, some of which border on Lake Erie. Improvements for Evangola along with appropriations, revenue and attendance are given. Statistics are given for Lake Erie State Park also. (BECPL)

468. New York State Conservation Department. 1963. 52nd Annual Report for the Year 1962. Legislative Document 106. Authorities and Commission. Albany, N.Y. pp. 195-198.

The Great Lakes Commission presented a biannual report, compiling Great Lakes fishing laws and regulations and a specific report on foreign commerce of the Great Lakes ports during 1960. The comprehensive Great Lakes water pollution study along with a variety of public issues were made a continual effort. The Great Lakes Commission is lauded here with concerns given. (BECPL)

469. New York State Conservation Department. 1963. 52nd Annual Report for the Year 1962. Legislative Document 106. Division of Fish and Game. Albany, N. Y. pp. 95-115.

The Bureau of Fish section is concerned with developing and applying resource management. This year biological surveys on waters, fish stocking, stream improvement, acquisition and development of land for public access to fishing waters, licensing of commercial fishing and compilation of catch statistics along with public education and information services were among the accomplishments of the Fish and Game Division. The commercial catch for Lake Erie was 545,484 pounds valued at $75,906. (BECPL)

470. New York State Conservation Department. 1963. 52nd Annual Report for the Year 1962. Legislative Document 106. Division of Parks. Albany, N. Y. pp. 145-149.

Parks and recreation areas bordering Lake Erie in the New York State area are coded as region one. The report lists activities and improvements of the region and Lake Erie State Park. (BECPL)

471. New York State Conservation Department. 1963. 52nd Annual Report for the Year 1962. Legislative Document 106. Division of Water Resources. Albany, N. Y. pp. 175-177.

Mention is made of planning assistance asked for by counties bordering Lake Erie. (BECPL)

472. New York State Conservation Department. 1964. 53rd Annual Report for the Year 1963. Legislative Document 101. Division of Fish and Game. Albany, N. Y. pp. 95-101.

Discussion is made of the Fish and Wildlife management Act, part of which pertains to Lake Erie.

The Bureau of Fish and Game reports on licensing for commercial boats and the total commercial catch for 1962 which amounted to 447,269 pounds, valued at $60,137 from the New York State segment of the Lake Erie waters. (BECPL)

473. New York State Conservation Department. 1964. 53rd Annual Report for the Year 1963. Legislative Document 101. Division of Parks. Albany, N. Y. pp. 145-151.

Lake Erie State Park is mentioned along with other parks along Lake Erie. Notable is the decline in activities and swimming for Lake Erie State Park because of pollution due to extreme algae infestation along the south shore of Lake Erie from Dunkirk to Barcelona. (BECPL)

474. New York State Conservation Department. 1964. 53rd Annual Report for the Year 1963. Legislative Document 101. Division of Water Resources. Albany, N. Y. pp. 173-177.

Lake Erie is mentioned in regards to a water resource planning board which was created. An economic base study blossomed, and from this, projections for the future water quality needs were made. (BECPL)

475. New York State Conservation Department. 1965. 54th Annual Report for the Year 1964. Legislative Document 98. Authorities and Commissions. Albany, N. Y. pp. 186-187.

In this report there is discussion of the establishment of the Great Lakes Commission. (BECPL)

476. New York State Conservation Department. 1965. 54th Annual

Report for the Year 1964. Legislative Document 98. Division of Fish and Game. Albany, N. Y. pp. 89-127.

This section mentions stream improvement and lake development on Lake Erie. The commercial fishing catch on Lake Erie was 883,520 pounds valued at $135,800 for this year from New York State waters. Included also is the number of permits issued for fish management and control projects. (BECPL)

477. New York State Conservation Department. 1965. 54th Annual Report for the Year 1964. Legislative Document 98. Division of Lands and Forests. Albany, N. Y. pp. 34-44.

This report includes tables for counties surrounding the lake, fishing rights, land aquisition, boat launch sites, and other recreational facets. (BECPL)

478. New York State Conservation Department. 1965. 54th Annual Report for the Year 1964. Legislative Document 98. Division of Parks. Albany, N. Y. pp. 143-145.

This report discusses attendance and water pollution on a Lake Erie beach. (BECPL)

479. New York State Conservation Department. 1965. 54th Annual Report for the Year 1964. Legislative Document 98. Division of Water Resources. Albany, N. Y. pp. 167-168.

This report summarizes investigations being done on Lake Erie. (BECPL)

480. New York State Conservation Department. 1966. 55th Annual Report for the Year 1965. Legislative Document 98. Authorities and Commissions. Albany, N. Y. pp. 134-139.

A discussion of formation of the Great Lakes Commission and its activities are given with functions and accomplishments such as the Water Quality Act. (BECPL)

481. New York State Conservation Department. 1966. 55th Annual Report for the Year 1965. Legislative Document 98. Division of Fish and Game. Albany, N. Y. pp. 85-87.

The Bureau of Fish reports statistics for (1964) licensing and other areas concerning the commercial fisheries. The catch is listed

for Lake Erie as 179,511 pounds, valued at $45,994.

The Fisheries Research section includes studies of fisheries problems in relation to sport and commercial fishing. (BECPL)

482. New York State Conservation Department. 1966. 55th Annual Report for the Year 1965. Legislative Document 98. Division of Parks. Albany,N. Y. pp. 115-118.

The parks in the Niagara Frontier region along Lake Erie are cited according to appropriations, revenue and attendance statistics. Figures for Lake Erie State Park are given. (BECPL)

483. New York State Conservation Department. 1966. 55th Annual Report for the Year 1965. Legislative Document 98. Division of Water Resources. Albany, N. Y. pp. 134-139.

Mention is made of the Erie-Niagara Basin Board highlighting an economic base report completed in 1965. New York State is also taking part in an Ohio River Basin study mentioned on behalf of an 8 interstate compact on a water pollution study, while a water resource investigation study will be undertaken in the Lake Erie-Niagara Basin. (BECPL)

484. New York State Department of Health. 1963. Lake Erie (west end) and tributary drainage basins in Chautauqua County except Cattaraugus Creek and Silver Creek drainage basins. New York State Dept. Health. Albany, N. Y. Lake Erie-Niagara River Drainage Basin Series. Rept. 6. 115 p.

The purpose of surface water surveys and studies is to determine and give consideration to the factors mentioned in subdivision 3 Section 1205, Article 12 of the Public Health Law, so that the waters of the state can be classified and assigned standards of quality and purity under the provisions of the law.

The recommended classifications for those waters of Lake Erie and the streams covered in this report are listed in Table 1, appended. In arriving at these recommended classifications, consideration has been given to the best usages of these waters in accordance with the requirements of Article 12 of the Public Health Law.

485. New York State Water Resources Commission. 1962. Cattaraugus Creek portion in vicinity of Gowanda, New York. New York State Water Resources Commission. Albany, N. Y. Lake Erie-Niagara River Drainage Basin Series. Rept. 5. 37 p.

Given here are the water quality standards for purity for the designated waters of New York State. (BL)

486. New York State Water Resources Commission. 1969. Erie-Niagara Basin comprehensive water resources plan. Erie-Niagara Basin Regional Planning Board. N. Y. State Cons. Dept. Albany, N. Y. 201 p.

This report documents a plan for water resource management for the Erie-Niagara Basin. Investigations identify available resources and evaluations are given for industrial water supply, water quality, agriculture, water recreation, fish and wildlife, and other integrated needs. Developmental projections are given for the future.

487. Niagara Frontier Transit Authority. 1973. Port of Buffalo 1973 handbook. NFTA. Buffalo, N. Y. 26 p.

The article includes information about the Buffalo Harbor, as well as the listing of all shipping companies which use that harbor, the types of cargo imported and exported, port services, commercial banks, customhouse brokers, consular offices, etc. Also included is nautical mileage from Buffalo to all major ports of the world. (BECPL)

488. Oberlin, David. 1971. The Great Lakes-St. Lawrence System. Communicator. Great Lakes Basin Commission. Ann, Arbor, Mich. 2(3):3-4.

This article discusses the Great Lakes-St. Lawrence Seaway system and its economic importance as a major trade route. Future projections and demands are mentioned in the article.

489. Oeming, Loring F. 1963. Water resources management-The scientists contribution. Univ. Mich. Great Lakes Res. Div. Proc. 6th Conf. Great Lakes Res. Pub. 10: 288-291.

Lake Erie is mentioned in respect to power plants and their temperature effect as a depletion of the fishery in Lake Erie. Recreational and aesthetic concerns are mentioned as considerations for establishing water management controls, along with public demands and concepts.

490. Oglesby, Ray T. 1970. Lakes which produce too much. N.Y. State Conservationist. Albany, N.Y. 24(6):18-21.

Lake Erie is mentioned as becoming eutrophic due mainly to man-made pollutants. (SM)

491. Ohio Department of Health. 1968. Public water supply in Ohio. Columbus, Ohio. 52 p.

This is a very general booklet prepared for the use of school pupils and the general public for a basic knowledge of where water comes from, its characteristics, treatment, distribution and public health knowledge. Lake Erie waters are included in this booklet.

492. Ohio Environmental Protection Agency. 1973. Water quality standards. Columbus, Ohio. 32 p.

This document contains the revised Water Quality Standards of the State of Ohio, effective July 27, 1973. The standards were adopted by the Director of the Ohio Environmental Protection Agency as authorized in Section 6111.041 of the Ohio Revised Code, after public hearing and an extensive period of review and comment by govennmental, industrial, environmental and public spokesmen. The standards are based upon scientific and technical knowledge accumulated by the Ohio Environmental Protection Agency and the United States Environmental Protection Agency as to the quality of waters of the State of Ohio required to sustain the following beneficial uses: municipal, agricultural and industrial water supplies, well balanced aquatic life habitat, and recreational activities.

493. Ohio Historical Society. 1969. Lake Erie, 1669-1969. Echoes. Columbus, Ohio. 8(9):1.

This article describes the history of sailing vessels on Lake Erie. Violent storms sank many ships. (SM)

494. Ohio State University. 1969. Systems analysis for Great Lakes water resources. In: Proceedings of the Symposium on Water Resources Research. Water Resources Center. Columbus, Ohio. 139 p.

In this publication an economic subsystem was dealt with in Section II which described an interindustry forecasting model with water quantity and quality constraints. Some determinants of Detroits regional share of economic activity are given through selected industries and a regional trade and structure model for pollution abatement in the Western Basin of Lake Erie. (CA)

495. Ohio Water Pollution Control Board. 1967. Annual Report for 1966. Ohio Dept. Health. Columbus, Ohio. 8 p.

In 1966, the Ohio Water Pollution Board stated a series of public hearings for the setting of new water quality critera; they

ordered a higher degree of waste treatment by many industries and municipalities, increased in number the enforcement hearings, pressed for a high rate of activity in the construction of waste treatment facilities, and outlined a billion dollar program of improvements for the next four years.

496. Ohio Water Pollution Control Board. 1968. Annual Report for 1967. Ohio Dept. Health. Columbus, Ohio. 8 p.

In 1967, the Ohio Water Pollution Control Board adopted new and much higher water quality standards for all stretches of water in interstate waterways and streams. It began public hearings for the setting of new water quality standards on all intrastate streams and started on implementation of the higher standards by new requirements in the permit orders of the Water Pollution Control Board. It also increased the number of enforcement hearings by the board, strengthened the board's powers by legislative amendments, and continued in gains in the construction of waste treatment facilities.

497. Ohio Water Pollution Control Board. 1970. Annual Report for 1969. Ohio Dept. Health. Columbus, Ohio. 9 p.

In 1969, the Ohio Water Pollution Control Board implemented new and higher quality water standards for all stretches of streams and waterways in Ohio. It legislated statewide requirements for waste treatment, expanded surveillance and monitoring, intensified enforcement, continued gains in the construction of industrial and municipal waste treatment facilities, continued the program for abatement of pollution caused by water treatment plants, and continued control of acid mine drainage.

498. Ohio Water Pollution Control Board. 1971. Annual Report for 1970. Ohio Dept. Health. Colombus, Ohio. 5 p.

In 1970, the Ohio Water Pollution Control Board set a new high of 148 formal enforcement hearings, reviewed and approved 320 plans for sewerage projects, up-graded a number of basic water quality standards involving temperature and acidity-alkalinity balance, expanded monitoring of Ohio's waterways, and conducted a special investigation of mercury in Lake Erie shores of Ohio.

499. Olds, N. V. 1964. Some legal problems affecting the Great Lakes. Univ. Mich. Great Lakes Res. Div. Proc. 7th Conf. Great Lakes Res. Pub. 11:32-44.

The article includes a history of treaties (1793-1955) and legal problems of the Great Lakes (Lake Erie) influencing rights and responsibilities of the Great Lakes region. There is spe-

concern over Canada and U. S. cooperation affecting economic and resource potentials of the region.

500. Ontario Ministry of Natural Resources. 1972. Ontario commercial fish industry-statistics on landings, 1961-1965. Div. Fish and Wildlife. Commercial Fish and Fur Branch. Ottawa, Ont. pp. 19-21.

This publication is a record of fish landings reported by the commercial fish industry in the Province of Ontario for the years 1961-1965. The information presented came from records submitted by the commercial fish industry.

The first table for Lake Erie lists landings by species and and average price per pound. The following table summarizes the total landings and the total landed value per year.

The second table for Lake Erie lists landings (in pounds) by species and statistical district for the years 1961 through 1965.

501. Ontario Ministry of Natural Resources. 1972. Ontario commercial fishery industry-statistics on landings 1966-1970. Div. Fish and Wildlife. Commercial Fish and Fur Branch. Ottawa, Ont. pp. 19-21.

This publication is a record of fish landings reported by the commerical fish industry in the Province of Ontario for the years 1966-1970. The information presented came from records submitted by the commercial fish industry.

The first table for Lake Erie lists landings by species and average price per pound. The following table summarizes the total landings and the total landed value per year.

The second table for Lake Erie lists landings (in pounds) by species and statistical district.

502. Ontario Treasury Board. 1971. Review of planning for the Grand River watershed. Ontario Treasury Board. Services Div. Ottawa, Ont. 107 p.

This study investigates issues related to water management in the Grand River Basin to its impact on future growth and development of the communities on the periphery. Costs and financial implications of alternative procedures will be identified and analysed. (CCIW)

503. Osborn, Herbert. 1901. The Lake Laboratory. Ohio Naturalist. Columbus, Ohio. 1(6):79-82.

The Ohio State University laboratory at Sandusky first opened in 1895. This article describes the facilities available here, as well as the goals of the laboratory. (BU)

504. Osborn, Herbert. 1904. Formal opening of the Lake Laboratory building. Ohio Naturalist. Colombus, Ohio. 4(8):177-187.

The formal opening of the new building for the Lake Laboratory on Cedar Point near Sandusky, Ohio was on July 2nd, 1903. Included in the article is a description of the facilities, and the address of Capt. Alexis Cope, Secretary of the Board of Trustees, and comments by Herbert Osborn, the director of the laboratory. (BU)

505. Osburn, Raymond C. 1920. A survey of game fish conditions in Ohio. Trans. Am. Fish. Soc. 50:353-363.

The article discusses the small-mouth bass which is common to the open waters of Lake Erie, and the large-mouth bass which occurs in the weedy bays and inlets. In 1919, small-mouth bass fry were abundant about the islands in Western Lake Erie, yet no fry could be found in 1920. This was probably due to weather conditions which destroyed the eggs before they could catch. (CCIW)

506. Osmerod, G. K. 1970. The relationship between real estate values, algae, and water levels. Lake Erie Task Force. Internat. Great Lakes Levels Board. Chicago, Ill. 15 p.

This report is concerned with the prime effect of algae on recreational land uses and activities and the psychological effect of a deteriorating environment. The Canadian shoreline of the eastern end of Lake Erie is dominated by such land uses and activities and it is obvious that algae (or pollution generally) is not compatible with recreational uses. Environmental degradation is expected and tolerated however, the cost of shoreline deterioation through algae accumulation may in a large part be immeasurable in precise economic terms. Among the problems to contend with algae growths are the nuisance effect on fishing operations, faltering operations on industrial and municipal treatment plants or private water systems and the offensive and obnoxious odors that all interests situated on the shoreline must live with for the July and August period. (CCIW)

Ostrom, Elinor - See: S. E. Goldstone, et al, No. 232.

Ostrom, Elinor - See: Vincent A. Ostrom, et al, No. 507.

Ostrom, Vincent A. See: S. E. Goldstone, et al, No. 232.

507. Ostrom, Vincent A., Elinor Ostrom, and Ira L. Whitman. 1970. Problems for institutional analysis of the Great Lakes Basin. Internat. Assoc. Great Lakes Res. Proc. 13th Conf. Great Lakes Res. pp. 156-167

Recent national investigations pinpoint institutional and policy issues as being at the heart of present water-management difficulties. In the Great Lakes Basin, institutions involved in water management exist at all levels of government, from international agencies to localized special districts.

There is a theoretical basis for describing the behavior of institutions in a common-pool resource situation such as is typified by the Great Lakes. Based on common-pool theory, complete institutional analysis of specific problem areas (e.g., Lake Erie water quality) features the following research components: (1) Extension of common-pool resource theory to fit the specific problem; (2) Development of methodology for assessment of institutions; (3) Assessment of existing institutional arrangements; (4) Specification of new institutional formation or modification; (5) Verification of common-pool theory based on observed behavior.

Complete institutional analysis, leading to modified or restructured institutional arrangements, is seen as a necessary early step toward more effective resource management procedures in the Great Lakes Basin.

508. Ontario Department of Economics and Development. 1965. Lake Erie Region Economic Survey 1965. Ont. Dept. Economics and Develop. Spec. Res. and Surveys Brancn. Ottawa, Ont. 154 p.

This entire book investigates and sets down conspicuous characteristics of the Central Lake Erie region's economy. Population, natural resources, manufacturing, transportation, communications construction, trade, tourism and other aspects of the economy are considered. Information relevant to many of more significant local communities as such, is dealt with in the chapter on counties and municipalities. An understanding of trends pertaining to land use and settlement within the area is provided by the chapter on physical geography. (CCIW)

509. Owens, Morlais and Gavin Wood. 1968. Some aspects of the eutrophication of water. Water Res. 2:151-159.

There are many important economic consequences of eutrophication. In some instances fisheries may be damaged; the abundance of many important commercial fishes in Lake Erie has declined markedly during the last 40 years (Baldwin and Saalfield, 1962). The recreational value of the water may be affected as a result of the replacement of game fish, such as the salmonids, by less desirable coarse fish. If there is pronounced development of littoral weed and filamentous algae then boating and bathing facilities may be impaired.

510. Outboard Boating Club of America. 1968. Legislative Ledger. Government Relations Dept. Washington, D. C. 13(3):4.

Discussion is made on the state's boat pollution control law. Lake improvement, management regulation, and control of lakes and surrounding lands, water quality, weed growth, boat traffic and recreational facilities are discussed in relation to legislation.

511. Outboard Boating Club of America. 1968. Legislative Ledger. Government Relations Dept. Washington, D. C. 13(5):9.

Reference is made here to legislation on boats and sewage from watercraft. Registration of boats and its requirements are also mentioned. This New York State legislation is also effective on Lake Erie.

512. Outboard Boating Club of America. 1968. Legislative Ledger. Government Relations Dept. Washington, D. C. 13(8):4.

Discussion is made on watercraft waste disposal, with the Health Department having the final authority in regard to the matter.

513. Outboard Boating Club of America. 1968. Legislative Ledger. Government Relations Dept. Washington, D. C. 14(2):5.

Again, regulation of sewage disposal from watercraft including the Health Department's ruling on pollution control devices is discussed. Regulations and requirements for boating are also mentioned.

514. Outboard Boating Club of America. 1968. Ohio: Boat gas tax money helps build small boat harbor. Facilities Facts. Chicago, Ill. p. 3.

The U. S. Army Corps of Engineers and the Ohio's Water Craft Safety Fund are jointly building a small boat harbor on Lake Erie, using the boat gas tax money.

515. Outboard Boating Club of America. 1969. Legislative Ledger. Government Relations Dept. Washington, D. C. 14(3):4.

The Health Department of New York State is mentioned in regard to setting public health and pollution standards for boat controlled pollution devices. Lake Erie also falls under its regulation.

516. Outboard Boating Club of America. 1969. Legislative Ledger. Government Relations Dept. Washington, D. C. 14(4):5.

Hazards to navigation and boating regulations have come up in legislation for New York State, affecting Lake Erie and its recreational authority.

517. Outboard Boating Club of America. 1969. Legislative Ledger. Government Relations Dept. Washington, D. C. 14(5):5.

Boating regulations in regard to waterskiing are given for New York's navigable waters, including Lake Erie.

518. Outboard Boating Club of America. 1970. Legislative Ledger. Government Relations Dept. Washington, D. C. 15(1):4.

Safety conditions for boating, pollution, and water standard regulation by health departments are mentioned in this article. Higher standards may be set on Lake Erie.

519. Outboard Boating Club of America. 1970. Legislative Ledger. Government Relations Dept. Washington, D. C. 15(2):5.

Revenue, boat harbors and navigational improvements in New York State waters and other regulatory changes are mentioned here.

520. Outboard Boating Club of America. 1970. Legislative Ledger. Government Relations Dept. Washington, D. C. 15(3):5.

Boat pollution, sewage disposal and its regulation by state and local health departments are given here.

521. Outboard Boating Club of America. 1970. Legislative Ledger. Government Relations Dept. Washington, D. C. 15(5):5.

Health Department inspection is cited here for all navigable waters of New York State, including Lake Erie.

522. Outboard Boating Club of America. 1970. Legislative Ledger. Government Relations Dept. Washington, D. C. 15(7):5.

Fines and state regulation of boaters, intoxication, and other regulatory measures are mentioned.

523. Outboard Boating Club of America. 1971. Legislative Ledger. Government Relations Dept. Washington, D. C. 16(1):7.

Standards for public safety, health, and regulations are set for the navigable waters of New York State.

524. Outboard Boating Club of America. 1971. Legislative Ledger. Government Relations Dept. Washington, D. C. 16(2):6.

Public health, regulation and sewage disposal are cited in this article, concerning bodies of water within New York State.

525. Outboard Boating Club of America. 1971. Legislative Ledger. Government Relations Dept. Washington, D. C. 16(3):6.

Regulatory measures in correlation with recreational harbors are mentioned in regard to waters of New York State, with permits being issued. Other regulatory measures are also mentioned.

526. Outboard Boating Club of America. 1971. Legislative Ledger. Government Relations Dept. Washington, D. C. 16(4):6.

Mentioned here are safety features required on water vehicles. Other regulatory controls are also included.

527. Outboard Boating Club of America. 1971. Legislative Ledger. Government Relations Dept. Washington, D. C. 16(6):6.

Safety requirements are given here for all water vehicles operating on New York State navigable waters, including Lake Erie. Stress is also placed on age of operation of the vehicles.

528. Outboard Boating Club of America. 1971. Legislative Ledger. Government Relations Dept. Washington, D. C. 16(7):4.

Discussed here is the municipal home rule law in regard to regulation policies on technological advances in recreational vehicles.

529. Outboard Boating Club of America. 1972. Legislative Ledger. Government Relations Dept. Washington, D. C. 17(2):5.

New York regulation on recreational vehicles is cited here along with manufacturing controls. Pollution is the concern here, with its effect on the bodies of water in New York State including Lake Erie.

530. Outboard Boating Club of America. 1972. Legislative Ledger. Government Relations Dept. Washington, D. C. 17(3):6.

Operation and use of vessels is discussed in accordance with broadening the regulatory authority by localities.

531. Outboard Boating Club of America. 1972. Legislative Ledger. Government Relations Dept. Washington, D. C. 17(5):5-7.

This article cites New York's motor drain bill, which would effect craft on Lake Erie. Also mentioned is regulation of water vehicles by a local division, approved by the appropriate state agency.

532. Outboard Boating Club of America. 1972. Legislative Ledger. Government Relations Dept. Washington, D. C. 17(6):5.

Discussion of regulation of watercraft. Reckless operation of vehicles and the like is subject to local health and police authorities.

533. Outboard Boating Club of America. 1972. Legislative Ledger. Government Relations Dept. Washington, D. C. 17(9):5.

This article examines the level--whether local, state, or federal--upon which the responsibility lies for enhancing the environment.

534. Outboard Boating Club of America. 1973. Legislative Ledger. Government Relations Dept. Washington, D. C. 18(1):8-9.

Discussion of motor boat registration is given for New York State, affecting Lake Erie. Improvements and appropriation for recreational facilities on the Barge Canal System are also given.

535. Outboard Boating Club of America. 1973. Legislative Ledger. Government Relations Dept. Washington, D. C. 18(2):6.

Strict regulatory measures in operation and ownership of recreational vehicles (boats) are enforced in New York State, including the NYS sector of Lake Erie.

536. Outboard Boating Club of America. 1973. Legislative Ledger. Government Relations Dept. Washington, D. C. 18(3):7.

The OBC registers its opposition to proposed legislation in New York which would transfer to the Motor Vehicles Department all functions and powers of the Office of Parks and Recreation relating to registration of recreational vehicles.

537. Outboard Boating Club of America. 1973. Legislative Ledger. Government Relations Dept. Washington, D. C. 18(5):3.

Mentioned here is a controversial bill over motor drainage which would affect boaters and recreational pursuits on Lake Erie.

538. Outboard Boating Club of America. 1973. Legislative Ledger. Government Relations Dept. Washington, D. C. 18(6):5.

Registering and numbering motorboats is required for New York State and is under the jurisdiction of the Department of Motor Vehicles. It is likewise a requirement for the region of New York State on Lake Erie.

Owen, G. E. - See: J. H. Neil, No. 377.

539. Pacific Northwest Laboratories, Division of Battelle Memorial Institute. 1968. Great Lakes restoration - review of potentials and recommendations for implementation. Commission Marine Sci., Eng. and Resources. Washington, D. C. pp. 1-5, 18, 37.

This report discusses the restoration of Lake Erie in terms of cost and methods. Projections of the future population of the Lake Erie Basin are included, and a map shows the locations of industry, shipbuilding, commercial fisheries, Federal agencies and University Centers for Great Lakes Research.

540. Parker, Carl E. 1970. Mercury - major new environmental problem. Conservationist. Albany, N.Y. 25(1):6-9.

Because of high concentrations of mercury in certain fish, the New York Department of Agriculture and Markets recommended an embargo on all commercial fishing in Lake Erie and seizure of commercial landings by its inspectors. Continued monitoring and sampling of Lake Erie fish is warranted because of the threat to human health. (SM)

541. Parsons, John W. 1967. Contributions of year-classes of blue pike to the commercial fishery of Lake Erie, 1943-59. J. Fish. Res. Board Canada. 24(5):1035-1066.

The blue pike (Stizostedion vitreum glaucum) contributed about 12.7 million lb annually to the commercial production of fish in Lake Erie in 1915-59. Production averaged about 27% of the total for all species; in some years it exceeded 50%. The catch fluctuated greatly and was featured by a series of seven "highs" and "lows" during the 45-year period. The landings ranged between 2 million and 26 million lb; periods of peak production were 5 to 9 years apart. A sharp decline in the catch started in 1957. The take of 79,000 lb in 1959 was the lowest on record to that time.

Age and size compositions of the catch were determined from samples of blue pike taken from commercial landings in the fall, 1943-59. Peaks in production in that period were attributed to a few strong year-classes separated by several weak year-classes. Of the 20 year-classes represented in the samples, those of 1944 and 1949 were by far the strongest; together they contributed 42% (by weight) of the fall blue pike production in 1943-59. The strength of the 1939 and 1940 year-classes was moderate and the 1954 year-class was the last one of any importance. The other 15 year-classes were weak.

The 1957-59 decline in production was accompanied by a marked increase in rate of growth. Blue pike in age-group III weighed nearly eight times more and were 7.7 inches longer in 1959 than in 1951. Landings after 1958 consisted of only a few large fish. The collapse of the fishery forced blue pike fishermen either to fish for less valuable species or to discontinue operation.

542. Parsons, John W. 1970. Walleye fishery of Lake Erie in 1943-62 with emphasis on contributions of the 1942-61 year-classes. J. Fish. Res. Board Canada. 27:1475-1489.

The commercial fishery for walleyes (Stizostedion vitreum vitreum) in Lake Erie virtually collapsed in the late 1950's. The extreme decline in production was attributed primarily to a succession of weak year-classes, caused by habitat deterioration (increased water temperatures, enrichment, and pollution) in Western Lake Erie. Unusually high fishing intensity and high yields of walleyes in the mid-1950's contributed to the collapse.

Annual lakewide production of walleyes dropped from a record high of 15 million lb in 1956 to a record low of 717,000 lb in 1962. Canadian catches exceeded those of the United States only during the high production years of 1956-58; U. S. fishermen took 71% of the total catch in 1915-62.

543. Parsons, John W. 1972. Life history and production of walleyes for the 1959 year-class in Western Lake Erie, 1959-1962. Trans. Am. Fish. Soc. 101:655-661.

Because of the near collapse of the fishery for walleyes (Stizostedion vitreum vitreum) in Lake Erie in the late 1950's, walleyes of the 1959 year-class were studied to gain a better understanding of the life history of the species and the dynamics of the population. In the summer of 1959 most walleyes of the year-class were in water 10 to 20 feet deep along the south and west shores of the Western Basin. By fall they averaged about 10 inches long and were rather widely distributed throughout the Basin. By September 1960 most had reached legal length (then 13 inches in Ohio), and in October they made up nearly the entire commercial walleye production and made the highest monthly contribution during the life of the year-class. Walleyes of the 1959 year-class were cropped intensively and remained in the fishery for only a relatively short time. Estimated Ohio trap net production of the year-class

was 261,000 fish in 1960, 168,000 in 1961, and 21,000 in 1962. Few fish survived beyond the spring of 1962. About 97% of the females of the year-class were caught before they had spawned once. (BU)

544. Patterson, Thomas M. and Harley F. Lawhead. 1968. History and present status of regulation studies of water levels and flows on the Great Lakes. In: Proceedings of the Great Lakes Resources Conference. Eng. Inst. Canada. Ottawa, Ont. pp. 201-228.

This article discusses water regulation and how it affects recreation, navigation, and power interests. The relationship of the Lake Erie area to these aspects is mentioned.

545. Paulus, Robert D. 1969. Walleye fry food habits in Lake Erie. Ohio Dept. Nat. Resources. Div. Wildlife. Ohio Fish Mono. Columbus, Ohio. 45 p.

This article deals with the value of the walleye as an important sport fish in Western Lake Erie. Desirability is listed as a factor for its importance. This study on fry is being done in order to maintain the constant population of this species.

546. Pearson, Norman. 1971. The Great Lakes Basin. Canadian Audubon. Ottawa, Ont. 33(2):44-50.

This article reviews the problems facing the Great Lakes Basin. The author states that the lakes can be saved, but that their present rate of deterioration must be reversed before it is too late. It has been estimated that the restoration of Lake Erie would cost $40 billion, but as yet there is no sign that such funds are to be committed. (SM)

547. Pearson, Norman. 1972. The Great Lakes Basin: Alternative institutional arrangements for multiple-purpose resources management. Canada-United States University Seminar on Institutional Arrangements for the Integrated Management of the Water and Land Resources of the Eastern Great Lakes, 1971-1972. Pub. 55: 7, 12.

This paper reports on legislation and international action concerning the Great Lakes. Lake Erie is cited as an example of certain legislation in a few cases.

548. Peeva, George E. 1968. Recommended program of regional economic development, final report. Economic Council: Erie Region Province of Ontario. London, Ont. 27 p. + supplements.

This booklet contains statements of design for development. The advisory council encourages economic growth and tries to create and maintain a good environment for living. The recommendations stress provincial growth and regional development. (CCIW)

549. Pennsylvania Department of Health. 1968. Offshore drilling in Lake Erie. Pa. Dept. Health. Sanitary Water Board. Pub. 22. 25 p.

The purpose of the report was to review the experience gained and to define the pollution potential of the further development of oil and gas resources in the Pennsylvania waters of Lake Erie. Conclusions were that offshore gas deposits in Lake Erie may be of considerable economic value since the present consumption of natural gas exceeds production. The major concern is pollution from drilling operations which can be prevented by lease agreements designed to minimize the effect of accidents. (CCIW)

Pentland, R. L. - See: E. Megerian, No. 365.

Persoage, N. P. - See: G. T. Carlson, No. 145.

550. Phillips, Bonnie and Janet Massaro. 1971. A summary of the detergent problem. ECHO Issues. Buffalo, N. Y. 1(4):1-2.

Various committees have recommended approximately 8 suggestions on the control and manufacture of the detergent-phosphate dilemma. Canadian feelings, along with those of the F.T.C. and the F.D.A., are stated in concern with subjects of debate. Consumer education is encouraged here.

551. Phillips, Bonnie. 1971. Assembly Bill 6963-A-Detergents. ECHO Issues. Buffalo, N. Y. 1(9):3.

A summation of a bill signed by Governor Rockefeller which provides a regulatory program to insure protection of human health and the environment against possibly harmful ingredients in household cleansing products with phosphorus is discussed here.

Phillips Planning and Engineering Ltd. - See: G. L. Reeds, No. 569.

552. Pomeroy, Lawrence A. Jr. 1971. Great Lakes calendar. Inland Seas. 27(1):57-63.

This article summarizes the important events concerning the Great Lakes from November 1970 to January 1971. Included are new vessels, legislation, navigation, television programs, conferences, etc. (BU)

553. Pomeroy, Lawrence A. Jr. 1972. Great Lakes calendar. Inland Seas. 28(3):225-233.

This article summarizes the important events concerning the Great Lakes from May 1972 to July 1972. Included are legislation, new vessels, sailing contests, etc. (CCIW)

554. Pomeroy, Lawrence A. Jr. 1972. Great Lakes calendar. Inland Seas. 28(4):306-314.

This article summarizes the important events concerning the Great Lakes from August 1972 until October 1972. Included are legislation, new vessels, shipping, industries, etc. (CCIW)

555. Pomeroy, Lawrence A. Jr. 1973. Great Lakes calendar. Inland Seas. 29(1):52-60.

This article summarizes the events concerning the Great Lakes from November 1972 to January 1973. Included are legislation, shipping, new vessels, television documentaries, etc. (CCIW)

556. Pomeroy, Lawrence A. Jr. 1973. Great Lakes calendar. Inland Seas. 29(2):132-139.

This article summarizes the important events concerning the Great Lakes from February 1973 to April 1973. Included are legislation, vessels, shipping, publications, etc. (CCIW)

557. Pomeroy, Lawrence A. Jr. 1973. Great Lakes calendar. Inland Seas. 29(3):205-211.

This article summarizes the important events concerning the Great Lakes from May 1973 to July 1973. Included are legislation, appointments, shipping, new vessels, licenses, rescues, etc. (CCIW)

558. Pomeroy, Lawrence A. Jr. 1974. Great Lakes calendar. Inland Seas. 30(1):52-57.

This article summarizes the important events concerning the Great Lakes from November 1973 to January 1974. Included are legislation, new vessels, shipping, etc. (CCIW)

559. Poston, H. W. 1961. The Great Lakes-Illinois Waterway Basins Comprehensive Water Pollution Control Project. Univ. Mich. Great Lakes Res. Div. Proc. 4th Conf. Great Lakes Res. Pub. 7:57-63.

The St. Lawrence Seaway will accelerate the growth of large population complexes. Giant metropolitan areas can be visualized stretching from Milwaukee around the southern edge of Lake Michigan through Chicago into Indiana; from Detroit around Lake Erie to Toledo and Cleveland; and from Buffalo along the edge of Lake Ontario to Rochester. Similar changes can be predicted for metropolitan development on the Canadian side of the Great Lakes. The growth of these areas will depend on the Great Lakes and their watersheds for municipal, industrial, and recreational waters. Rather than quantity of water, a deterioration of quality of the lake water might be the eventual limiting factor on growth and commercial development.

Under the basic authority contained in the Water Pollution Control Act, the Congress has commissioned the Public Health Service to serve as coordinator in the development of a comprehensive plan for the improvement and preservation of the quality of water in the Great Lakes for all legitimate purposes. This task is too large and too complex for any group or indeed any Department to handle without the active, sympathetic participation and cooperation of interested parties at all levels of government and private practice. (RL)

560. Powers, Charles F. and Andrew Robertson. 1966. The aging Great Lakes. Sci. Am. 215(5):94-104.

The natural aging of the Great Lakes is being accelerated by human and industrial wastes. Pollution in Lake Erie is especially serious. The article gives a description of the decline in quality fish which was attributed to man's activities.

561. Prince, A. T. and J. P. Bruce. 1969. Canadian scientific programs for optimum management of Great Lakes water resources. Internat. Assoc. Great Lakes Res. Proc. 12th Conf. Great Lakes Res. pp. 877-882.

A number of programs have recently evolved in Canada to help solve management problems of fluctuating water quantities, shore erosion, and deteriorating water quality in the Great

Lakes. Three levels of government, the academic community and the private sector are all involved in finding economical solutions and in implementation. Research on longer term problems, international aspects of management and shipping are all dealt with primarily by federal agencies. Ontario agencies such as the Department of Lands and Forests, the Water Resources Commission and the Hydro-Electric Power Commission have important operational and control responsibilities and undertake applied research closely related to their missions. An outline is given of coordination machinery in Canada for research and management and some suggestions are put forward for improvements and for better coordination of Canadian programs with those in the United States.

562. Prince, A. T. and J. P. Bruce. 1972. The Canada Centre for Inland Waters: An approach to research coordination. In: Canada Centre for Inland Waters. Collected Reprints. Vol. 5.
Reprinted from: Water Management - Basic Issues. (Paris, OECD). pp. 287-300.

This paper describes the conception, organization and aims of the Centre for Inland Waters. One of the problems confronting the organization is the environmental deterioration of Lake Erie. The social implications of continued deterioration, involving human health and recreation, have become pressing issues.

563. Prince, A. T. and R. H. Clark. 1971. Canada's international waters. Dept. Environment. Inland Waters Branch. Ottawa, Ont. Tech. Bull. 53. 9 p.

The Boundary Waters Treaty of 1909 is the basis of present arrangements to study and assess the utilization of the "international waters" between Canada and the United States. This report outlines the main features of the Treaty and discusses some of its effects.

The International Joint Commission (IJC), established under the Boundary Waters Treaty as a permanent tribunal, has the essential role of seeking solutions to conflicts involving boundary waters. Examples are given in this report of problems and investigations before the Commission.

The development of the Canada Centre for Inland Waters (CCIW), which is administered by the Department of the Environment, is explained and its concept and plan defined: the Canada Water

Act provides the framework to the Department for water resource planning and development on any interjurisdictional and international waters, and to complement and supplement studies on international waters being carried out under the Boundary Waters Treaty.

564. Purdy, R. W. 1963. Michigan pollution control policy and Lake Erie. Industrial Water and Wastes. 8(4):16-17.

Water pollution abatement requirements are discussed in relation to the Great Lakes, along with means and procedures to implement control measures. (BL)

565. Quinlan, D. W. 1968. Conflicts arising from the use of shore property on the Great Lakes. In: Proceedings of Great Lakes Water Resources Conference. Eng. Inst. Canada and Am. Soc. Eng. Toronto, Ont. pp. 145-154.

Rapid population growth in the Great Lakes Basin calls for better planning of shoreline development.

566. Radcliffe, Lewis. 1929. Status of Great Lakes fisheries. Trans. Am. Fish. Soc. 59:45-52.

The Great Lakes fisheries are a very important source of industry and employment in the United States and Canada. In 1927, a conference was held concerning the United States Bureau of Fisheries and conservation of the fishes of Lake Erie. Many scientific projects, a new system of fishery statistics suitable to the needs of biologists, revision of conservation laws of Michigan, Indiana, Ohio, and inaugurating studies of fish species are some of the projects that this bureau has undertaken. (CCIW)

Rader, Terry - See: Bruce Wilkens, No. 740.

Raines, C. E. - See: T. R. Jaske, et al, No. 309.

567. Ratigan, William. 1960. Great Lakes Shipwrecks and Survivals. Wm. Beerdmans Publishing Co. Grand Rapids, Mich. 298 p.

This book presents a colorful history of Lake Erie's navigation, including descriptions of various shipwrecks which took place. (BU)

568. Rau, John L. 1968. The evolution of the Cuyahoga River and its geomorphology and the environmental geology. In: G. Cooke (Ed.), The Cuyahoga River Watershed. Kent State Univ. Inst. Limnology and Dept. Biological Sci. Kent, Ohio. pp. 9-29.

Future projections are made in terms of urban effect on the geology of the Cuyahoga concerning sediments, flood heights, power, and water quality.

Reardon, W. A. - See: T. R. Jaske, et al, No. 309.

569. Reeds, G. L. 1971. Regional municipality of Niagara: Official plan studies and agricultural reports. Phillips Planning and Engineering Ltd. St. Catharines, Ont. 136 p.

The agricultural area along the northern shore of Lake Erie plays a major role in the economy termed the regional municipality of Niagara. The purpose of this report is to provide an overview of agriculture, to indicate the regional and provincial significance of agriculture, and to ensure that agriculture will provide an important input. (CCIW)

570. Reeves, Robert B. 1971. The Niagara group of the Sierra Club. ECHO Issues. Buffalo, N. Y. 2(2):3.

The steel industry's quantitatively notable contribution to air and water pollution has been relatively undetected throughout the years. Their methods of disposal of pickle liquor is discussed in this article, with an urged denial of a permit from the state for deep well disposal methods to be utilized by the Bethlehem Steel Corporation. The Sierra Club's position and demands on legislation are given concerning this issue.

571. Regier, H. A. and W. L. Hartman. 1973. Lake Erie's fish community: 150 years of cultural stresses. Science. 180(4092):1248-1255.

This review contrasts primeval Lake Erie with Lake Erie today. The article identifies the major ecological stresses, considers the effects of the fishery and other cultural stresses on the lakes resources, explores the difficulties in managing common property resources, and outlines current initiatives of fishery research and management.

572. Reitze, Arnold W. Jr. 1968. Wastes, water, and wishful thinking: The battle of Lake Erie. Case Western Law Review. 20(1):5-86.

This article discusses some of the economic and political aspects of Lake Erie with regard to pollution.

573. Retter, Otto. 1932. Pictorial Buffalo and Niagara Falls and Surroundings. Buffalo, N. Y. 320 p.

The entire publication traces the buildings, parks, recreational facilities, trade, commerce, and social activities of Buffalo and the surrounding area. (SM)

574. Ripprich, William F. 1972. A memorable yacht: From halcyon days to holocaust. Inland Seas. 28(2):87-95.

The history of LaBelle, a yacht which sailed the Great Lakes during the first half of the 20th century, is presented in this article. (CCIW)

575. Ripprich, William F. 1973. The North West and the North Land. Inland Seas. 29(1):3-15.

This article presents a history of the North West and the North Land, two famous luxury ships of the Great Lakes. Launched in the 1800's, one of these ships went on to attend two world wars. (CCIW)

576. Ripprich, William F. 1974. "The Anchor Line" Tionesta, Juniata, and Octorara. Inland Seas. 30(1):3-19.

This article is a brief history of the "Anchor Line"--its ships, their final disposition, and the men who sailed them. These ships traveled the Great Lakes route; mention is made of certain ports on Lake Erie. (CCIW)

Ritter, Alfred H. - See: MacElwee, No. 350.

577. Ritter, Alfred H. 1925. Transportation Economics of the Great Lakes-St. Lawrence Ship Channel. N. C. P. Press. Washington, D. C. 276 p.

This publication discusses waterway practices for ocean vessels. Foreign and domestic trade are discussed in relation to waterway traffic. The Great Lakes-St. Lawrence waterway has been credited with agricultural and industrial growth and stimulating the foreign and domestic trade of this region. (BECPL)

578. Robb, David C. N. 1970. Land and water usage in the Lake Erie Basin. In: The Environmental Problems

of the Lake Erie Basin. Carroll Business Bull. Cleveland, Ohio. 10(1):11-15.

This publication is a comprehensive article concerning the Lake Erie Basin and man's effect on it. Descriptive statistics include population surveys and percentages of water withdrawals for industry, municipal, home, and usage.

Recreational demands are increasing, bu' the Lake Erie Basin is one of the poorest in terms of available recreation areas in the entire country. Commercial fishing has decreased alone with water quality.

A summary of systems approach to lake planning and management was discussed. A cooperative effort of federal, state, local and non-governmental entities is necessary for effective management of Lake Erie.

Robertson, Andrew. See: Charles F. Powers, No. 560.

579. Roecker, Robert M. 1961. Osmerus mordax - the smelt. Conservationist. Albany, N. Y. 15 (5):16-18.

The article discusses the commercial and sport harvest of the smelt in Lake Erie. In 1960, 68,000 anglers harvested over 5 1/4 million pounds of smelt and the commercial catch was estimated to be over 10 million pounds. (SM)

580. Romans, J. T. undated. A brief tract on the Niagara Frontier economy: Its past performance, prospects for the future, and a policy proposal. Greater Buffalo Develop. Foundation. Buffalo, N. Y. 20 p.

This article presents an excellent futuristic view for the economic growth potential of Buffalo and analyzes the sluggish economy. Segments are detailed with the structure the Buffalo economy. Policy proposals are made.

Ropek, J. F. See: J. C. Wilkerson, No. 739.

581. Rosenberg, H. B. 1962. Activities of the Co-ordinating Committee on Great Lakes Basin Hydrologic Data. Univ. Mich. Great Lakes Res. Div. Proc. 5th Conf. Great Lakes Res. Pub. 9:192-194.

The Great Lakes are bordered by the U. S. and Canada. Prior to 1953, data pertaining to hydraulic and hydrologic factors of the Great Lakes and St. Lawrence River were compiled independently by the responsible government agencies in the U. S. and

Canada. As a result, the data was divergent in many respects. Information on joint projects by the U. S. and Canada are presented in this article. (RL)

Rosenber , H. B. See: A. M. Beeton, No. 98.

Roth, James C. See: Claire L. Schelske, No. 586.

582. Rouse, Fredrick O. 1972. Great Lakes alternative futures and impact on research. In: Proceedings of the First Federal Conference on the Great Lakes. Interagency Committee on Marine Sci. and Eng. for the Federal Council for Sci. and Tech. Washington, D. C. pp. 299-311.

This is a socio-economic article concerning the Great Lakes region, specifically mentioning that 85% of the total population (29 million people) surrounding the Great Lakes in 1970 lived within 50 miles of the shores of Lakes Erie and Michigan.

The article states that the per capita income values for the Great Lakes area in 1970 ranged between $3000 and $4000 with Lakes Erie and Michigan the highest.

583. Ryan, Robert J. 1974. A citizens look at nuclear power. ECHO Issues. Buffalo, N. Y. 4(5):11.

This article discusses the impact of a nuclear power plant on Lake Erie.

584. Saalfeld, Robert. 1972. Role of the Great Lakes Fishery Commission. In: Proceedings of the First Federal Conference on the Great Lakes. Interagency Committee on Marine Sci. and Eng. for the Federal Council for Sci.and Tech. Washington, D. C. pp. 320-323.

This article lists the duties of the Great Lakes Fishery Commission: 1. formulating and coordinating fishery research programs, 2. advising governments on measurements to improve fisheries, and 3. implementing a program to control the sea lamprey.

Lake Erie is specifically mentioned because of the depletion of commercially valuable fish: lake herring, whitefish, and bluepike.

585. Scheele, William. 1965. Winter birds in Northwestern Ohio. Explorer. Cleveland, Ohio. 7(1):10-15.

This article suggests a region of Lake Erie abundant with water fowl to be enjoyed by recreational enthusiats who enjoy bird

watching. The various abundant species are given for reference and review. (SM)

586. Schelske, Claire L. and James C. Roth. 1973. Limnological survey of Lakes Michigan, Superior, Huron and Erie. Univ. of Mich. Great Lakes Res. Div. Pub. 17. 108 p.

Earlier data exists on Lake Erie than the other Great Lakes due to the work at the Franz Theofore Stone Laboratory which operated on a year-round basis from 1928-1955. By the 1960's Lake Erie was considered a " problem" area and several agencies cooperated in studies. These included the U. S. Federal Water Pollution Control Administration, Lake Erie Water Pollution Control Board, Canadian Centre for Inland Waters, and the U. S. Environmental Protection Agency.

This publication also includes a review of the biological, chemical and physical aspects of Lake Erie.

587. Schenker, Eric. 1968. The St. Lawrence Seaway to date and its future. Internat. Assoc. Great Lakes Res. Proc. 11th Conf. Great Lakes Res. pp. 640-657.

The St. Lawrence Seaway-Great Lakes navigation route has been a significant stimulant to the expansion of foreign trade by the lowering of transportation costs from mid-America. This article looks at some new cargo handling methods and vessels and their effect on the future of the Great Lake Ports. The effects of containerization were examined and the possibility of the development of ports on a regional basis (one would be located on Lake Erie).

588. Schenker, Eric. 1972. Extending the St. Lawrence Seaway navigation season: a cost benefit approach. Univ. of Wis. Milwaukee, Wisc. Spec. Rept. 15. 61 p.

This report discusses the economic advantages of extending the St. Lawrence Seaway navigation season, including tables which show how commercial transportation on Lake Erie would benefit.

589. Schenker, Eric. 1973. Effects of containerization on Great Lakes ports. Univ. of Wis. Center for Great Lakes Studies. Milwaukee, Wis. Spec. Rept. 2. 97 p.

This report discusses containerization in terms of benefits to be gained from regional growth and development. Tables show

cargo traffic for the major ports on Lake Erie, and projections of future development are given.

590. Schenker, Eric and David Smith. 1972. The economic merits of extending the St. Lawrence Seaway navigation season, Internat. Assoc. Great Lakes Res. Proc. 15th Conf. Great Lakes Res. pp. 737-750.

It is the purpose of this paper to explore the technical problems of extending the St. Lawrence Seaway navigation season, the costs of solving the problems, the economic benefits of an extended season and finally to make a comparison of costs and benefits.

Technical problems are broken down into two categories: 1. keeping locks and terminal facilities functioning and 2. keeping navigation channels navigable. Many techniques now exist for keeping locks open and the facilities functioning; keeping channels navigable is a more difficult and more costly problem to solve. At the present time no satisfactory solution has been found for handling spring ice breakup and thus year-round operation is not feasible yet.

This analysis uses costs of extending the navigation season which have been compiled by the U. S. Coast Guard. Through a complicated procedure they estimated ice breaker, operating and construction costs incurred in keeping facilities functioning and channels navigable for an additional two-week, four-week and six-week periods at the end of the present season.

The authors then estimate benefits which would be derived from the extensions by means of costs savings in lower transport charges, savings in stockpiling and in benefits from new and diverted traffic.

Finally, costs and benefits are compared by discounting future costs and benefits in the operating stream of costs and benefits to obtain present costs and benefits. Both present costs and benefits rise as the extension period increases. The cost of the ice breaking fleet overpowers benefits to be derived from a two-week extension; for short periods of amortization construction costs and additions to the ice breaker fleet make six-week extensions less economically justified than four-week extensions. If long capital amortization periods are acceptable, however, then six-week and possibly even longer extension periods are economically justified.

Little can be said about the economics of a year-round season at present. New technical solutions are necessary which are

unknown at the present and the costs of which are therefore difficult to estimate. Benefits, too, are difficult to estimate: the effects of containerization, new technical developments in other transportation fields, even the future size of imports-considering the present uncertainty in the world trade situation-affect benefits in ways difficult to quantify.

The results of this study, then, suggest that extension periods of four weeks or six weeks are both technically feasible and economically justified. Much must be done, however, before it becomes meaningful to talk about a year-round season.

591. Schoellkopf, J. F. Jr. 1932. Buffalo, center of finance and business. In: Otto Retter (Ed.) Pictorial Buffalo and Niagara Falls and Surroundings. Buffalo, N. Y. pp. 232-249.

The photographs here deal with power, finance, and business growth in the Buffalo area. (SM)

592. Schrag, Peter. 1969. Life on a dying lake. Saturday Review. pp. 19-21, 55-56.

Thirteen million people live in the Lake Erie Basin. They are directly dependent on the lake, but each day industries and cities dump millions of pounds of sewage into Lake Erie. The fear is that under existing conditions, Erie could, without warning, turn into a huge swamp.

593. Schueler, Robert L. and Michael T. Long. 1970. Environmental planning in the Great Lakes, a U. S. perspective on its implications for fish and wildlife resources research and management. Internat. Assoc. Great Lakes Res. Proc. 13th Conf. Great Lakes Res. pp. 1035-1040.

Planning activities, their concepts and functions, have been developing and changing at a rapid rate, especially since the status and implications of comprehensive water resources planning to fish and wildlife research and management were presented at the 1967 IAGLR meeting. The numbers, types and present status of the major studies and activities in the Great Lakes area are described and their findings and impacts on fishery resources research summarized. Conclusions are presented as to the types of inputs needed from fishery biologists and fish research and management programs in order to remain relevant to the overall planning process.

Seibel, E. - See: R. A. Davis, Jr., et al, No. 170.

594. Seltzer, Louis. 1965. Cleveland: Saving Lake Erie. Saturday Review. 48: 36, 41.

Lake Erie is the "life blood" that feeds the industrial complexes of Detroit, Toledo, Cleveland, Erie, Buffalo, and intermediate points. Without it, the economy of the lake basin, with its more than 25,000,000 people, would wither and die. The dramatic decline in commercial fishing is reviewed. Emphasis is placed on Cleveland and the city's efforts to control municipal and industrial pollution.

595. Sengbusch, William C. 1949. Lake Erie. Conservationist. Albany, N. Y. 3(5):26-27.

This article reviews the history of commercial fishing on Lake Erie. Reference is also made to Lake Erie and its influence on the automobile flour milling, and trade industries.

596. Severing, C. W. 1962. New Yorks big game season-1961. Conservationist. Albany, N. Y. 16(6):8-11.

This article gives a listing of hunters and hunting for the counties of New York, including Erie county. (SM)

Sheperd, William F. - See: Harry D. Van Meter, No. 716.

597. Shimkin, D. B. 1965. Human ecology and resource management: An application to the Great Lakes. Univ. Mich. Great Lakes Res. Div. Proc. 8th Conf. Great Lakes Res. Pub. 13: 3-12.

Reference is made to Lake Erie. Pollution, lack of financial investment, and general lack of regulation have created problems in Lake Erie.

598. Sinclair, Margaret. 1970. A survey of housewives' attitudes about water pollution centered around the phosphate debate. Great Lakes Basin Commission. Communicator. 2(8):3-4.

Public concern over the phosphate issue began with the Report to the International Joint Commission in 1969. This survey concerns the housewives in an area on Lake Ontario, but the results could be generalized to Lake Erie.

599. Sinclair, Margaret. 1971. A survey of housewives' attitudes. Internat. Assoc. Great Lakes Res. Proc. 14th Conf. Great Lakes Res. pp. 706-715.

States that showed interest in phosphate pollution in the Great

Lakes was stimulated by studies conducted on Lake Erie.

600. Skoch, Edwin J. 1970. Keynote address. In: The Environmental Problems of the Lake Erie Basin. Carroll Business Bull. Cleveland, Ohio. 10(1): 5-6.

An address presented before the American Values Series Conference (1970) states that Lake Erie's pollution was attributable to man's ignorance of the need for a stable, clean environment, as well as his ignorance of the environment's need to be controlled.

601. Skoch, Edwin J. 1971. Planning for Lake Erie's future. John Carroll Univ. Cleveland, Ohio. 21 p.

This publication consists of edited proceedings from a seminar concerning the upgrading of the Lake Erie environment, furthering public understanding of planning needs, and encouraging the involvement of private citizens, civic, industrial, educational, and environmental groups to assure active and effective environmental programs.

Specific problems discussed were: the unresponsiveness and often incompetant work of present environmental control groups, technological shortcomings, legislative difficulties, and cost limitations.

602. Smiley, Charles.W. 1882. Changes in the fisheries of the Great Lakes during the decade 1870-1880. Trans. Am. Fish. Cult. Assoc. 11:28-37.

Commercial catches in the Great Lakes declined during this decade. This was attributed to technological change in fishing methods, which were cleaning out the lakes. Stocking from hatcheries was recommended. (BU)

Smith, David - See: Eric Schenker, No. 590.

603. Smith, Gordon S. 1966. Seahorses in the harbor. Buffalo. Buffalo, N. Y. 41(4):17-20.

This is a pictorial story about the tug, California, which works on Lake Erie in the Buffalo area. (BU)

604. Smith, Perry H. 1884. History of Buffalo and Erie County. D. Mason and Company Publishers. Syracuse, N. Y. Vol. 1&2. 776 p.

This publication gives an entire history of the establishing of political boundaries, companies, political organizations, the War of 1812 and the importance of navigation during this period. With urban growth also came new progress in navigation and agricultural development. (SM)

605. Smith, Standford H. 1956. Limnological surveys of the Great Lakes-early and recent. Trans. Am. Fish. Soc. 86:409-418.

Early explorations on the Great Lakes were concerned largely with things easily collected or observed-common organisms, water levels, and surface temperatures. Even when more scientific studies were undertaken, they were at first scattered and small-scale. Effective surveys became possible only through inter-agency cooperation which permits a pooling of facilities, staff, and equipment. Expansion of limnological research on the Great Lakes has been rapid in later years and the outlook for the future is good. (BU)

606. Smith, Stanford H. 1962. Lake Erie or Lake Eerie? Izaak Walton Magazine. 27(4):4-5.

The cumulation effect of uncontrolled waste disposal into Lake Erie seriously reduces the capacity of the water to perform many beneficial and necessary functions vital to the health, recreation, and economy of the people of the area.

607. Smith, Stanford H. 1968. The alewife. Limnos. 1(2): 12-20.

Large numbers of alewives die off in early spring creating a pollution problem in Lake Erie. The alewife was introduced to the lake after completion of the Welland Canal.

608. Smith, Stanford H. 1968. Species succession and fishery exploitation in the Great Lakes. J. Fish. Res. Board Canada. 25(4):667-693.

This publication traces the history of the decline of several commercially valuable fish. Intensive and selective fishing for certain species has been a major factor in the decline of fish stocks.

The author advocates careful control of stocking programs and fisheries, and coordination of management among the various states of the U. S. and the Province of Ontario which manage fish stocks. These programs will be necessary to restore and maintain a useful fishing balance.

609. Smith, Stanford H. 1970. Species interactions of the alewife in the Great Lakes. Trans. Am. Fish. Soc. 99(4):754-765.

The alewife was recorded in Lake Erie in 1931. Introduction of the species to the lake was through the Welland Canal. Increasing populations have contributed to the general reduction in fishery productivity.

610. Smith, Stanford H. 1970. Trends in fishery management of the Great Lakes. In: A Century of Fisheries in North America. Am. Fish. Soc. Great Lakes Fish. Lab. Spec. Pub. 7. Contribution 418. pp. 107-114.

Pollution is most apparent in Lakes Michigan and Erie. Time schedules have been set up by federal-state enforcement conferences for waste treatment in these lakes. Protection and management of the Great Lakes will succeed only through collective legislation between states and province. The article mentions the decline of quality fish in Lake Erie and the introduction of exotic species (lamprey, alewife). The Lake Erie Advisory Committee met periodically for 10 years but the legislatures of the various states and province failed to support the recommendations of the committee. The restoration of the fisheries of Lake Erie is uncertain due to selective overfishing, pollution problems, and expansion of trash fish.

611. Smith, Stanford H. 1972. Research grants for fisheries of the Great Lakes. In: Proceedings of the First Federal Conference on the Great Lakes. Interagency Committee of Marine Sci. and Eng. for the Federal Council for Sci. and Tech. Washington, D. C. pp. 220-224.

Commercial fishing on Lake Erie has benefited from commercial fishery research and development funds. Cited are research studies by Ohio and Pennsylvania which propose to increase quality fish populations. State and federal funds will share the costs.

612. Smith, Stanford H. 1973. Application of theory and research in fishery management of the Laurentian Great Lakes. Trans. Am. Fish. Soc. 102(1):156-163.

Local pollution in the Detroit River and Western Lake Erie was partly responsible for the 1909 treaty between the U. S. and Great Britain leading to the formation of the International

Joint Commission. Pollution was the suspected cause for the collapse of Lake Erie's major fishing resource (lake herring) which instigated a series of environmental investigations (1926-1930).

613. Spangler, Miller B. 1969. The role of marine sciences in the multiple uses of the coastal zone of Lake Erie and Lake Superior. National Planning Assoc. Washington, D. C. 302 p.

The Marine Resources and Engineering Development Act of 1966 includes the Great Lakes within its areal scope of a national marine sciences program. The National Council on Marine Resources and Engineering Development outlined in 1967 a series of case studies in "Multiple Uses of Coastal Zone" for diverse coastal zone areas. The purpose of these studies was to derive important general principles concerning marine and related science and technology and institutional developments which can contribute to effective social and economic utilization of the nation's coastal margins; and to determine the unique characteristics of the different coastal regions as guidelines to formulating research needs and making decisions tailored to the socio-economic activity along these coastal areas. This study has sought to identify measures in marine sciences which can be applied to promoting the optimum use of the coastal zone of the Great Lakes. Lake Erie and Lake Superior were selected for this study to illustrate the contrast of problems and opportunities in utilizing the waters and shoreline resources of the Great Lakes System.

614. Sport Fishing Institute. 1966. Lake Erie fishing. SFI Bull. Washington, D. C. 173:2

A census was taken of fishermen on the Ohio sector of Lake Erie. Species and amount of fish caught are given.

615. Sport Fishing Institute. 1966. Lake Erie walleyes. SFI Bull. Washington, D. C. 172:1.

The Ohio Wildlife Division has adopted some new commercial regulations for Lake Erie. The new regulations are designed to restore the populations of walleyes for both sport fishermen and commercial fisheries. Changes also occur in the type of equipment used by commercial fishermen.

616. Sport Fishing Institute. 1966. Winter fishing. SFI Bull. Washington, D. C. 175:4.

This article summarizes ice fishing on Lake Erie with the pound-

are being noted. The fishing was done by sport fishermen.

617. Sport Fishing Institute. 1968. Great Lakes stripers? SFI Bull. Washington, D. C. 199:3-4.

This article discusses the establishment of a new type of bass into Lake Erie by the Michigan Conservation Department.

618. Sport Fishing Institute. 1970. Fishing restrictions re mercury. SFI Bull. Washington, D. C. 219:2-3.

The U. S. Bureau of Sport Fisheries and Wildlife has acertained the extent and nature of state imposed fishing restrictions because of mercury containerization. A warning and commercial fishery embargo are given for Lake Erie.

619. Sport Fishing Institute. 1970. Known mercury dischargers-analysis positive. SFI Bull. Washington, D. C. 220:8.

The article lists industrial polluters by name and address which are discharging mercury into streams, rivers, and lakes (Lake Erie included).

620. Sport Fishing Institute. 1970. Lake Erie much alive. SFI Bull. Washington, D. C. 244:7-8.

Lake Erie is reputed to be a highly viable ecosystem by this article. Reports of fish caught in Lake Erie are given.

621. Sport Fishing Institute. 1970. Lake Erie nets. SFI Bull. Washington, D. C. 193:4.

According to the Ohio Division of Wildlife certain gill nets will not be allowed on Lake Erie. Trout or salmon may not be taken by use of commercial fishing gear.

622. Sport Fishing Institute. 1970. Lake Erie walleye regulations. SFI Bull. Washington, D. C. 210:6.

Dissatisfaction is expressed in this report by the Ohio Department of Natural Resources in regulation of commercial walleye set for Lake Erie by the Ontario Department of Lands and Forests. Here is plainly visible the interactions of interstates and nations. It is hoped from this report that the state and provincial agencies involved with the management of the fishery will come to agreement on uniform regualtions necessary to improve the valuable sport and commercial fishery

of Lake Erie.

623. Sport Fishing Institute. 1970. Lake Erie walleye regulations. SFI Bull. Washington, D. C. 211:6

In conjunction with Ohio and Ontario, Michigan also agreed to impose regulations on commercial walleye fishery to insure future abundance. Restrictions are also placed on type of equipment used.

624. Sport Fishing Institute. 1970. Mercury pollution. SFI Bull. Washington, D. C. 214:6.

Because of mercury containerization, the Canadian Government banned the sale of perch and pickerel. Industrial reprimand and regulation is enforced by the Canadian Government which asked that the Governor of Michigan take similar steps.

625. Sport Fishing Institute. 1970. Most angling waters mercury safe. SFI Bull. Washington, D. C. 218:1-4.

The F.D.A. standard of acceptability does not include the mercury contaminated whitebass and walleye found in the west end of Lake Erie. The governors of each state surrounding the body of water were contacted and urged to take strong action to halt the discharge of mercury in waste effluents from industrial plants in their states.

626. Sport Fishing Institute. 1971. Mercury pollution survey. SFI Bull. Washington, D. C. 221:5.

This report issues a warning to sport fishermen not to eat their catch of fish from Lake Erie.

627. Sport Fishing Institute. 1973. Much alive Lake Erie. SFI Bull. Washington, D. C. 241:4.

A rebuttal is given in this issue on Lake Erie being too much alive. Mention is made of stocking efforts, of coho-salmon, between states and the lack of a unified effort made by Ontario Province.

Stacey, Gary S. - See: Richard M. Davis, et al, No. 169.

628. Starler, Norman, Ann Fisher and Warren Fisher. 1972. The impact of changes in Lake Erie on incomes, land values, local taxes, and employment in Chautauqua and Erie Counties: 1950-1970. New York State

Sea Grant Program. Albany, N. Y. pp. 25-27.

This article is an insight into the deteriorating economic basis of lake shore communities, specifically dealing with Chautaqua and Erie Counties. Lake related activities here are the catalysts which provide data for projections and planning for the economic and social future of the coastline area.

629. Steggles, W. A. 1968. Organization and planning of water quality control. In: Proceedings of Great Lakes Water Resource Conference. Eng. Inst. Canada and Am. Soc. Civil Eng. Toronto, Ont. pp. 449-470.

This article discusses some social and economic problems caused by pollution, and describes plans for water quality management in Lake Erie.

630. Sterling, E. 1876. Propagation of white fish. Trans. Am. Fish. Cult. Assoc. 5:13-15.

Discussion is made of hatcheries in Detroit which will stock Lake Erie. Methods of handling fish eggs are mentioned. (BU)

631. Stillson, Richard T. 1969. Regional trade and structure model for pollution abatement study. In: Proceedings of the Fourth Symposium of Water Resources Research. Ohio State Univ. Columbus, Ohio. pp. 75-89.

The purpose of this paper is to present the outlines of a regional trade model which will be useful in determining the likely economic impact of various proposed pollution abatement programs for the Western Basin of Lake Erie. The pollution abatement programs to be studied and the area which they will affect are outlined in "The Lake Erie Report: A Plan for Water Pollution Control." The report proposes several abatement programs which include construction of sewers, secondary and tertiary treatment facilities of municipal waste and enforcement of a high standard of industrial treatment facilities.

632. Stimson, Miriam Mansfield. 1972. From shore to shore. Inland Seas. 28(3):171-182.

This article presents a history of commerce at Detroit across the Detroit River via ferries in the 1800's. (CCIW)

633. Stout, Warren W. 1962. The future for boating in New York. Conservationist. Albany, N. Y. 16(4):10-13.

This article discusses the opportunities for the future of boating. Major issues presented are greater boat safety, additional facilities and prudent regulation of waterway traffic. (SM)

634. Streeter, H. W. 1953. Bacterial and sanitary analysis. In: Lake Erie Pollution Survey, Final Report. Ohio Dept. Nat. Resources. Div. Water. Cleveland, Ohio. pp. 29-80.

The purpose of this report was to determine where and to what extent the sanitary quality of Lake Erie was affected by sewage pollution; and on the basis of the data propose corrective measures to restore and maintain proper sanitary conditions. (CCIW)

635. Strobridge, Truman R. 1973. Early lake captains, revenue cutters and politics. Inland Seas. 29(4):240-248.

Two early Lake Erie captains, Dobbins and Knapp were rivals for the command of the Revenue Cutter on Lake Erie in the early 19th century. These were important figures in early navigation of the Great Lakes. (CCIW)

636. Sweeney, Robert A. 1970. The Great Lakes Laboratory of State University College at Buffalo. Limnos. 3(1):13-17.

The concern of the Great Lakes Lab is applied research concerning water pollution, and its biological, chemical, economic, legal, physical and social ramifications, education and communications cooperation. It is funded by SUNY, and outside sources including federal and private industries. Many aspects of Lake Erie are studied here, including properties of fish and pollution.

637. Sweeney, Robert A. 1970. Mercury, a heavy metal problem. ECHO Issues. Buffalo, N. Y. 1(2):1-2.

Mercury is mentioned in regard to its pollutant nature in Lake Erie and mention is also made of knowledgable companies who discharged this pollutant. Incorporation of mercury compounds into food chains which would effect urban populations and fauna is of primary concern here.

638. Sweeney, Robert A. 1971. Great Lakes Laboratory. ECHO Issues. Buffalo, N. Y. 2(2):2.

The Great Lakes Laboratory in this article respectfully requests

that the permit for the operation of the deep well for the disposal of waste acids at Bethlehem Steel Corporation at the Lackwanna plant be denied. Opposition is based on four factors given in the article.

639. Sweet, David. 1968. The river basin as a socio-economic region. In: G. Cooke (Ed.), The Cuyahoga River Watershed. Kent State Univ. Inst. Limnology and Dept. Biological Sci. Kent, Ohio. pp. 41-56.

The model described above can be used for socio-economic analysis and planning as well as water-resource management. It has been focused primarily on the river basin-defined by the nearest county boundary and thus, the first conclusion is that it is possible to consider the river basin as a region and developed socio-economic analysis within this context. However, in resource management and other fields dealing with scientific analysis of river basins that, when one considers the socio-economic characteristics of the river basin and begins to make plans or examine implications of socio-economic changes on the river basin, it is essential that preliminary analysis be made of the spatial interaction within the basin and with outside areas.

As Cuyahoga example clearly demonstrates socio-economic changes outside the formal river basin may have as large, if not larger, impact on the basin as those changes which occur within the basin. Until our data-gathering capabilities increase, we will probably continue to be restricted to county boundaries for our socio-economic analysis. Within this constraint, each river basin will have to be analyzed separately to determine how effectively it can be used as a planning unit.

640. Sykora, T. A. 1972. 1972-A new era in Great Lakes transportation. Inland Seas. 28(2):131-133.

The author describes the Stewart J. Cort, a new vessel launched on Lake Erie. (CCIW)

641. Tait, Howard. 1971. Great Lakes Fishery Laboratory. In: Progress in Sport Fishery Research. U. S. Dept. Interior. Bureau of Sport Fish. and Wildlife. Washington, D. C. pp. 86, 98-100.

In Lake Erie, yellow perch, walleyes and whitebass produced in 1971 were considerably lower than in most years of the 1959-1970 period. A table shows types and number of young-of-the-year fish caught per hour of trawling with small mesh

nets in Western Lake Erie.

642. Tait, Howard D. 1972. Federal Great Lakes fishery research objectives, priorities, and projects. In: Proceedings of the First Federal Conference on the Great Lakes. Interagency Committee on Marine Sci. and Eng. for the Federal Council for Sci. and Tech. Washington, D. C. pp. 44-47.

Reference is made to Lake Erie's decline in quality fish for commercial use. The discovery of high mercury concentrations in fish have curtailed sport and commercial fisheries.

643. Tarbox, Robert M. 1968. A new problem in the maintenance of Great Lakes harbor depths. Internat. Assoc. Great Lakes Res. Proc. 11th Conf. Great Lakes Res. pp. 664-667.

In early 1967, the Corps of Engineers instituted a Pilot Program on Disposal of Polluted Dredgings from Great Lakes Harbors. The Federal Water Pollution Control Administration (FWPCA) and other agencies are cooperating in the program. Under the Pilot Program, the Corps is testing the effectiveness and comparing costs of different type of disposal areas, of various methods of handling dredged material and of methods of treating the effluent from the disposal areas. The data are being obtained at various representative harbors, with the degree of pollution varying from heavy to negligible. FWPCA and the Corps are sampling water and bottom sediments at the dredging areas and in the vicinity of the alternate disposal areas and conducting various tests on the samples. The objective is to determine means of disposal and management of dredged materials so that they will not degrade the water quality of the lakes. The Corps is working to complete its investigations and to prepare a report by December 1968.

644. Thackray, Donald E. (Ed.). 1970. The Sea Grant Program: Developing Great Lakes resources. Univ. Mich. Ann Arbor, Mich. Research News. 20(9):11 p.

This article examines the accelerated aging of the Great Lakes and describes how the University's Sea Grant Program can employ a systems approach to investigate its causes, effects, and potential solutions. A major cause of the rapid eutrophication of Lake Erie has been the population increase surrounding Erie's shore. The population has gone from 3 million in 1900 to 10.1 million in 1960, the largest growth among the Great Lakes.

Thomas, N. A. - See: T. T. Davies, No. 167.

645. Titus, Harold (Ed.). 1965. Brighter picture for the Great Lakes. Field and Stream. 70:24-26.

Cities and states bordering Lake Erie and their proposed pollution abatement programs are reviewed. For example, Detroit has completed a study of the Detroit River which took 2 1/2 years and cost $750,000. Polluters have been notified that corrective measures must be taken, or federal agencies will be called in. Ohio proposed a $1 billion bond which will be designated for Lake Erie protection if passed by the voters. Overall, because of the many pollution control programs being formulated, the future of Lake Erie has improved considerably.

646. Toles, George. 1967. A key to the ice-locked Great Lakes. Buffalo. Buffalo, N. Y. 42(10):36-37.

Winter paralizes Great Lakes shipping for several months each year. A new ice-cutter, Alexbow is described with the hope that it may be the answer to opening up winter navigation on the Great Lakes and St. Lawrence Seaway. (BU)

647. Tomkiewicz, Linda A. 1970. Typical fish mortality rates in Eastern Lake Erie. State Univ. College at Fredonia. Lake Erie Environmental Studies. Tech. Data Rept. 15 p.

The purpose of this study has been to establish a base line of natural fish mortalities in Eastern Lake Erie throughout a yearly cycle. Of particular significance is the recognition of unusual mortalities which become evident after having established the base line. This should be of vital importance to the local commercial and sports fisheries, since they depend upon fishing as a source of income or recreation.

648. Townshend, A. R. 1972. Canadian programs and approaches to phosphorus removal at waste treatment plants on the lower Great Lakes. In: Canada Centre for Inland Waters, Collected Reprints Vol. 5. Reprinted from: Conference papers, Oceanology International 72. Brighton, England. pp. 442-446.

This paper reviews the programs and approaches of the government of Canada and the Province of Ontario to control phosphorus discharges from municipal and industrial sources.

Trautman, Milton B. - See: Harry D. Van Meter, No. 717.

649. Tufty, Barbara. 1966. The dying lake. Sci. News. 90:10-11.

The article states that man is hastening the death of Lake Erie: polluting it with chemicals, sewage and trash. Commercial fishing has disappeared, recreational opportunities have diminished, tourism decreased, and residents are moving away from the area.

Various cities; Buffalo, Detroit, Cleveland, Toledo, Erie, and their industries are major sources of pollution. Federal pollution control programs are also described.

650. Turner, Clarence L. 1920. Distribution, food, and fish associates of young perch in the South Bass Island region of Lake Erie. Ohio J. Sci. 20(5):137-152.

This study demonstrated that perch fry around South Bass Island were fairly abundant since they had few enemies at this time. The study discussed the diet and fish associates of this species. (BU)

651. Turner, Clarence L. 1926. The crayfishes of Ohio. Ohio Biological Survey. Bull. 13. 3(3):149-190.

The article mentions the economic aspects of the crayfish in reference to food for game fish, food for human consumption, and its role as a nuisance organism. (SM)

652. University of Western Ontario. 1971. Lake Erie shoreline study. London, Ont. 135 p.

The Erie shoreline study was suggested with the purpose of looking at the shoreline as a single resource and considering it from all angles. The information presented here is available to municipal officials and the general public in a form they can use and understand. (CCIW)

653. U. S. Army Corps of Engineers. 1899. Regulation of the level of Lake Erie. 56th Congress, 1st session. House Document 200. 26 p.

The entire publication is devoted to the regulation of the Lake Erie water level in its regard to navigational interests. Effects on local tributaries are given. (CE)

654. U. S. Army Corps of Engineers. 1900. Examination and plan and estimate of cost of improving Cleveland Harbor, Ohio. Board of Eng. for Rivers and Harbors. 56th

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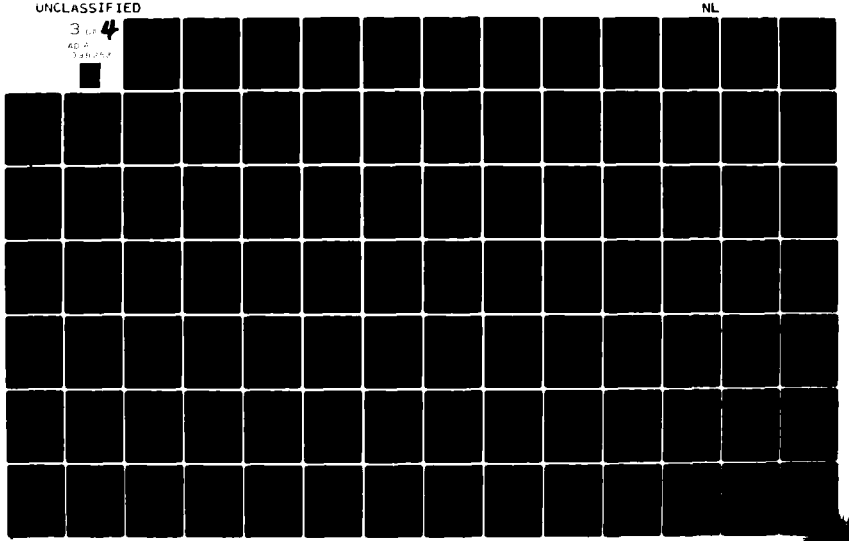

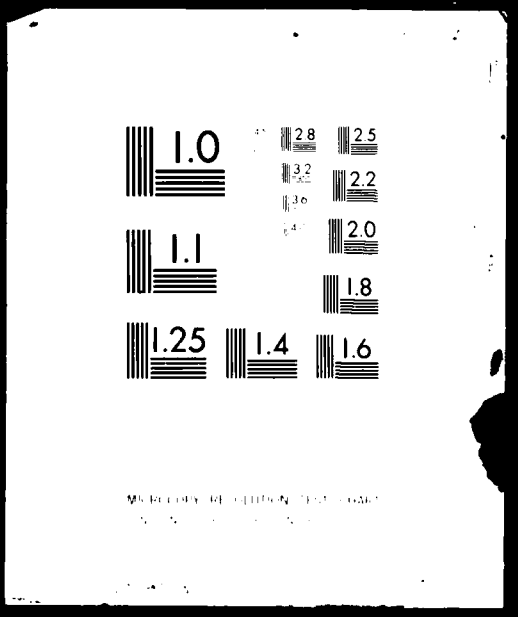

Congress. 2nd Session. House Document 118. 17 p.

The commercial importance of the Cleveland Harbor is very great. Therefore, it was recommended that the harbor is worthy of improvements that will facilitate the economical handling of incoming and outgoing vessels. (CE)

655. U. S. Army Corps of Engineers. 1910. Regulation of Lake Erie. 61st Congress, 2nd Session. House Document 779. 158 p.

This publication is a report of the International Waterways Commission on the regulation of Lake Erie. It concerns the building of a dam on Lake Erie and its benefits to navigation. Cost estimations are also given. (CE)

656. U. S. Army Corps of Engineers. 1914. Cuyahoga River, Ohio. Board of Eng. for Rivers and Harbors. 63rd Congress, 2nd Session. House Document 707. 96 p.

A report and estimate of the cost of improving the Cuyahoga River, Ohio is discussed. Improvements entail the elimination of river bends and increasing river depth. It was recommended that the U. S. assume the cost of dredging only; the cost of the remainder of the improvements, including the construction of bridges, provision of right of way, and the bulkheading required, to be borne by local interests. (CE)

657. U. S. Army Corps of Engineers. 1918. Black River at Lorain, Ohio. Board of Eng. for Rivers and Harbors. 65th Congress, 2nd Session. House Document 1200. 11 p.

This study consists of a survey of the Black River investigating the feasibility of channel improvements. It was concluded that since the U. S. Government provided for the improvements of the harbor at the mouth of the Black River, further upstream improvements to serve individual industries were not warranted. (CE)

658. U. S. Army Corps of Engineers. 1932. Cleveland Harbor, Ohio, including channel in Cuyahoga and Old Rivers. Board of Eng. for Rivers and Harbors. 72nd Congress, 2nd Session. House Document 477. 39 p.

This publication is a report on a survey of the Cleveland Harbor, including the channel in the Cuyahoga and Old Rivers authorized by the River and Harbor Acts approved in 1919 and in 1930. The survey was undertaken to investigate the feasibi-

lity of harbor and channel improvements. The population of Cleveland and its suburbs, water-borne commerce, tonnage shipped, and financial projections are the major considerations. Final recommendations entailed the deepening of the harbor to provide safe and convenient movement of large freighters, and channel improvements that would be completed contigent on local interests. (CE)

659. U. S. Army Corps of Engineers. 1933. Conneaut Harbor, Ohio. Board of Eng. for Rivers and Harbors. 73d Congress, 1st Session. House Document 48. 34 p.

A survey of the Conneaut Harbor was made to determine the economic feasibility of deepening and improving the harbor. It was concluded that improvements should be made contingent upon local interests inproving the river and terminal facilities. These improvements would stabilize property value, employment, and the general business of the community. (CE)

660. U. S. Army Corps of Engineers. 1934. Lorain Harbor, Ohio. 73rd Congress, 2nd Session. House Document 469. 16 p.

This report discusses the improvements made to Lorain Harbor, widening for beneficial use in commerce. The dredging and widening was thought to be an enomomic saving. (CE)

661. U. S. Army Corps of Engineers. 1936. Cleveland Harbor, Ohio. Board of Eng. for Rivers and Harbors. 74th Congress, 2nd Session. House Document 84. 41 p.

A survey investigating the feasibility of improving Cleveland Harbor, Cuyahoga and Old Rivers was done. It was decided that improvements were not economically justifiable except for the channel of the Old River. (CE)

662. U. S. Army Corps of Engineers. 1939. Cleveland Harbor, Ohio. Board of Eng. for Rivers and Harbors. 76th Congress, 1st Session. House Document 232. 28 p.

This publication is a report on the survey of the Cleveland Harbor. The harbor is located at the mouth of the Cuyahoga River. The survey was undertaken to investigate the feasibility of harbor improvements. Water-borne commerce, tonnage shipped, commodities shipped, vessel traffic, and cost estimates were the major considerations. It was concluded that the perspective benefits to be derived from the proposed channel extension do not justify the cost of construction. The construction of a turning basin was recommended. (CE)

663. U. S. Army Corps of Engineers. 1939. Lorain Harbor, Ohio. 77th Congress, 1st Session. House Document 161. 18 p.

The study on Lorain Harbor examines navigation benefits for lake carriers commercial navigation, statements on the existing navigation season and local industries, public participation and economic reactions to harbor construction, including economic impact on agriculture. (CE)

664. U. S. Army Corps of Engineers. 1944. Emergency relief of farm lands in Lucas County, Ohio. Committee on Commerce. 78th Congress, 2nd Session. Washington, D. C. 20 p.

This report deals with a record of the hearing before the subcomittee of the Committee on Commerce concerning a bill to authorize emergency relief and rehabilitation of farm lands on the shore of Lake Erie in Lucas County, Ohio. The area had been damaged by floods in 1943. Proposed action was the building of dikes and levees by the Federal Government which were to be maintained by the State of Ohio. (BECPL)

665. U. S. Army Corps of Engineers. 1957. Cleveland Harbor, Ohio. Board of Eng. for Rivers and Harbors. 85th Congress, 1st Session. House Document 107. 41 p.

This article is a report on the proposed improvement of the Cleveland Harbor, including the relocation of three bridges and the straightening and improving of the channel of the Cuyahoga River to facilitate navigation and commerce. Industries, roads and railroads, bridges, shipping traffic, principal commodities, and financial projections are reviewed. It was recommended that funds be allocated to complete the proposed harbor improvements. (CE)

666. U. S. Army Corps of Engineers. 1960. Great Lakes Harbor Study-interim report on Erie Harbor, Pennsylvania. Army Corps Eng. Buffalo District. Buffalo, N. Y. 38 p.

The article deals with the Corps participation in a construction project which would boost the navigation and commerce for Erie, Pa. with accompanying economic implications. (BECPL)

667. U. S. Army Corps of Engineers. 1965. Review report on Buffalo Harbor, N. Y., Black Rock Channel, and Tonawanda Harbor, N. Y., Niagara River, N. Y., and tributary waterways. Army Corps Eng. Buffalo District. Buffalo, N. Y. Review Rept. pp. 1-31.

A1-A4, B1-B7.

This review report is limited to an investigation to determine the advisability of establishing a separate project for the collection, removal and disposal of drift in Buffalo Harbor, New York, Black Rock Channel and Tonawanda Harbor, New York. Niagara River, New York, and in the tributary waterways considered to be a source of drift which would enter these project areas. The work involved would be supplementary to presently authorized water maintenance activities.

668. U. S. Army Corps of Engineers. 1965. Water levels of the Great Lakes-report on lake regulation. Army Corps Eng. North Central Div. Chicago, Ill. 57 p.

This report discusses the economic and political aspects of regulation, including the effects that this would have on Lake Erie.

669. U. S. Army Corps of Engineers. 1967. Coast of Lake Erie-Interim report on the Cattaraugus Creek Harbor, New York. Army Corps Eng., Buffalo District. Buffalo, N. Y. 65 p.

This report concerns a proposed small boat harbor for the Cattaraugus Creek, The condition of the creek was inadequate to accomodate small boat traffic. Construction of the harbor is considered necessary for safe and easy navigation. The mouth of the creek experiences serious flooding which could be controlled with harbor improvements. Federal and local governments would share the cost. Recreation facilities would be enhanced. (BECPL)

670. U. S. Army Corps of Engineers. 1968. Great Lakes Basin Compact. 90th Congress, 2nd Session. House Document 1178. 14 p.

This report discusses the creation of the Great Lakes Basin Compact and its ratification by five of the eight Great Lakes states. (CE)

671. U. S. Army Corps of Engineers. 1968. Great Lakes Harbor study-second interim report on Erie Harbor, Pennsylvania. Army Corps of Eng., Buffalo District. Buffalo, N. Y. 49 p.

This article discusses Erie Harbor and its general cargo traffic. Problems encountered in commercial shipping

and navigation are discussed. Recommendations and projections are made. (BECPL)

672. U. S. Army Corps of Engineers. 1970. Great Lakes and St. Lawrence Seaway ports. In: L. Watkins Jr. (Ed.), Navigational Developments in the North Central States. Rockwell F. Clancy Co. Chicago, Ill. pp. 51-83.

Major ports along Lake Erie and other Great Lakes are listed alphabetically with commentary on each port and local districts of transportation. Also given are the accomodations for each port. (BECPL)

673. U. S. Army Corps of Engineers. 1970. Interstate Port Handbook. Rockwell F. Clancy Co. 36th Ed. Chicago, Ill. 252 p.

Water levels of the Great Lakes in cooperation with Canada, state, local, and federal agencies with public interest highly held are being used to obtain answers to questions on the proper management and control of the Great Lakes. This is to insure proper management and control or regional water resources. (BECPL)

674. U. S. Army Corps of Engineers. 1970. Instituitional evaluation Clevleand-Akron Metropolitan and Three Rivers Watershed areas. Linton, Mields and Coston, Inc. Washington, D. C. 126 p.

This report is a summary of the watewater management institutions which exist within the Cleveland-Akron and Three Rivers Watershed area. The summary will not attempt to discuss every institution but instead those institutions which play a significant role in wastewater managemsnt. Instituitions included in the study are federal agencies, including EPA HUD, Farmers' Home Administration, Soil Conservation Service, Economic Development Commission (Department of Commerce), and the Army Corps of Engineers, besides regional planning commissions, sanitary engineering departments and municipal departments. Interelationships are given. (CE)

675. U. S. Army Corps of Engineers. 1971. Cuyahoga River Basin. Ohio Restoration Study. Army Corps Eng., Buffalo District. Buffalo, N. Y. 104 p.

This is the first interim report of the Cuyahoga River Restoration Study. Restoration of environmental quality, social well-being, and economic stability to this river basin

will take place over a period of years. The report presents the scope of the longer-term framework plan plus an early-action program that will begin in fiscal year 1973. Interim reports submitted in 1973 and subsequent years will have improvement plans that will ultimately fulfill the total framework plan. This first interim report and implementation of its suggested programs will begin to help restore the Cuyahoga River Basin to a more liveable and pleasant condition for all the inhabitants.

676. U. S. Army Corps of Engineers. 1971. Great Lakes region inventory report, National Shoreline Study. Army Corps Eng., North Central Div. Chicago, Ill. pp. 157-197.

The report concerns erosion and the need for protection of the shoreline zone of the U. S. portion of the Great Lakes. The shoreline represents a unique natural resource, rich in aesthetic and ecological values, scenic attractiveness, and many beaches which provide outstanding recreational opportunities. Damages in dollar estimates are given due to erosion and flood problems. Solutions and their cost estimates for shoreline erosion are presented.

677. U. S. Army Corps of Engineers. 1971. National Shoreline Study, shore management guidelines. Army Corps Eng. Washington, D. C. 56 p.

This report includes information regarding Michigan's methods of shoreline management. Shore management procedures are also given. These include: 1. Define the planning context, 2. Derive tentative shore objectives, 3. Examine techniques for achieving the objectives, 4. Formulate a shore plan and 5. Implement the plan.

678. U. S. Army Corps of Engineers. 1972. Great Lakes shoreline damage, causes and protective measures. Army Corps Eng., North Central Div. General Information Pamphlet. Chicago, Ill. 22 p.

This report is organized in three parts. Part I is a history and background discussion of lake levels, causes of fluctuations and, most important, effects of lake level changes on shorelines. Part II discusses the role of Federal and State governments in various activities and responsibilities on the Great Lakes related to water and shore areas. It includes information on available data and the sources of such data. Part III is a brief discussion of several emergency-type remedial measures, estimates of their cost and general statements on their applicability to

various typical situations. Qualified engineering advice is called for.

679. U. S. Army Corps of Engineers. 1972. Waterborne Commerce of the United States, Part 3; Waterways and Harbors, Great Lakes. Army Corps Eng. Lower Mississippi Valley Div. Vicksburg, Mississippi. 100 p.

This publication contains statistics on waterborne commerce for the Great Lakes for the year 1972. Data on commodities, vessels and harbors on the waterways are given. Both foreign and domestic commerce is included. (BECPL)

680. U. S. Army Corps of Engineers. 1972. Vermilion Harbor, Erie County, Ohio. Army Corps Eng. Buffalo District. Buffalo, N. Y. 38 p.

The project involves the construction of a " t" type breakwater. Material in this harbor will be dredged and pose no problem to the municipal water supply. The project will improve conditions in the harbor. (CE)

681. U. S. Army Corps of Engineers. 1973. Public involvement for Cleveland-Akron Metropolitan and Three Rivers Watershed area. Army Corps Eng. Buffalo District. Buffalo, N. Y. unumbered.

Participation by the public in water resources planning has become vital because of the increasing number of citizens who desire to be involved in helping make decisions in local planning. The Cleveland-Akron Wastewater Management Study affects some 3-3/4 million people. There are almost 2-1/2 million people living today in the Three Rivers Watershed region, another 3/4 million living in the western counties where land treatment is possible, and 1/2 million living in the counties where sludge might be used to reclaim strip mined land. These people represent a great variety of interests. Such complexity of size and interest calls for extensive public input. The objectives of a public participation program is to establish and maintain meaningful and effective communication between the planner and the many people whose interests are affected by the results of the study. Social, political, and environmental aspects of any planning program are as important as engineering and economic feasibility. It is only through a close working relationship with the local people the social need and political realities can be related to the study. (CE)

682. U. S. Army Corps of Engineers. 1973. Review of reports

on Lake Erie-Lake Ontario waterways, New York. Army Corps Eng., Buffalo District. Buffalo, N. Y. 16 p. and attachments.

In this article Lake Erie is looked upon as thoroughfare for navigation. The total report contains 5 appendages, including economics. The feasibility of a constructed canal is economically scrutinized.

683. U. S. Army Corps of Engineers. 1973. Water resources development. Army Corps Eng. Cincinnati, Ohio. 111 p.

The economic activity of the Lake Erie Basin in Ohio is described. The main emphasis is on harbor projects along the shore of Lake Erie. The harbor project information includes: estimated federal/private costs, principal commodity traffic, tonnage per year, and terminal facilities.

Reference is also made to lake level fluctuations and a plan to control them, with the purpose to reduce shore property damage, navigation, power development, and local flood control protection.

684. U. S. Army Corps of Engineers. 1973. Water resources development in New York. Army Corps Eng. North Atlantic Div. New York, N. Y. 147 p.

This report mentions various areas along Lake Erie in New York state harbors; their commerce and building, and navigational problems. Projections are made for future problems. Information is also given on the status of various projects.

685. U. S. Bureau of Outdoor Recreation. 1966. Water oriented outdoor recreation-Lake Erie Basin. Dept. Interior. Ann Arbor, Mich. 102 p.

This report considers the recreation potential within the U. S. portion of the Great Lakes Basin. The purpose of the study is to: 1. inventory existing recreation areas, 2. establish goals for meeting outdoor recreation needs within the basin, 3. identify potential recreation areas, 4. discussion of water quality influences on present and future outdoor recreation use, 5. recommend action and/or programs to improve the basin's water recreation opportunities both now and in the future. The accomplishement of the above purposes will facilitate the development of water quality goals with respect to water recreation and will serve to emphasize the urgent need for measures for the prevention of pollution and control of

water quality in present and potential recreational areas.

686. U. S. Committee on Foreign Affairs. 1966. Great Lakes Basin Compact. Washington, D. C. 137 p.

This publication gives explicit statements on hearings of the Great Lakes Basin Compact. This report also lists pertinent publications, addresses and legislative units of states and localities involved with the Great Lakes, including the New York region on Lake Erie. (BECPL)

687. U. S. Congress Senate Committee on Commerce. 1964. Economic impact of low water levels of the Great Lakes. Washington, D. C. 100 p.

This report discusses lake levels and their impact on commerce, navigation, property market value and other chain-like reactions resulting form a change in lake levels. (BECPL)

688. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of Lake Erie and its tributaries. Dept. HEW. Public Health Serv. Washington, D. C. 1:1-230.

This report explains the purpose of this conference to bring together the state water pollution control agencies, the representatives of the Department of Health, Education, and Welfare, and other interested parties to review the existing situation and the progress which has been made to lay a basis for future action by all parties concerned, and to give the states, localities and industries an opportunity to take any indicated remedial action under state and local law. Lake Erie is discussed extensively in relation with all mentioned concerns.

689. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of Lake Erie and its tributaries. Dept. HEW. Public Health Serv. Washington, D. C. 2:231-605.

The economic aspects of the Cuyahoga Basin, Detroit area, and eastern Ohio are included in this volume. These include the industrial, and municipal commerce, recreational, rural and aesthetic uses of water, and sources of wastes. General recommendations for the preservation of Lake Erie in terms of waste treatment are made, including specific recommendations for various industries which dump wastes into Lake Erie. Reports from various government agencies with regard to current and past projects and activities are included, and Act 245, Public Acts

1929, as ammended through 1965, regular session of the Michigan Water Resources Commission is in this volume.

690. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of Lake Erie and its tributaries. Dept. HEW. Public Health Serv. Washington, D. C. 3:606-788.

This volume includes a report from various Ohio agencies, and the Ohio Health Department concerning Ohio's efforts to combat pollution. This includes legislation, and water quality of public water supplies, bathing beaches, tributary streams and population, economic and sewage treatment aspects of various areas in Ohio. Included also are statements by the Republic Steel Corporation, Jones Laughlen Steel Corporation and U. S. Steel Corporation.

A table includes the status of municipal waste treatment facilities from the Lake Erie drainage area in Ohio.

691. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of Lake Erie and its tributaries. Dept. HEW. Public Health Serv. Washington, D. C. 4:789-1099.

This volume includes the progress made by Cleveland toward water pollution abatement, including a description of the Westerly Wastewater Treatment Plant, the Easterly Wastewater Treatment Plant, the Southerly Wastewater Treatment Plant, and overall treatment results. A map shows the area served by these plants. Statements made by the Harshaw Chemical Company, Republic Steel Corporation, Sherman-Williams Company, Standard Oil Company, Sun Oil Company, United Auto Workers-CIO, United States Steel Corporation, and various government representatives and government agencies concerning pollution are in this report. The conclusions of the conferees were summed up in 26 points.

692. U. S. Department of Health, Education, and Welfare. 1965. Report on pollution of Lake Erie and its tributaries: Part 1, Lake Erie. Dept. HEW. Public Health Serv. Washington, D. C. 50 p.

Lake Erie and its tributaries are polluted. The main body of the lake has deteriorated in quality at a rate many times greater than its normal aging process, due to inputs of pollution resulting from the activities of man. A comprehensive article encompassing all aspects of the social and economic aspects of the interaction of man and Lake Erie. Fisheries,

recreational facilities, lake commerce, municipal and industrial water supply demands, major industries, population projections, and recommendations to reverse the degradation of the lake are reviewed.

693. U. S. Department of Health, Education, and Welfare. 1965. Report on the pollution of Lake Erie and its tributaries: Part 2, Ohio, Indiana, and Michigan sources. Dept. HEW. Public Health Serv. Washington, D. C. 50 p.

This is Part 2 of a three-part report on the pollution of Lake Erie and its tributaries. Part 1 of the report concerns the main body of Lake Erie: its problems, their causes, and general remedial measures. This part deals with problems in local areas tributary to Lake Erie within Michigan, Ohio, and the headwaters in Indiana. Fishing, recreation, waterborne commerce, area populations, water uses, waste sources, pollution effects, and recommended actions as they apply to Lake Erie's tributaries are reported.

694. U. S. Department of Health, Education, and Welfare. 1965. Report on the pollution of Lake Erie and its tributaries: Part 3, New York and Pennsylvania sources. Dept. HEW. Public Health Serv. Washington, D. C. 19 p.

This is Part 3 of a three-part report on the pollution of Lake Erie and its tributaries. Part 1 covered the main body of Lake Erie: its problems, their causes, and general remedial measures. Part 2 dealt with tributaries and sub-areas in Michigan, Indiana, and Ohio. This part deals with pollution problems in three areas tributary to Lake Erie within Pennsylvania and New York. Fishing, recreation, waterborne commerce, area populations, water uses, waste sources, pollution effects, and recommended actions as they apply to Lake Erie's tributaries are reported.

695. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of the navigable waters of the Detroit River and Lake Erie and their tributaries in the State of Michigan. Dept. HEW. Public Health Serv. Washington, D. C. 1:1-304.

This report includes explanations of the projects concerning Lake Erie done by various agencies in the Detroit area. Tables include commercial traffic, pollution data, commercial fishing, recreation, industrial trends, employment, and population surveys and projections.

696. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of the navigable waters of the Detroit River and Lake Erie and their tributaries in the State of Michigan. Dept. HEW. Public Health Serv. Washington, D. C. 2:305-607.

This report includes a list of industries in the Detroit area and how they contributed to the pollution of Lake Erie. The effects of pollution on recreation, fishing, and wildlife are mentioned.

697. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of the navigable waters of the Detroit River and Lake Erie and their tributary waters in the State of Michigan. Dept. HEW. Public Health Serv. Washington, D. C. 3:608-910.

Description of pollution of Sterling State Park is included, with some of the costs and the number of people who use this park. The general effects of pollution on recreation, wildlife, and navigation are mentioned. Various companies responsible for pollution are listed along with recommendations to each specific industry for beginning pollution abatement.

698. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of the navigable waters of the Detroit River and Lake Erie and their tributaries in the State of Michigan. Dept. HEW. Public Health Serv. Washington, D. C. 4:911-1229.

Many different aspects of pollution and pollution control are mentioned. Section 13 of the River and Harbor Act (1899), as amended, is considered in terms of present day practices of dumping waste materials from ships into Lake Erie. Lake fishermen are finding that the type of fish available are not as suited to commercial purposes as in the past.

The costs of waste treatment in the Detroit area are discussed, and several counties are listed in terms of water supply and waste treatment. Tables show the action taken by communities and state regulation agencies since 1950 to maintain control of pollution in each county.

An explanation is made of how economic growth affects water quality. Various industries are cited as responsible in part for pollution, and listed in terms of how they have changed the water quality.

699. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of the navigable waters of the Detroit River and Lake Erie and their tributaries in the State of Michigan. Dept. HEW. Public Health Serv. Washington, D. C. 5:1231-1667.

This report looks at what the 1957 program for pollution has accomplished in Detroit. The future of this program is also mentioned in terms of cost and mechanics of waste treatment.

Tables include the proposed and present waste treatment service area of Detroit. Graphs show the population projections for 1940-1980 in terms of the financing of sewage treatment as population increases. A review of the Six-County (Michigan) Study on sewage treatment is given.

The accomplishments in correcting pollution are given, and reports from the United Auto Workers, the National Steel Corporation, the Ford Motor Company, Monsanto Company, Allied Chemical Corporation, Scott Paper Company, Wyandotte Chemical Corporation, Pennsalt Chemical Company, and E.I. DuPont de Nemours and Company are presented.

700. U. S. Department of Health, Education, and Welfare. 1965. Conference in the matter of pollution of the navigable waters of the Detroit River and Lake Erie and their tributaries in the State of Michigan. Dept. HEW. Public Health Serv. Washington, D. C. 6:1669-1787.

Suggestions for the controlling of pollution by the State of Michigan, the usage of natural waters instead of artificial lakes, and explanation of the present recreational usage of Lake Erie beaches is given by the Lake Erie Cleanup Committee. The Monroe County Health Department presents a comprehensive analysis of Lake Erie shores and streams which discharge into the lake in Monroe County. Reports from the Consolidated Packaging Company and the Union Bag-Camp Paper Corporation on their strategies in regard to pollution control are presented. Statements are included from the Greater Detroit Board of Commerce and other interest groups concerning the correction of poor water quality.

701. U. S. Environmental Protection Agency. 1971. Lake Erie, Ohio, Pennsylvania, New York intake quality summary, 1970. EPA Region V. Ohio District Office. Fairview Park, Ohio. 311 p.

This report mentions the monitoring of water quality of Lake Erie and algae-caused consumer distress. (CCIW)

702. U. S. Department of Transportation. 1973. St. Lawrence Seaway Developmental Corporation 1973 Annual Report. Washington, D. C. 24 p.

Contained in this report are the financial condition and progress made by the St. Lawrence Seaway. A record setting total of 600 million tons passed through the seaway this year, with the navigation season extended by a month. A summation of selected travel studies, tonnage totals, and cargo summaries of commercial navigation are given. Management procedures and operations are also included.

703. U. S. Federal Water Pollution Control Administration. 1965. Conference in the matter of pollution of Lake Erie and its tributaries. FWPCA. Washington, D. C. 1:1-265.

This volume includes addresses of government officials and a report of the polluted state of Lake Erie and its effect on fish population. The area of Lake Erie around Erie, Pennsylvania is discussed as it affects and is affected by pollution.

704. U. S. Federal Water Pollution Control Administration. 1965. Conference in the matter of pollution of Lake Erie and its tributaries. FWPCA. Washington, D. C. 2:266-496.

Reports concerning the pollution of Pennsylvania and New York waters of Lake Erie are given, including the costs of waste treatment and industrial concerns.

705. U. S. Federal Water Pollution Control Administration. 1968. Conference in the matter of pollution of Lake Erie and its tributaries, technical session. FWPCA. Washington, D. C. 134 p.

Verbatim report of the technical session of the conference dealing with the nutrient impact on the aging and eutrophication of Lake Erie, specifically the phosphate problem. (CCIW)

706. U. S. Federal Water Pollution Control Administration. 1968. Conference in the matter of pollution of Lake Erie and its tributaries, 4th session. FWPCA. Washington, D. C. 136 p.

A verbatim report of the proceedings of the 4th session of the

Conference in the Matter of Pollution of Lake Erie and its Tributaries. The prime concern is phosphate removal in Lake Erie and proposing time schedules for lake cleanup. (CCIW)

707. U. S. Federal Water Pollution Control Administration. 1968. The cost of clean water. In: Detailed Analyses. FWPCA. Washington, D. C. 2:1-244.

This report mentions investment requirements of wastewater for the Great Lakes.

708. U. S. Federal Water Pollution Control Administration. 1968. The cost of clean water. In: State and Major River Basin Municipal Tables. FWPCA. Washington, D. C. 4:1-44.

This report gives a summary of needs for municipal treatment works correlated to population needs for the Great Lakes.

709. U. S. Federal Water Pollution Control Administration. 1968. Lake Erie data surveillance summary, 1967-1968. FWPCA. Great Lakes Region. Cleveland Program Office. 65 p.

The effects of pollution in Lake Erie has prompted the Federal Water Pollution Administration Great Lakes Region to publish annual reports from surveillance stations on Lake Erie.

710. U. S. Federal Water Pollution Control Administration. 1968. Lake Erie report. FWPCA. Great Lakes Region. Cleveland Program Office. 105 p.

This report completes a cooperate Federal-State planning effort to save Lake Erie. Every economic aspect is mentioned from recreational usage to industrial impact. Treatment is especially stressed.

711. U. S. Federal Water Pollution Control Administration. 1968. Progress evaluation meeting, pollution of Lake Erie and its tributaries--Indiana, Michigan, New York. Ohio, Pennsylvania. In: Proceedings of Progress Evaluation Meeting. FWPCA. Washington, D. C. 467 p.

This report consists of the minutes of the progress evaluation meeting. Included are statements on pollution of Lake Erie by heads of government, heads of agencies, and interested citizens. The publications Lake Erie Surveillance Data Summary, Lake Erie Environmental Summary 1963-1964, by the United States

Department of the Interior, Lake Erie Bathing Beach Quality June 1968, by the Federal Water Pollution Control Administration, lake leasing contracts for oil drilling by Pennsylvania, and other related reports presented by participating agencies were discussed and criticized. The states which border Lake Erie presented their progress in fighting pollution, and their future programs. The Army Corps of Engineers also explained their stand concerning dredging and depositing the polluted dredged materials in Lake Erie.

712. U. S. National Water Commission. 1973. Water policies for the future: Final report to the President. U. S. Printing Office. Washington, D. C. 579 p.

This report reflects the Commission's earnest efforts to comply with the mandate given it by the National Water Commission Act. The report contains many recommendations for improvement of policies dealing with protection, development, and use of the nation's resources. Pollution problems and recommendations for the Great Lakes are given. Water quality is stressed. (CCIW)

713. U. S. Water Resources Council. 1968. The nation's water resources. In: The First National Assessment of the Water Resources Council. Washington, D. C. Part 6, Chapter 3, pp. 1-11.

Industrial and municipal wastes are contributing to Lake Erie pollution. These pollutants have reduced water recreation use, and have contributed to water taste and odor problems. Fish and waterfowl habitats have been damaged. Most serious problems center around highly industrialized centers.

Also included is a table of water (millions of gallons/day) withdrawn and consumed for rural, industrial, power, irrigation, and other uses. This conference was held to consider pollution abatement for the Lake Erie Basin.

714. Van Coevering, Jack. 1966. Tombstone for Lake Erie. Sports Afield. 153(5):66-67, 117-121.

The author describes the severe pollution problem in Lake Erie. Some principal sources of industrial pollution are mentioned. Consequences of the severe pollution problem in the lake are reviewed (e.g., decline in quality fish and recreational opportunities, public health hazards, etc.). If the battle to save Lake Erie is lost, there can be little hope elsewhere.

Van Meter, Harry D. - See: Vernon C. Applegate, No. 75.

715. Van Meter, Harry D. 1973. Unharvested fishes in the U. S. commercial fishery of Western Lake Erie in 1969. NOAA. Tech. Rept. NMFS SSRF-670. pp. 1-11.

Potential commercial fish production was estimated for U. S. waters of Western Lake Erie in 1969 from pounds landed and pounds discarded. Periodic observations of catches in haul seines and trap nets revealed that about 37% of the catch (by weight) in haul seines and 26% of that in trap nets were low-value fishes that were discarded. Projection of these discarded catches to include the total fishing effort indicated that an additional 2.8 million lb of low-value species would have been landed in 1969 if a reasonable profit had been assured. It is concluded that the sustained yield could be increased considerably with only a moderate increase in fishing effort.

716. Van Meter, Harry D. and William F. Sheperd. 1967. Fishery picture changing in Lake Erie. Conservationist. Albany, N. Y. 22(2):2-3.

This article is primarily a fish census of Lake Erie (1965-1966). Due to pollution, the commercial fish catch has decreased; only a handful of commercial fishermen are still in operation.

717. Van Meter, Harry D. and Milton B. Trautman. 1970. An annotated list of the fishes of Lake Erie and its tributary waters exclusive of the Detroit River. Ohio J. Sci. 70(2):65-78.

Dramatic fluctuations have occurred in the abundance of many species in Lake Erie and its tributary waters in the last century. Some fishes of former economic importance have become commercially extinct. Several species apparently have been extirpated, especially in the tributaries. It is believed that further changes in the abundance of other species will occur in the near future. This publication consolidates the confirmed records of fish species for Lake Erie and its tributaries. One hundred and thirty-eight species of fishes are listed and, where appropriate, brief comments on present and past distribution, and abundance and economic status are given. Selected references are listed as additional sources of information for each species.

718. Van Oosten, John. 1929. Some fishery problems on the Great Lakes. Trans. Am. Fish. Soc. 59:63-85.

An intense and extensive investigation of the Great Lakes

fisheries by the U. S. Bureau of Fisheries was inaugurated in 1927. The collapse of the Lake Erie fisheries has been explained by the destructiveness of fishery methods, fishing intensity, pollution, lack of food, lack of proper closed seasons and proper size limits, and natural fluctuations in abundance of year-classes due to variations in environmental conditions at spawning and hatching time. (CCIW)

719. Van Oosten, John. 1930. The disappearance of the Lake Erie ciscoe. Trans. Am. Fish. Soc. 60:204-214.

The ciscoe fishery of Lake Erie suddenly dropped in 1925. A graph shows catches for 1913-1928 in the United States and Canada. The ciscoes were available in abundance up until December 1924, then somehow disappeared over the winter months. The author suggests that two occurrences were responsible: an unusual congregation of ciscoes in one area and the overfishing of this area which nearly exterminated the species in the lake. (CCIW)

720. Van Oosten, John. 1932. Experiments on the mesh of trap nets and legislation of the commercial fisheries of Lake Erie. Trans. Am. Fish. Soc. 62:100-107.

The disappearance of the Lake Erie ciscoe fishery in 1925 has caused much concern and research. As a result, the bullnet was abolished and the fishing season was shortened. This article discusses the size of mesh and suggests that commercial fishermen trust the results of this study as it was done in an unbiased manner and in the best interest of the fishermen. (CCIW)

721. Van Oosten, John. 1949. The present status of the United States commercial fisheries of the Great Lakes. Trans. 14th North Am. Wildlife Conf. pp. 319-330.

Discussion of the sport fishing in Lake Erie is presented, with millions of game fish taken from the waters yearly. The average yearly yield is also given, in correspondence with the decline in production of important species. (SM)

722. Vaughan, R. D. 1963. Detroit River-Lake Erie project. Water and Sewage Works. 110(9):305-307.

This project was set up to summarize data and help guide current operations in water pollution control studies to determine the extent of pollution in the United States portion of

the Detroit River and the Michigan section of Lake Erie. Principal sources of pollution were investigated to determine the effect of pollution in various water uses and to prepare a plan for improving the water quality. Future projections are made in regard to planning, management, and development. (BL)

723. Vaughn, Stuart H. 1970. New and used water for individual industrial needs--where and when? Internat. Assoc. Great Lakes Res. Proc. 13th Conf. Great Lakes Res. pp. 567-570.

This article describes the process of water recycling used by the Ford Company in Cleveland, Ohio.

724. Verduin, Jacob. 1964. Changes in Western Lake Erie during the period 1948-1962. Verh. Internat. Verein. Limnol. 15:639-644.

In this article reference is made to the "Great Black Swamp" on the Maumee River which was drained and converted to valuable farmland. The author also notes that several smaller operators have gone out of business as commercial fishermen.

725. Verduin, Jacob. 1969. Man's influence on Lake Erie. Ohio J. Sci. 69(2):65-70.

This article reviews the rapid eutrophication of Lake Erie which has been promoted by man's activities. Particular emphasis is placed on the draining of the Great Black Swamp (Maumee River) for use as farmland, and the resulting impact on Lake Erie.

726. Vesley, Marjorie L. 1971. The Lake Erie Basin Committee. ECHO Issues. Buffalo, N. Y. 1(9):3.

The interaction of the League of Women Voters in concern for water resources and their usage led to the formation of this group. Concerns and positions on various issues are given, including: a bond issue for waste water treatment; legislative action on phosphates; and legislation to ban oil and gas exploration on Lake Erie.

727. Vesley, Marjorie L. 1971. League of Women Voters of the United States Lake Erie Basin Committee, New York subcommittee. ECHO Issues. Buffalo, N. Y. 2(2):3-4.

The League of Women Voters describes the dilemma of waste

disposal and its distribution forces on Lake Erie. Further discussion is made on New York State action concerning this matter.

728. Wagner, Frederick. 1929. Chemical investigation of the Erie-Niagara watershed. In: A Biological Survey of the Erie-Niagara System. N. Y. Cons. Dept. Albany, N. Y. Suppl. to 18th Ann. Rept. (1928). pp. 107-133.

Discussion is made of streams and their effect on a large body of water. Conjectures are made on the possible contributory influences of the tributary streams, municipalities, and industrial concerns which sewer into it. The depletion of Lake Erie fishing caused the formulation of a chemical policy, with emphasis on streams of past concern and that part of Lake Erie which might be affected by the influences mentioned.

729. Walper, George. 1971. The Erie County Federation of Sportsmans Clubs. ECHO Issues. Buffalo, N. Y. 1(8):3.

The purposes of this group as they relate to conservation in the western area of New York State on Lake Erie are given.

Walter, Erich - See: Harlan Hatcher, No. 283.

730. Waterfield, Donald. 1970. Continental Waterboy. Clark Irwin and Co., Ltd. Toronto, Ont. 250 p.

This book is devoted to the future projection of Canada's role as a major exporter and continental waterboy. Lake Erie is mentioned in regard to its pollution problem and as a source of transcontinental shipping. (CCIW)

731. Watt, James G. 1970. The challenge of the Lake Erie Basin. In: The Environmental Problems of the Lake Erie Basin. Carroll Business Bull. Cleveland, Ohio. 10(1):33-36.

This article states that Lake Erie pollution is the product of extravagant use of the lake's resources. A better understanding of pollution problems and a collective approach to their solution will expedite lake cleanup. The most important factor concerning control of pollution is education of the public.

732. Weber, Eugene W. 1966. The Great Lakes--a joint resource. In: The Fresh Water of New York State--Its Conser-

vation and Use. Proc. Symposium held at State Univ. of N. Y. at Buffalo. IJC. Washington, D. C. pp. 99-103.

The International Joint Commission, U. S. and Canada, is a permanent body established by the Boundary Waters Treaty of 1909 to administer specified delegated powers and to prepare recommendations when requested on problems of mutual concern to the two countries.

Significant current activities include surveillance of conformance to approved water quality objectives in the Great Lakes connecting channels, study of pollution of mutual concern in Lakes Erie and Ontario and the St. Lawrence River, supervision of operations affecting levels and flows at Niagara Falls and the St. Lawrence and studies of possible measures to bring about a more beneficial range of stage on the Great Lakes.

The Commission provides the procedures necessary to bring the appropriate local, State, Provincial, and national agencies and interests to exercise their respective responsibilities on problems of mutual concern to Canada and the United States along their common frontier.

733. Webster, Dwight. 1967. Fishery management. Conservationist. Albany, N. Y. 21(4):28-32.

Lake Erie has deteriorated due to man's influence. Eutrophication of the lake has increased at an abnormal rate. (SM)

734. Webster, Thomas C. 1969. Appendix: Production data for Regional Trade Study relevant to pollution abatement in the Western Basin of Lake Erie. In: Proceedings of the 4th Symposium of Water Resources Research. Ohio State Univ. Columbus, Ohio. pp. 91-110.

It is the primary purpose of this paper to provide data which will be used in the Regional Trade Study of the Western Basin of Lake Erie. These data provide a description of those industries which are important to the economy of the Western Basin and engaged in regional trade. Information about other manufacturing regions which have significant output in those industries and which are important to the Regional Trade Study of the Western Basin of Lake Erie is also presented.

735. Weickmann, Helmut K. 1972. Man-made weather patterns in the Great Lakes Basin. In: Proceedings of the

First Federal Conference on the Great Lakes. Interagency Committee on Marine Sci. and Eng. for the Federal Council for Sci. and Tech. Washington, D. C. pp. 205-219.

Weather manipulation (cloud seeding) over Lake Erie presents legal, international, socio-economic, and ecological implications. For example, cloud seeding would not be beneficial to skiing areas near the southern shore of Lake Erie.

736. Weller, Steve. 1967. Buffalo's winter fleet. Buffalo. Buffalo, N. Y. 42(3):24-25.

This article discusses winter navigation on Lake Erie, especially around the Buffalo Harbor. Buffalo is considered by some to be the most difficult port on the Great Lakes to enter in the winter because of ice and winds. (BU)

737. Whitehead, W. 1967. Canada 1967--One hundred years of natural wealth. Canadian Audubon. Ottawa, Ont. 29(5):144-159.

This article mentions the decline of commercial fishing in Lake Erie and the lake's pollution problem. (SM)

Whitman, Ira L. - See: Vincent A. Ostrom, et al, No. 507.

738. Wickliff, E. L. 1939. Fishery research by the Ohio Division of Conservation. Trans. Am. Fish. Soc. 61:199-207.

This article describes some of the projects of the Bureau of Scientific Research, including the "Hydrobiological Survey of the Western End of Lake Erie" designed to determine the suitability of the lake for fish life because of reports of a decrease in catch. The findings of this study include reports on pollution, parasites, distribution of fisheries etc. Another study, "Fish Parasites" by R. V. Bangham, includes information on the fish in Lake Erie and its drainage basin. (CCIW)

739. Wilkerson, J. C. and J. F. Ropek. 1967. An application of naval oceanographic development to inland waters. Internat. Assoc. Great Lakes Res. 10th Conf. Great Lakes Res. pp. 456-460.

This article mentions Lake Erie in regard to the correlation between the problems it faces and those of the other Great Lakes. A survey done on Lake Erie is also mentioned.

740. Wilkins, Bruce and Terry Rader. 1973. Advisory services program - Lake Erie. New York Sea Grant Program. Albany, N. Y. pp. 105-107.

This article presents a discussion among people of Sea Grant who wish to form a cooperative effort between New York and Pennsylvania which would benefit the citizens on Lake Erie. Stress on the shoreline area and economic change are coupled as regional problems to resolve.

741. Williams, Roger C. 1929. Pollution studies in the light of chemical analyses. In: Preliminary Report on the Cooperative Survey of Lake Erie, Season of 1928. Buffalo Soc. Nat. Sci. Bull. 14(3):59-64.

This article mentions Lake Erie in regard to industrial pollution and chemical factors affecting the extent of pollution. (no specific quantitative data)

742. Willoughby, William R. 1956. The impact of the Erie Canal. Buffalo Historical Soc. Buffalo, N. Y. 3(2):38-47.

With the connection of Lakes Erie and Ontario by the Erie Canal, New York State achieved immediate economic unity. (SM)

743. Wilson, James T. and John C. Ayers. 1968. An effort to mobilize inter-university water related research in the Great Lakes. In: Proceedings of Great Lakes Water Resources Conference. Univ. Mich. Ann Arbor, Mich. pp. 471-489.

This paper describes the progress made in 1967 and 1968 by multidisciplinary representatives from various universities and agencies toward developing a framework for research activities which appear necessary for comprehensive water quality management and related developments in the Great Lakes system. Lake Erie is mentioned in terms of pollution and planning.

744. Wolfert, David R. 1963. The movements of walleyes tagged in Lake Erie. Trans. Am. Fish. Soc. 92:414-420.

Walleyes were tagged and released along the shores of Western Lake Erie. The resulting information, obtained when the tags were returned by fishermen, showed the distances travelled by the fish. The condition that the fish were in when caught was reported by some of the fishermen. (BU)

745. Wolfert, David R. 1969. Maturity and fecundity of walleyes from the Eastern and Western Basins of Lake Erie. J. Fish. Res. Board Canada. 26:1877-1888.

In this article, reference is made to the history of the decline of the walleye in Lake Erie. The walleye had been one of the principal species in the commercial and sport fisheries.

746. Wolfert, David R., Vernon C. Applegate, and Leonard N. Allison. 1967. Infection of the walleye, Stizostedion v. vitreum, of Western Lake Erie with Bothriocephalus cuspidatus (Cooper). Mich. Acad. Sci., Arts and Letters. 52:105-114.

This article concerns walleye depletion due to parasites, partially studied through the use of commercial netting.

747. Wood, Kenneth G. 1968. Pollution and Lake Erie. Bios. 39(3):103-110.

The Great Lakes drainage basin contains approximately 30 million people who use the waters for drinking purposes and waste disposal. This paper is concerned with the effect these people have on the quality of the water in the system, particularly in regard to Lake Erie.

748. Youngquist, C. V. 1953. Introduction. In: Lake Erie Pollution Survey, Final Report. Ohio Dept. Nat. Resources. Div. Water. Columbus, Ohio. pp. 13-18.

Lake Erie is indispensable for the survival of the Lake Erie region. Continued degradation of that water resource endangers the region's survival and development. The purpose of the survey was to determine the chemical, physical, and bacterial quality of the waters of Lake Erie and its Ohio tributaries. Recommendations are made for the curtailment of pollutants found. The introduction reviews the five chapters which make up the Lake Erie Pollution Survey. (CCIW)

749. Zillig, Andrew M. 1929. Bacteriological studies of Lake Erie. In: Preliminary Report on the Cooperative Survey of Lake Erie, Season of 1928. Buffalo Soc. Nat. Sci. Bull. 14(3):51-64.

This paper reports on the sanitary condition of the water in Eastern Lake Erie. It is designed to evaluate if pollution is a factor in the decline of the fisheries (1928).

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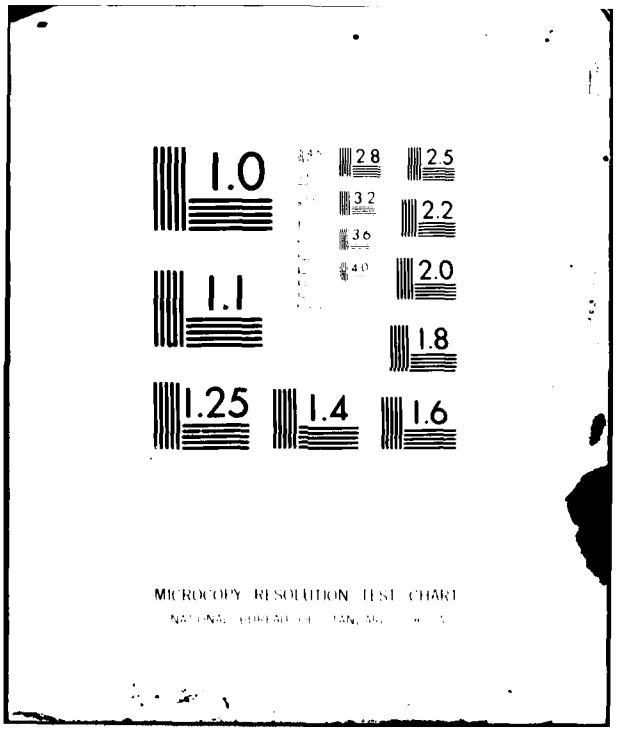
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VI. ACKNOWLEDGEMENTS

We would like to thank the librarians, scientists and engineers without whose assistance this compilation would not have been possible. We are particularly appreciative of the cooperation by the staff at the Buffalo District - Army Corps of Engineers, Buffalo Museum of Science, Canada Centre for Inland Waters, Calspan Corporation, Buffalo and Erie County Public Library, State University College at Buffalo and State University of New York at Buffalo Libraries. Access to a list of Lake Erie publications compiled by the Center for Lake Erie Area Research of The Ohio State University, with the assistance of other institutions, also was of considerable aid.

VII. ABBREVIATIONS

Acad.	Academy
Am.	American
Ann.	Annual
Assoc.	Association (s)
AWWA	American Water Works Association
BECPL	Buffalo and Erie County Public Library
BL	Bell Library - State University of New York at Buffalo
BU	Butler Library - State University of New York College at Buffalo
Bull.	Bulletin
CA	Calspan Corporation Library
Calif.	California
CCIW	Canada Centre for Inland Waters Library
CE	Corps of Engineers - Buffalo District Library
Chem.	Chemistry, Chemical
Co.	Company
Conf.	Conference
Cons.	Conservation
Cult.	Culturist
Dept.	Department
Develop.	Development
Div.	Division
ECHO	Environmental Clearing House Organization
Ecol.	Ecological
Ed.	Editor
Eds.	Editors
Eng.	Engineer(s), Engineering
Fish.	Fishery, Fisheries
FWPCA	Federal Water Pollution Control Administration
HEW	Health, Education and Welfare (Department of)
IJC	International Joint Commission
Ill.	Illinois
Inc.	Incorporated
Internat.	International
J.	Journal
Lab.	Laboratory
LO	Lockwood Library - State University of New York at Buffalo

Man.	Manitoba
Mass.	Massachusettes
Md.	Maryland
Mich.	Michigan
Mono.	Monographs
M.Sc.	Master of Science
Nat.	Natural
NFTA	Niagara Frontier Transit Authority
No.	Number
NOAA	National Oceanic and Atmospheric Administration
N.Y.	New York
Ok.	Oklahoma
Ont.	Ontario
p.	Page
pp.	Pages (inclusive)
___p.	Pages (total in report)
Pa.	Pennsylvania
Proc.	Proceedings
Pub.	Publication
Rept.	Report
RL	Ridge Lea Library - State University of New York at Buffalo
Sci.	Science
Serv.	Service
SM	Buffalo Museum of Science Research Library
Soc.	Society
Spec.	Special
Suppl.	Supplement
Tech.	Technical
Trans.	Transactions
UB	State University of New York at Buffalo
Univ.	University
U.S.	United States
Va.	Virginia
Vol.	Volume (s)
Wis.	Wisconsin


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