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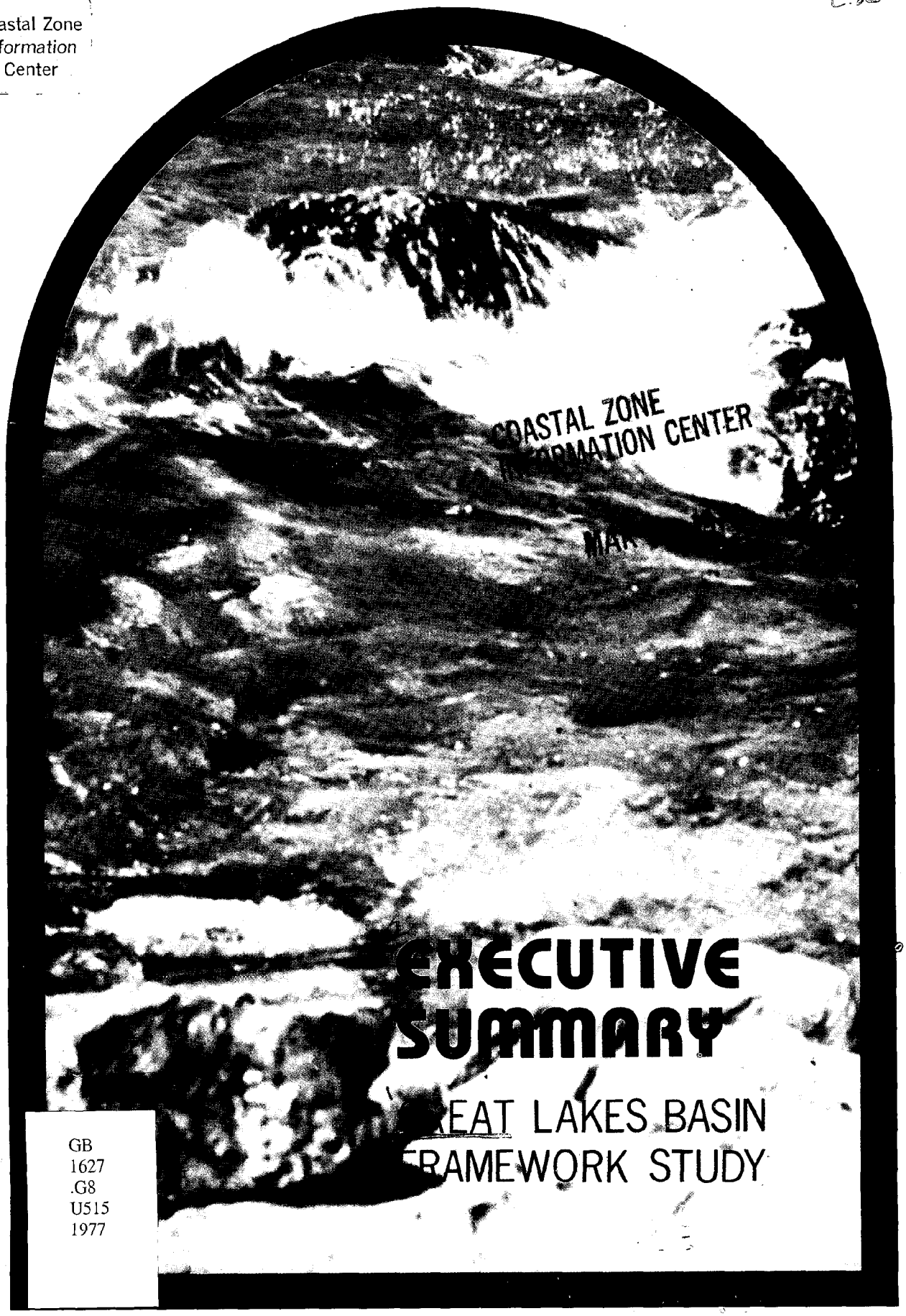

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EXECUTIVE SUMMARY

GREAT LAKES BASIN FRAMEWORK STUDY

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introduction

The Great Lakes lie approximately at the center of the North American continent and provide an abundant water supply, a transportation network, and recreational opportunities to thousands of square miles of continental interior (Figure 1). Intense and diverse uses of the Great Lakes and other water and related land resources in the Basin, however, have resulted in resource depletion and damage which can be mitigated only by proper planning.

During the late 1960s, in light of projected population growth and economic expansion, it became evident to the Great Lakes Basin states that further resource utilization must be carefully planned to maintain water quality and quantity adequate to meet the physical, economic, and aesthetic needs of the Basin's population. It was also evident that effective planning for such a large, hydrologically and socially complex and interrelated system could not occur through the isolated actions of federal, state, and local organizations in the Basin. Coordinated effort would be imperative. Thus, in accordance with Public Law 89-80, the Water Resources Planning Act of 1965, the Great Lakes Basin Commission was established on April 20, 1967, at the request of five Basin states, with the concurrence of the other three.

As set forth by this federal mandate, the Basin Commission's duties are fourfold. It is the primary coordinator of all federal, state, interstate, local, and nongovernmental planning for water and related land resources. It must prepare and keep current a comprehensive coordinated joint plan, the Great Lakes Basin Plan. It must recommend long-range schedules of priorities for collecting and analyzing data and for investigating, planning, and constructing projects. And it may undertake special studies that will augment the available information on water and related land resources.

The comprehensive Basin Plan is necessary for the adequate fulfillment of the Commission's latter three responsibilities. Work on this plan was therefore begun immediately. The initial step, utilizing existing data, was an exhaustive survey of Basin water and related land resources and their uses, problems, possible solutions, and projected future needs (Table 1).

This survey is the *Great Lakes Basin Framework Study*. The ultimate purpose of the Framework Study was to develop a framework, or basic plan, for meeting future water needs. The major objective that guided framework formation was improvement of the quality of life, with emphasis on enhancing national economic development by continuation of past economic trends as modified by present conditions. The resulting framework, called the Normal Framework, was then revised to reflect to the extent practicable the desires of the citizens and governmental units of the Basin for maintenance of a high-quality environment and for regional economic development. The synthesis of these revisions is the Proposed Framework, which, together with public comment, is the basis of the Framework Study recommendations presented on the following pages. These recommendations specify the actions that the Great Lakes Basin Commission proposes be supported by the President and Congress and by the Governors and legislatures of the Great Lakes states.

Implementation of the recommended studies and programs will constitute the initial actions resulting from the Great Lakes Basin Plan. Study findings and program accomplishments will then be added to the Plan, expanding its base of information and enabling determination of what further studies and programs are needed.

This executive summary presents the problems identified in the Framework Study, the recommendations in full, and a discussion of institutional and other considerations involved in Framework Study implementation and future planning.

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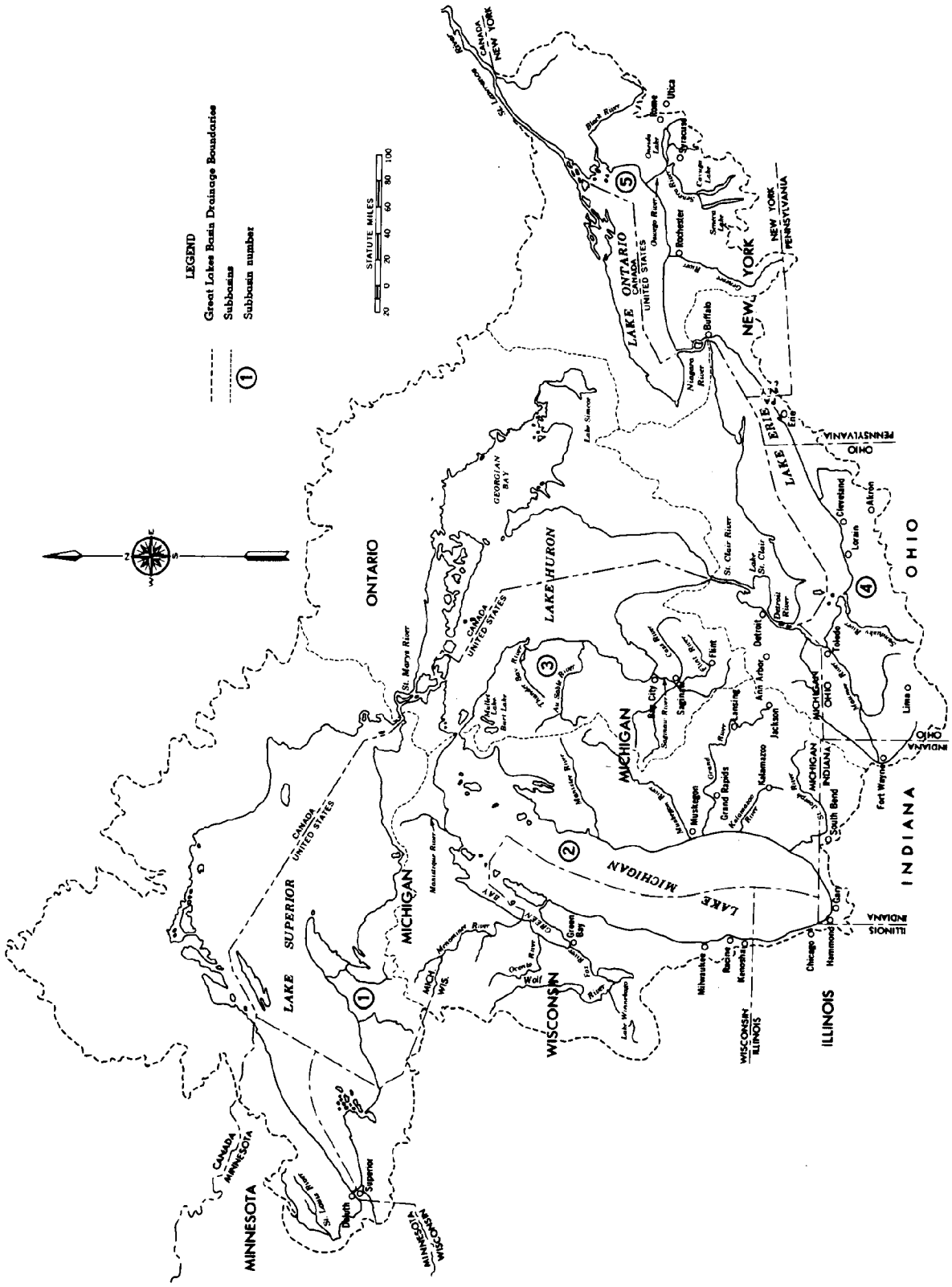

FIGURE 1 Great Lakes Basin

TABLE 1 Great Lakes Basin: Needs, Outputs, and Percent Needs Met, Proposed Framework, 1980, 2000, 2020

RESOURCE USE CATEGORY	UNIT	1970 SUPPLY	1980 N	1980 O	1980 %	2000 N	2000 O	2000 %	2020 N	2020 O	2020 %
WATER WITHDRAWALS											
MUNICIPALLY SUPPLIED	MILLION GALLONS PER DAY	4,300	870	1,030	over	2,810	2,990	over	5,400	5,550	over
SELF-SUPPLIED INDUSTRIAL	MILLION GALLONS PER DAY	10,600	1,110	695	62	4,670	3,500	75	10,300	8,220	80
RURAL DOMESTIC & LIVESTOCK	MILLION GALLONS PER DAY	471	64.0	58.7	92	179	162	91	267	245	92
IRRIGATION	MILLION GALLONS PER DAY	661	824	684	83	1,570	1,320	84	2,460	2,090	85
MINING	MILLION GALLONS PER DAY	780	148	124	84	450	350	78	965	724	75
THERMAL POWER COOLING		17,200	8,210	8,210	100	38,700	38,700	100	96,500	96,500	100
NON-WITHDRAWAL WATER USES											
MUNICIPAL WASTEWATER DISCHARGES	MILLION GALLONS PER DAY	3,060	3,680	3,680	100	4,940	4,940	100	6,720	6,720	100
INDUSTRIAL WASTEWATER DISCHARGES	MILLION GALLONS PER DAY	8,580	7,330	7,330	100	6,000	6,000	100	9,210	9,210	100
HYDROELECTRIC POWER	MILLION GALLONS PER DAY	NA	47,300	47,300	100	51,300	51,300	100	105,000	105,000	100
WATER ORIENTED OUTDOOR REC.	1000 RECREATION DAYS	100,000	105,000	57,300	55	201,000	132,000	66	324,000	190,000	58
	1000 ACRES WATER SURFACE	NA	---	---	---	---	---	---	---	---	---
SPORT FISHING	1000 ANGLER DAYS	80,700	24,800	20,300	82	52,300	46,700	89	79,200	72,800	92
	1000 ACRES WATER SURFACE		---	---	---	---	---	---	---	---	---
RECREATIONAL BOATING	1000 BOAT DAYS	29,000	6,820	2,470	36	12,500	6,330	51	19,500	10,800	55
	1000 ACRES WATER SURFACE	7,260	7,260	---	---	7,260	---	---	7,260	---	---
COMMERCIAL FISHING	MILLION TONS PER YEAR		---	---	---	---	---	---	---	---	---
COMMERCIAL NAVIGATION	MILLION TONS PER YEAR	343	432	432	100	583	583	100	754	754	100
RELATED LAND USES & PROBLEMS											
AGRIC. LAND-TREATMENT	1000 ACRES	20,450	20,450	4,000	20	20,450	11,400	56	20,450	15,500	76
-CROPLAND DRAINAGE	1000 ACRES	6,210	6,210	695	11	6,210	1,810	29	6,210	2,610	42
FOREST LAND-TREATMENT	1000 ACRES	27,900	27,900	4,370	16	27,900	13,100	47	27,900	21,800	78
SHORELAND EROSION	MILES	1,200	1,200	45.6	4	1,200	125	10	1,200	204	17
STREAMBANK EROSION	MILES	10,900	10,900	585	5	10,900	1,760	16	10,900	2,930	27
	$1000 AVE ANNUAL DAMAGES	1,710	1,710	342	20	1,710	1,026	60	1,710	1,710	100
FLOOD PLAINS-URBAN	1000 ACRES	222	230	78	34	240	139	58	251	199	79
-URBAN	$1000 AVE ANNUAL DAMAGES	46,300	67,100	52,200	78	118,000	103,000	87	190,000	177,000	93
-RURAL	1000 ACRES	2,570	2,560	532	21	2,560	921	36	2,550	1,220	48
-RURAL	$1000 AVE ANNUAL DAMAGES	14,200	18,000	6,580	37	24,200	11,300	47	32,400	18,100	56
WILDLIFE MANAGEMENT	1000 ACRES		2,920	1,170	40	7,990	3,020	38	14,100	4,930	35
	1000 USER DAYS	49,600	15,000	2,250	15	23,900	7,230	30	33,300	12,500	38
AESTHETIC & CULTURAL	1000 ACRES	NA	---	---	---	---	---	---	---	---	---
OUTDOOR RECREATION-INTENSIVE	1000 ACRES		30.0	22.2	74	62.0	52.9	84	109	75.3	69
-EXTENSIVE	1000 ACRES	NA	170	151	89	348	319	92	600	453	76

basin problems & recommendations for their solution

The *Great Lakes Basin Framework Study* has identified problems of varying severity associated with practically all water and land resources and resource uses (Table 2). The problems include water pollution, lake level regulation, heavy recreational demands, unplanned land use, and inadequate coastal zone management. The following discussion of these problems and the Commission's recommendations concerning them also cover general recommendations pertaining to the Proposed Framework and to actions that should be taken under the auspices of the Great Lakes Basin Commission.

GENERAL RECOMMENDATIONS

Recommendation Concerning the Great Lakes Basin Proposed Framework

Follow the Proposed Framework as an initial guide to the development of the water and related land resources of the Basin.

The Proposed Framework encompasses the features believed necessary to develop the water and related land resources of the Basin in an optimal manner. It builds on the situation that existed in 1970, the base year. Costs have been estimated for most of the elements and indicate a capital investment of $25 billion, about one-half of which is federal (Table 3) and an expenditure for operation, maintenance, and replacement of $47 billion, about 80 percent of which is public non-federal (Table 4) in the 50 years from 1970 to 2020. This translates into an annual per capita cost of $30 in the early 1970s and $8.50 in 2020 and an annual operation, maintenance, and replacement cost of $16 in the early 1970s and $30 in 2020. In view of the central importance of a high level of water quality to the future of the Basin, the water quality management program represents the largest single investment at $10 billion over the 50-year period, or 40 percent, for municipal wastewater treatment facilities in order to meet the requirements of P.L. 92-500, the Federal Water Pollution Control Act as amended. To build new facilities and bring existing facilities up to current standards, nearly one-half of this expenditure is projected for the first 10 years, resulting in the high per capita costs shown for the early period.

Recommendations Concerning the U.S. Great Lakes Basin for Action Under the Auspices of the Great Lakes Basin Commission

(1) Accelerate the development of the next portion of the Comprehensive Coordinated Joint Plan to ensure its completion by 1980 through (a) utilizing to the maximum practicable extent national assessments of water problems and needs, and other federal, state, interstate, regional, local, and non-governmental plans in a continuous planning process, and (b) adequately funding more detailed studies conducted by the Commission, including the following in order of recommended priority for federal funding and early action by the Commission:

Studies	*Cost ($1,000)*	*Start (F.Y.)*	*Length (Years)*
Fox-Wolf River Basin Level B Study	*830*	*1977*	*2*
Great Lakes Regional Water and Energy Study	*875*	*1978*	*2*
Great Lakes Environmental Planning Study	*2,100*	*1978*	*3*

(2) Coordinate and support expanded data collection and research programs necessary for improved management of the water and related land resources of the Basin.

(3) Foster and support a comprehensive study of transportation needs and opportunities in the Great Lakes Basin and their implication for water resources in the Great Lakes Basin.

(4) Foster or undertake appropriate additional studies to provide the details necessary for development of the Comprehensive Coordinated Joint Plan, and for authorization and construction of projects.

ENERGY

The Great Lakes Basin is an attractive region for power plant development (Table 5). The Great Lakes provide abundant water for cooling and are a transportation medium for fuel delivered along the thousands of miles of Great Lakes shoreline. Industrial and urban centers in and

TABLE 2 Great Lakes Basin Resource Problems Matrix

Resource Use Category	Great Lakes Basin					Lake Superior					Lake Michigan					Lake Huron					Lake Erie					Lake Ontario				
	Overall	Open Waters	Urban	Rural	Interface	Overall	Open Waters	Urban	Rural	Interface	Overall	Open Waters	Urban	Rural	Interface	Overall	Open Waters	Urban	Rural	Interface	Overall	Open Waters	Urban	Rural	Interface	Overall	Open Waters	Urban	Rural	Interface
WATER WITHDRAWALS																														
MUNICIPALLY SUPPLIED	1	-	1	-	-	-	-	-	-	-	1	-	2	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
SELF-SUPPLIED INDUSTRIAL	1	-	1	-	-	1	-	-	1	-	1	-	1	-	-	1	-	1	-	-	1	-	1	-	-	-	-	-	-	-
RURAL DOMESTIC & LIVESTOCK	1	-	-	1	-	1	-	-	1	-	1	-	-	1	-	1	-	-	1	-	1	-	-	1	-	1	-	-	1	-
IRRIGATION	1	-	-	1	-	1	-	-	1	-	1	-	-	1	-	-	-	-	-	-	1	-	1	1	-	2	-	-	2	-
MINING	2	-	-	1	2	2	-	2	1	2	1	-	-	-	-	1	-	-	1	-	1	-	-	1	1	2	-	-	1	2
THERMAL POWER COOLING	1	-	-	1	1	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1	-	-	-	1	2	-	-	2	2
NON-WITHDRAWAL WATER USES																														
MUNICIPAL WASTEWATER DISCHARGES	2	-	2	2	1	1	-	1	-	-	2	-	2	-	-	1	1	2	-	1	3	-	3	2	3	2	-	2	1	1
INDUSTRIAL WASTEWATER DISCHARGES	2	-	2	1	1	1	-	-	-	-	2	-	2	-	-	2	1	2	1	1	3	-	2	2	-	2	-	1	1	1
HYDROELECTRIC POWER	1	-	-	1	-	1	-	-	1	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WATER ORIENTED OUTDOOR REC.	2	-	2	2	2	1	1	1	-	1	2	-	3	1	2	1	-	1	1	1	2	-	2	2	2	3	-	2	2	3
SPORT FISHING	1	-	2	1	1	1	1	-	1	-	1	-	2	1	-	1	1	1	1	1	2	-	2	2	2	1	-	-	-	1
RECREATIONAL BOATING	1	2	2	1	2	1	2	-	-	-	1	1	2	1	2	1	-	-	1	1	1	1	2	-	2	1	2	1	-	1
COMMERCIAL FISHING	1	1	-	-	-	1	1	-	-	-	1	1	-	-	-	1	1	-	-	-	1	1	-	-	-	-	-	-	-	-
COMMERCIAL NAVIGATION	1	-	2	-	1	1	1	2	-	1	1	-	1	-	1	1	-	1	-	-	1	-	-	-	1	2	-	2	-	-
RELATED LAND USES & PROBLEMS																														
LAND USE	2	-	3	2	3	2	-	2	1	3	2	-	2	2	2	3	-	-	3	3	1	-	3	2	2	2	-	3	2	1
AGRICULTURAL LAND TREATMENT	1	-	-	1	-	1	-	-	1	-	1	-	-	1	-	1	-	-	1	-	2	-	-	2	-	1	-	-	2	-
CROPLAND DRAINAGE	1	-	-	2	1	1	-	-	1	1	1	-	-	2	-	1	-	-	1	-	2	-	2	2	1	1	-	-	2	-
FOREST LAND TREATMENT	1	-	-	1	-	1	-	-	1	-	2	-	-	1	-	1	-	-	1	-	-	-	-	-	-	1	-	-	1	-
SHORELAND EROSION	1	-	-	-	2	1	-	-	-	1	2	-	-	-	2	1	-	-	-	2	1	-	-	-	1	1	-	-	-	1
STREAMBANK EROSION	1	-	-	1	-	1	1	-	1	-	1	-	-	2	-	1	-	-	1	-	1	-	-	2	-	2	-	3	1	-
FLOOD PLAINS	2	-	2	2	1	1	-	1	1	-	1	-	2	2	1	1	-	1	1	-	2	-	3	3	3	2	-	3	3	-
WILDLIFE MANAGEMENT	2	-	2	2	3	1	-	1	1	1	1	-	1	1	1	1	-	-	1	3	3	-	3	3	2	2	-	3	2	3
AESTHETIC & CULTURAL	1	-	2	1	1	1	-	1	1	1	1	1	2	1	1	1	-	-	1	1	2	-	2	1	2	1	-	-	1	1
OUTDOOR RECREATION	2	-	2	1	-	2	-	-	-	-	1	-	2	1	1	1	-	-	1	-	2	-	2	1	2	3	-	3	2	3

Legend: 3 Severe--Demands immediate attention
2 Moderate--Of major concern; potentially serious
1 Minor--Not considered a serious problem
- Problem is insignificant or not known

TABLE 3 Identified Proposed Framework Capital Costs, Great Lakes Basin ($1,000,000) (1970 Prices)[1]

RESOURCE USE CATEGORY[2]	1971-1980				1981-2000				2001-2020				Total
	Federal	Non-Fed	Private	Total	Federal	Non-Fed	Private	Total	Federal	Non-Fed	Private	Total	
WATER WITHDRAWALS													
MUNICIPALLY SUPPLIED	125.6	293.0	0	418.6	204.0	476.0	0	680.0	274.8	641.1	0	915.9	2014.5
SELF-SUPPLIED INDUSTRIAL	0	0	57.5	57.5	0	0	232.7	232.7	0	0	391.5	391.5	681.7
RURAL DOMESTIC & LIVESTOCK	0.3	0	2.3	2.6	0.5	0	4.1	4.6	0.4	0	3.4	3.8	11.0
IRRIGATION	0	0	20.1	20.1	0	0	17.0	17.0	0	0	21.4	21.4	58.5
MINING	0	0	6.2	6.2	0	0	11.6	11.6	0	0	20.7	20.7	38.5
THERMAL POWER COOLING[3]	0	14.4	272.7	287.1	0	54.2	1032.1	1086.3	0	101.1	1921.4	2022.5	3395.9
NON-WITHDRAWAL WATER USES													
MUNICIPAL WASTEWATER DISCHARGES[4]	3588.0	1196.0	0	4784.0	2186.2	728.8	0	2915.0	1970.2	656.8	0	2627.0	10326.0
SPORT FISHING	26.7	45.3	0	72.0	19.1	22.1	0	41.2	28.6	33.7	0	62.3	175.5
RECREATIONAL BOATING	95.4	95.4	81.2	272.0	142.8	142.9	122.3	408.0	122.0	121.9	104.5	348.4	1028.4
COMMERCIAL NAVIGATION	295.6	0	0	295.6	1386.6	0	0	1386.6	0	0	0	0	1682.2
RELATED LAND USES & PROBLEMS													
AGRIC. LAND-TREATMENT	40.9	0	105.3	146.2	76.9	0	197.6	274.5	46.7	0	120.0	166.7	587.4
-CROPLAND DRAINAGE	36.2	0	84.4	120.6	60.8	0	141.9	202.7	39.0	0	91.0	130.0	453.3
FOREST LAND-TREATMENT	150.4	9.4	28.2	188.0	301.6	18.9	56.5	377.0	300.0	18.8	56.2	375.0	940.0
SHORELAND EROSION	5.7	0	22.1	27.8	9.2	0	36.7	45.9	9.2	0	36.8	46.0	119.7
STREAMBANK EROSION	5.3	0	13.9	19.2	16.3	0	41.4	57.7	26.9	0	69.4	96.3	173.2
FLOOD PLAINS-URBAN[5]	410.7	0	136.7	547.4	297.3	0	98.8	396.1	84.8	0	28.4	113.2	1056.7
WILDLIFE MANAGEMENT	12.1	109.1	0	121.2	22.5	202.1	0	224.6	21.2	190.7	0	211.9	557.7
OUTDOOR RECREATION-INTENSIVE	252.8	469.6	0	722.4	297.0	551.5	0	848.5	253.9	471.5	0	725.4	2296.3
TOTAL	5045.7	2232.2	830.6	8108.5	5020.8	2196.5	1992.7	9210.0	3177.7	2235.6	2864.7	8278.0	25596.5

[1] Some of these costs are presently being incurred through expenditures for programs now underway; notably the programs for water quality management accelerated under P.L. 92-500. The Federal obligations for this purpose in FY 1974 were estimated to be $488 million.

[2] Costs were not estimated for all the elements considered and evaluated in the Framework. The text should be consulted for details.

[3] Water withdrawal costs only. Does not include secondary cooling facilities, etc.

[4] Does not include private costs for industry treatment of water for reuse or discharge.

[5] Some of these costs are associated with alleviating rural flood damages; however these are a relatively small part of the total cost, and the basic cost data did not permit distinguishing between urban and rural.

TABLE 4 Identified Proposed Framework Operation, Maintenance, and Replacement Costs, Great Lakes Basin ($1,000,000) (1970 Prices)[1]

RESOURCE USE CATEGORY	1971-1980 Federal	1971-1980 Non-Fed	1971-1980 Private	1971-1980 Total	1981-2000 Federal	1981-2000 Non-Fed	1981-2000 Private	1981-2000 Total	2001-2020 Federal	2001-2020 Non-Fed	2001-2020 Private	2001-2020 Total	Total
WATER WITHDRAWALS													
MUNICIPALLY SUPPLIED	0	192.0	0	192.0	0	1,224.3	0	1,224.3	0	2,713.9	0	2,713.9	4,130.2
SELF-SUPPLIED INDUSTRIAL	0	0	53.5	53.5	0	0	704.7	704.7	0	0	2,015.3	2,015.3	2,773.5
RURAL DOMESTIC & LIVESTOCK	0	0	8.3	8.3	0	0	56.9	56.9	0	0	103.9	103.9	169.1
IRRIGATION	0	0	2.9	2.9	0	0	16.3	16.3	0	0	26.6	26.6	45.8
MINING	0	0	7.8	7.8	0	0	61.4	61.4	0	0	139.2	139.2	208.4
THERMAL POWER COOLING	0	3.7	70.1	73.8	0	42.1	800.6	842.7	0	121.6	2,309.8	2,431.4	3,347.9
NON-WITHDRAWAL WATER USES													
MUNICIPAL WASTEWATER DISCHARGES	0	4,108.7	0	4,108.7	0	9,955.0	0	9,955.0	0	16,223.9	0	16,223.9	30,287.6
SPORT FISHING	9.4	12.6	0	22.0	21.0	33.2	0	54.2	29.0	42.4	0	71.4	147.6
RECREATIONAL BOATING	0	0	62.9	62.9	0	0	432.0	432.0	0	0	772.5	772.5	1,267.4
COMMERCIAL NAVIGATION	36.0	0	0	36.0	438.2	0	0	438.2	732.4	0	0	732.4	1,206.6
RELATED LAND USES & PROBLEMS													
AGRIC. LAND-TREATMENT	0	0	3.4	3.4	0	0	31.9	31.9	0	0	50.7	50.7	86.0
-CROPLAND DRAINAGE	0	0	3.1	3.1	0	0	25.2	25.2	0	0	38.7	38.7	67.0
FOREST LAND-TREATMENT	0.5	1.0	3.3	4.8	4.3	8.6	30.1	43.0	7.0	14.1	49.3	70.4	118.2
SHORELAND EROSION	0.5	0	2.2	2.7	4.0	0	16.3	20.3	7.8	0	31.0	38.8	61.8
STREAMBANK EROSION	0	0	1.8	1.8	0	0	17.8	17.8	0	0	49.8	49.8	69.4
FLOOD PLAINS-URBAN	0.1	1.1	0	1.2	0.5	8.9	0	9.4	0.6	11.6	0	12.2	22.8
WILDLIFE MANAGEMENT	0	6.0	0	6.0	0	11.2	0	11.2	0	11.2	0	11.2	28.4
OUTDOOR RECREATION-INTENSIVE	29.5	117.7	0	147.2	203.3	813.1	0	1,016.4	357.6	1,429.4	0	1,787.0	2,950.6
TOTAL	76.0	4,442.8	219.3	4,738.1	671.3	12,096.4	2,193.2	14,960.9	1,134.4	20,568.1	5,586.8	27,289.3	46,988.3

[1]These costs include the operation, maintenance, and replacement costs of plant constructed by the capital costs shown in Table 1. They do not include OM&R costs of existing facilities, for example the present navigation facilities, or for facilities for which capital costs were not estimated.

TABLE 5 Power Development, Great Lakes Basin by State, 1970

State	Installed Capacity (MW) Hydro-electric[1]	Thermal Non-Condensing[2]	Fossil Steam	Nuclear Steam	Total	Steam-Electric Water Withdrawal (mgd)
Illinois	0	113	1,068	0	1,181	580
Indiana	11	106	2,831	0	2,948	1,562
Michigan	285	1,148	9,932	145	11,510	6,149
Minnesota	83	8	307	0	398	250
New York	3,544	45	2,732	1,159	7,480	3,109
Ohio	0	188	4,388	0	4,576	3,400
Pennsylvania	0	4	119	0	123	144
Wisconsin	144	132	3,796	524	4,596	2,044
TOTAL	4,067	1,744	25,173	1,828	32,812	17,238

[1]Conventional hydroelectric except 240 MW pumped storage in New York.

[2]Internal combustion and gas turbine.

around the Basin provide a market for the energy produced. A large quantity of power is presently produced in the Basin, supplying the Basin's needs and providing for some needs outside the Basin. It is expected that demands for electrical energy from both inside and outside the Basin will increase with population growth and industrial expansion.

Although water withdrawals for electrical energy production are expected to increase 5½ times by 2020, the major difficulties associated with energy production are not water supply, but water quality and overall environmental quality. There is concern about the local and lakewide effects of elevated temperature in power plant discharges, and the attraction of fish to heated discharges and the interactive effects of temperature, chlorine, copper, and other effluent components on fish and other organisms are areas of active research. The significance of fish mortalities, including those caused by power plant cooling systems, is still being determined in laboratory and field research studies. The natural beauty of a locality may be spoiled and the air polluted by burning fossil fuels. The introduction of nuclear power plants is opposed by those who fear the possibility of radioactive waste emissions, accidents destructive to human life, or unsafe waste disposal.

The crucial problem facing the Great Lakes Basin in the area of energy production is the reconciliation of the growing demands for electrical power with ecological and environmental values. To aid in this reconciliation, the Great Lakes Basin Commission recommends the following:

(1) Support studies by state and federal agencies and other power interests of hydroelectric power projects and other alternative sources of energy, including their economic, environmental, and social impacts and costs.

(2) Develop policies to reduce energy problems through proper management of water and related land resources, including the early accomplishment of the Great Lakes Regional Water and Energy Study.

(3) Foster energy conservation as a basic policy for the reduction of energy problems.

NAVIGATION

The vast Great Lakes-St. Lawrence River system is a unique and valuable transportation route, stretching 2,342 miles eastward from America's grain and iron ore producing heartland, past major industrial centers and on to the Atlantic Ocean. By linking the midcontinent with eastern cities and the seacoast, the Great Lakes significantly influence economic development and help maintain economic health in the Region and nation (Table 6).

The great potential of this water highway is only partially realized. Only a fraction of the cargo passing through the Great Lakes Region is

TABLE 6 Cargo Carried on the Great Lakes and Connecting Channels by Area, 1959–1973 (million tons)

Area	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Lake Superior	60.3	81.8	68.9	70.0	72.7	77.9	78.7	85.3	75.4	76.5	85.3	78.7	71.6	75.6	92.0
St. Marys River	65.9	86.6	74.2	74.5	77.4	83.7	81.3	87.3	77.9	78.7	88.1	81.1	75.9	79.7	97.6
Lake Michigan including the Port of Chicago[1]	81.5	92.0	85.4	85.1	107.4	117.7	117.5	125.9	124.6	120.7	125.5	131.1	121.3	122.9	124.5
Lake Huron	106.4	126.0	113.8	114.9	122.7	136.7	138.9	148.0	136.0	138.5	144.5	141.3	130.8	135.5	155.4
St. Clair River, including Channels in Lake St. Clair	78.9	97.2	84.6	87.2	93.0	103.5	107.0	113.9	101.0	107.1	109.3	109.2	102.9	106.5	118.9
Detroit River	92.6	111.2	96.2	100.0	107.2	120.3	124.5	129.2	118.5	122.6	122.8	125.6	115.7	119.0	131.7
Lake Erie, including Upper Niagara River	100.7	114.9	101.0	107.4	120.2	134.5	140.6	147.5	136.6	143.2	142.7	142.7	129.9	132.6	147.4
Welland Canal	21.0	21.7	21.5	27.5	31.1	38.9	40.6	43.8	41.7	46.6	43.4	45.7	43.3	44.0	49.5
Lake Ontario, including Lower Niagara River	21.4	22.1	21.7	28.0	33.1	38.8	41.0	43.1	41.0	47.1	45.0	45.1	42.9	43.5	49.8
St. Lawrence River[2]	12.5	12.0	12.8	16.3	19.4	25.6	27.7	29.5	27.9	33.1	27.7	30.9	30.4	30.6	37.4
Net United States traffic on the Great Lakes				184.3	209.5	213.3	217.5	231.7	217.3	221.8	225.9	228.2	208.8	214.0	231.9

[1]This area includes Chicago Harbor, North Branch, South Branch, Sanitary Ship Canal, Calumet-Sag Canal, Calumet Harbor and River, and Lake Calumet.

[2]Includes the portion of the River between the International Boundary Line and Lake Ontario.

shipped on the Great Lakes. Major difficulties encountered by navigation are ice and channel depths and lock widths that do not accommodate today's larger vessels used in international shipping. It is possible to ease these navigational constraints, but some of the solutions may be environmentally harmful. There is great concern about shore damage from lake traffic and about bottom disruption and wetland destruction resulting from channel dredging and dredge material disposal. Careful planning and thoughtful actions are necessary to reconcile the interests of navigation with those of the environment and to provide Basin residents with the best possible solutions. To help solve these problems, the Great Lakes Basin Commission recommends the following:

(1) Continue the Great Lakes-St. Lawrence Seaway Navigation Season Extension Demonstration Project until the technical, economic, and environmental feasibility, or lack thereof, of season extension has been determined for all parts of the system, and investigate related programs having significant impacts on navigation.

(2) Modify and deepen navigation harbors, consistent with findings of need and with the current 27-foot depth navigation system, considering environmental quality and economic efficiency.

LAKE LEVELS

Great Lakes levels affect the extent of flooding, shoreline erosion, and shoreline property damage; wetland acreage; depth of navigation channels; and hydroelectric power output. The levels of the Lakes respond to both natural and artificial factors (Figure 2). Variations in precipitation and evaporation influence long-term fluctuations. Wind, barometric pressure differentials over the Lakes, ice and the variance of river outflows cause short-term fluctuations. A few diversions, channel alterations and regulatory works constitute the present artificial controls.

Intensified interest in lake levels, resulting from unusually high and low lake levels since the early 1960s, together with increased use of the lakes or the shoreline for living, recreation, industry, and navigation, has generated diverse and sometimes conflicting proposals for lake level regulation. The international effects of lake levels add to the delicacy of decisions about lake level regulation.

Studies are underway to further increase understanding of the natural causes of lake level fluctuation, to improve forecasting techniques, and to determine the effects of various lake level regulation plans. To help expand knowledge of lake level phenomena and their effects, the Great Lakes Basin Commission recommends the following:

(1) Foster or undertake Great Lakes level studies and lake level control studies through the International Joint Commission, giving emphasis to state and local involvement and considering benefits, costs, and environmental effects of: (a) the proposed plan to regulate Lakes Superior, Erie, and Ontario (SEO-17P) employing existing works and additional controlled outflow capacity provided through the Black Rock Canal to the Niagara River, using a new objective for regulating

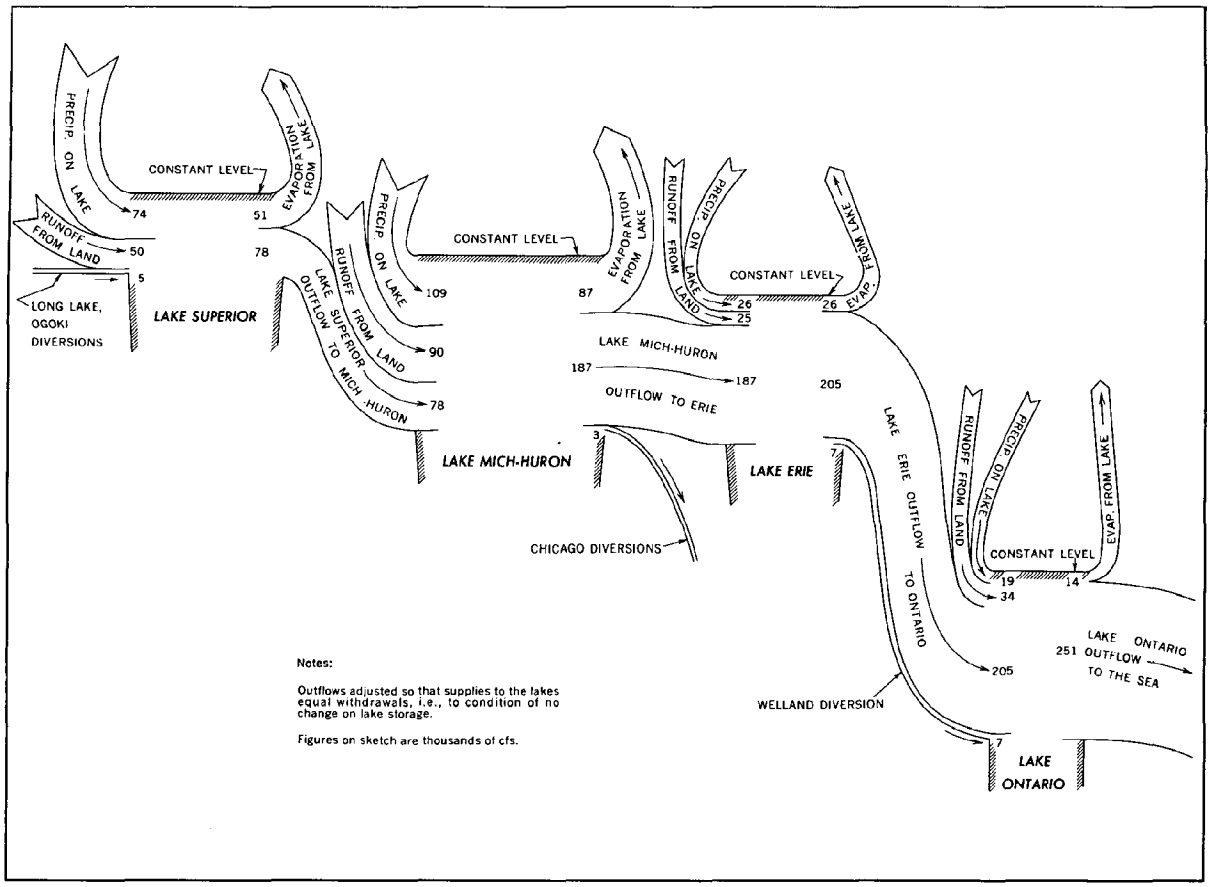

FIGURE 2 Factors of Water Supply to the Lakes, Average Values for October 1950–September 1960

the levels of Lake Superior; (b) constraints on lake regulation downstream from Lake Ontario in the St. Lawrence River; and (c) alternative means by which such constraints can be met or modified.

RECREATION

The Basin's lakes, streams, parks, harbors, and other recreational resources provide both residents and nonresidents with many opportunities for outdoor recreational enjoyment (Table 7). The resulting tourist industry has aided the Basin's economy. As demands for these resources increase, shoreland development and erosion, urban sprawl, and waste disposal sometimes diminish their capacity and attractiveness. While most recreational waters and lands occupy the northern portion of the Basin, most of the population dwells in the southern portion. There is a need for more day use and weekend use facilities close to metropolitan areas. Competing land uses, high costs of recreational development, conflicting public opinion about developments, and congestion are some of the problems federal, state, and local decisionmakers face. The Great Lakes Basin Commission recommends the following:

(1) Give high priority to development of land-based, water-oriented outdoor recreation facilities in and near large urban concentrations.

(2) Encourage additional public access to private lands for recreational purposes, especially in the southern half of the Basin, through incentive programs, education of users and private landowners, and other methods.

(3) Provide recreational boating harbors and harbors of refuge where determined necessary and agreed to in the Great Lakes.

(4) Encourage development of public facilities

TABLE 7 Recreational Boating Use in the Great Lakes Basin by Lake Basin

Lake Basin	Great Lakes Harbors	Access Sites[1]	Total Number of Boats (000s) Resident	Non-Resident	Inland	Great Lakes	Boat Days in Use (000s) Inland	Great Lakes
Superior	37	426	62.5	25.5	78.4	9.6	2,157.0	112.0
Michigan	96	NA	301.8	197.4	362.9	136.3	9,759.1	3,019.9
Huron	23	198	49.4	80.2	93.1	36.5	2,720.9	1,071.7
Erie	59	129	190.9	17.9	134.3	74.5	3,956.9	2,148.1
Ontario	29	42	104.0	33.1	91.5	45.6	2,698.1	1,327.9
Great Lakes Basin	244		708.6	354.1	760.2	302.5	21,294.0	7,679.6

NA--Not Available
[1]Includes only access sites to inland lakes.

TABLE 8 Municipal and Industrial Water Supply Data for the Great Lakes Basin by State, 1970

State	Municipal: 1970 Average Demand: Domestic & Commercial	Industrial	Total	Source Capacity	Source: Great Lakes	Inland Lakes & Streams	Ground-Water	Gross Industrial Water Req.	Self-Supplied Industrial: Withdrawal	Consumptive Use
Illinois	1,084.5	252.4	1,336.9	1,843.9	1,566.0	0	277.9	NA	1,348	100
Indiana	117.1	53.9	171.0	397.7	146.8	49.1	201.8	NA	3,251	285
Michigan	738.1	414.8	1,152.9	1,915.9	1,529.4	41.4	345.1	3,833	2,374	224
Minnesota	18.1	7.6	25.7	49.6	38.3	0.2	11.1	153	68	5
New York	435	200	635	909	539	268	102	1,062	1,187	99
Ohio	487	187	674	1,173	886	208	79	2,786	1,605	119
Pennsylvania	36	19	55	78	70	3	5	NA	145	12
Wisconsin	182.3	122.9	305.2	1,042.2	748.9	77.6	215.7	95	595	54
TOTAL	3,098.1	1,257.6	4,355.7	7,409.3	5,524.4	647.3	1,237.6	---	10,575	898

NA--Not Available

for recreation by demonstrating the potential for recreation and fishing. To support such development, foster one or more federally funded research and development projects on small watersheds in or near urban areas where water quality conditions are being restored.

WATER QUALITY

Water, vital to all life, is the Great Lakes Basin's most abundant resource and is used for such valuable purposes as municipal supply, industrial and agricultural production and processing, navigation, and recreation.

The Great Lakes contain many times the amount of water conceivably needed for municipal, industrial, and agricultural uses. Because inland distribution of this water is expensive, many areas of the Basin rely on more limited inland surface-water or ground-water supplies (Table 8). The quality of these and Great Lakes supplies must be maintained if they are to be usable.

However, many Great Lakes Basin waters have been contaminated. Urban and industrial centers, feedlot runoff and heavy cropland fertilization, and widespread commercial and recreational use of the water surface contribute municipal wastes, toxic chemicals and elements, phosphate and nitrate nutrients to the Basin's waters. Dredge material, heated water effluent, and wastes from watercraft also enter the waters. Extremely difficult to control are nonpoint sources of pollution which originate from urban construction and land management practices such as row cropping and clearcutting.

Although general public awareness of the disadvantages of polluted water has resulted in pollution reduction through measures provided by federal and state legislation, much more must be done to restore many of the Basin's waters to acceptable conditions and prevent degradation of presently clean waters. The Great Lakes Basin Commission recommends the following actions:

Water Quality

(1) Continue to implement the planning and management aspects of the water pollution control program for meeting the goals of, and standards

TABLE 9 Water Area and Land Use, by Plan Area (Base Year 1966–1967) (thousands of acres)

Plan Area	Total Area[1]	Rivers, Lakes, and Embayments	Total Land Area	Urban Built-Up	Land Resource Base: Cropland	Pasture Range	Forest Land	Other	Total
1.0	16,998.4	1,083.1	15,915.3	422.3	692.9	165.3	14,264.5	370.3	15,493.0
2.0	33,283.1	1,010.7	32,272.4	2,907.8	13,016.1	1,405.3	12,596.2	2,347.0	29,364.6
3.0	8,628.4	186.5	8,441.9	568.6	2,901.2	358.8	4,109.0	504.3	7,873.3
4.0	15,876.0	197.6	15,678.4	2,421.3	8,550.7	715.4	3,022.4	968.6	13,257.1
5.0	11,721.0	449.3	11,271.7	667.7	3,448.1	861.0	5,632.6	662.3	10,604.0
TOTAL	86,506.9	2,917.2	83,579.7	6,987.7	28,609.0	3,505.8	39,624.7	4,852.5	76,592.0

[1]Area measurement by county boundaries.

developed pursuant to, the Federal Water Pollution Control Act as amended in 1972 and the Great Lakes Water Quality Agreement.

(2) Maintain a level of federal and state funding for construction grants for wastewater treatment facilities adequate to meet national and international commitments, and assurances of funding continuity.

(3) Foster methods of reducing nonpoint-source pollution. This includes increased support for development and implementation of areawide waste treatment management plans (Section 208 of P.L. 92-500).

(4) Accelerate those aspects of implementation of P.L. 92-500, in addition to those above, and state programs which facilitate the improvement of the quality of waters of the Great Lakes. This includes additional funding for research, demonstration, water quality surveillance and monitoring, implementation, and legislative amendments.

(5) Undertake the Great Lakes Environmental Planning Study to provide for a major study of water quality aspects in the Great Lakes.

(6) Foster studies of environmentally hazardous substances such as organic contaminants, mercury, and other heavy metals to assess their effects and persistence and to determine methods of eliminating their introduction and reducing their concentration in the Lakes.

(7) Support legislation for immediate ban of nonessential uses of polychlorinated biphenyls (PCBs), and a complete ban as soon as substitutes for essential uses are found.

Waste Management

(1) Continue study of all aspects of waste disposal, including solid and liquid wastes, and accelerate studies on the recovery of useful materials therefrom.

LAND USE AND MANAGEMENT

Approximately 38 percent of the Great Lakes Basin land area is in agricultural production. Urban or built-up areas occupy more than 8 percent of the land and are expected to increase. The forests, which comprise over 47 percent of the Basin's land area, are subject to frequent, heavy use by recreationists and by logging operations (Table 9).

Two major problems are associated with land use management. The most obvious is that some activities disturb the land or destroy its natural vegetative cover. This results in unsightliness, decreased usefulness of the land for many purposes, and degradation of water quality as soil and contaminants wash into streams and lakes or seep into the ground water. Agricultural activities often expose the land to erosion by water and wind and add fertilizers and pesticides to the environment. Urban construction repeatedly exposes great patches of earth to erosion. Unrecorded, abandoned oil, gas, and salt wells and test wells may pollute surface and ground water. Unreclaimed mined lands pollute the water with undesirable chemicals and silt. Heavy recreational use of forested areas may damage the plant cover, exposing the soil to erosion. Improper logging activities have similar effects. Many acres of forest growing over previously cleared land require proper management to adequately protect the soil.

The second problem associated with land is the competition for land and the allocation of land among conflicting uses. In heavily populated and growing areas of the Basin and in areas where natural resources are abundant, demand for land is intense. More than one-third of the total and much of the best cropland in the Basin is in standard metropolitan statistical areas where it will be in demand for urban expansion. With

increased urbanization comes a demand for more open space within the urban area. Demand for recreational opportunities is growing as population, incomes, and leisure time increase.

Urban expansion often results in the loss of available mineral-bearing land, as zoning ordinances and construction prevent access to sand, gravel, and stone deposits. Planning to preserve mineral-bearing lands for future production is impossible when the location of mineral deposits is not known. Demand for land has frequently resulted in construction in flood plains, so that high economic losses are experienced when flooding occurs.

All of these problems illustrate the need for land use planning that will allocate land among suitable uses to the greatest benefit of the people in the Basin. The Great Lakes Basin Commission recommends the following:

Agricultural and Forest Land Treatment

(1) Complete or update detailed soil surveys within the U.S. Great Lakes Basin, particularly in the Lake Erie basin.

(2) Accelerate soil and water conservation treatment programs including those to reduce sedimentation for land now in agricultural use in the Lake Erie basin and also in the northeastern Lake Michigan basin. These programs should include, when appropriate, federal cost sharing and other incentives to private land owners.

(3) Accelerate forest land treatment programs to maintain high quality forest, sustain continuous timber production, continue multiple use, control surface and streambank erosion, and promote reforestation which will affect runoff, ground water, organic loadings, and water temperatures, with emphasis in the northwestern and northeastern Lake Michigan basins, northern Lake Huron basin, and eastern Lake Ontario basin.

(4) Accelerate assistance to improve soil drainage of active cropland, consistent with preserving wetland, primarily in the Saginaw and Maumee basins and in the northwestern and southwestern Lake Michigan basins.

Mineral Deposits

(1) Determine locations, extents, and values of mineral deposits in the Basin. These determinations are especially important in areas of rapid growth where access to essential minerals may be lost, recovery of mineral deposits impeded, or implementation of community plans later encumbered by higher priority need for minerals.

(2) Identify locations, extents, and values of mineral deposits in the beds of the Great Lakes in states where approval has been granted.

(3) Support reclamation of mined lands to abate pollution from them and to provide the opportunity for as many varied future land uses as possible. High priority consideration should be given to the opportunities of using mined lands for future recreation and open space use.

Flooding

(1) Accelerate flood plain delineation and flood elevation determination studies in emerging urban areas.

(2) Institute flood damage reduction using both structural and nonstructural measures.

(3) Encourage nonstructural flood plain measures, such as purchase (including less than fee simple and purchase with lease backs) or zoning of shoreland and flood plain areas, as priority measures for resolution of flood problems wherever feasible.

FISH AND WILDLIFE

The wide range of water and land habitats in the Great Lakes Basin supports diversified fish and wildlife populations (Table 10). Over the ages these populations have evolved to fit the climate and habitat in which they live, and each species has become an integral, necessary part of the food chain or natural balance. The loss of one species or the introduction of an alien species may result in severe imbalance among other species, and environmental change may cause a degradation or decline in fish or wildlife populations. Therefore, a healthy, diverse fish and wildlife population is of value as an indicator of a healthy environment.

In many parts of the Great Lakes and in the Basin, however, fish species diversity and numbers have been reduced by contamination of water by municipal, industrial, and agricultural pollutants. The balance of the fish population in the Great Lakes has also been disturbed by invasion of exotic species, particularly the parisitic sea lamprey. While the number and diversity of fish species have declined, the demand for sport fishing has grown, further complicating the maintenance of a balanced population.

The most serious threat to wildlife is habitat loss and degradation due to human activities. Urban and industrial expansion destroy wildlife habitat. Clean-farming practices reduce the habitat's ability to support varied wildlife species. Of particular concern is the loss of wetlands, so important to waterfowl as nesting and resting places, due to dredging and filling for navigation, construction, and other purposes.

TABLE 10 Acres of Farm and Forest Game Habitat in the Great Lakes Region by State, 1960

State	Total Land Area (in acres)	Farm Habitat		Forest Habitat		Total Habitat	
		Acres	% of Total Land	Acres	% of Total Land	Acres	% of Total Land
Illinois	2,367,300	1,466,500	62	148,100	6	1,614,600	68
Indiana	3,635,300	2,811,800	77	364,800	10	3,176,600	87
Michigan	36,223,100	13,447,700	37	18,993,600	52	32,441,300	89
Minnesota	6,579,900	587,400	9	6,037,500	92	6,624,900	101[1]
New York	13,822,500	6,788,000	49	5,527,900	40	12,315,900	89
Ohio	7,747,500	6,354,500	82	1,089,800	14	7,444,300	96
Pennsylvania	519,100	281,900	54	124,000	24	405,900	78
Wisconsin	12,685,000	5,506,500	44	6,003,200	47	11,509,700	91
TOTAL REGION	83,579,700	37,244,300	45	38,288,900	46	75,533,200	91

[1]Total habitat probably includes some water areas excluded from "land" area.

NOTE: The area of the land resource base, made up of the farmland and forest land, and reported elsewhere, is based on 1966-67 measurements and estimates. Habitat is based on 1960 information and estimates. In some instances changes in land use result in habitat being recorded as greater than the corresponding land base in the PSA or State.

Thus, pollution abatement and land use planning, as well as wildlife management, are necessary to preserve the Basin's fish and wildlife resources. Towards this end, the Great Lakes Basin Commission recommends the following:

(1) Accelerate protection and management of all wetlands that are valuable for wildlife and fishery habitat and other unique and critical wildlife habitat in the Basin through appropriate state and federal legislation.

(2) Expand wildlife management extension services, cost sharing, and other incentives to private landowners to encourage game habitat development and maintenance.

(3) Provide increased federal and state support for fish population research, assessment, and analysis so that interstate and international Great Lakes programs will have a stronger data base for cooperative decisions on species introductions, fish stocking, available harvest, and commercial and sport fishery regulations.

(4) Insure that the Great Lakes fishery management decisions are designed for maximum public benefit.

(5) Increase international efforts to develop comprehensive alternative programs of sea lamprey control to reduce dependence on the selective toxicant TFM as the primary control method in order that the value of the Great Lakes fishery (hundreds of millions of dollars in revenue annually) is not solely dependent on this control method.

(6) Support the formulation and implementation of an accelerated fish restocking program for the Great Lakes, closely coordinated among U.S. federal and state agencies and with the Canadian government, to attain an optimum yield based on the productive capacity of the Lakes.

(7) Continue federal support of Great Lakes public access and harbor of refuge programs to provide access to the fishery resources.

SHORELANDS

The scenic beauty of many Great Lakes shorelands and use of their waters for recreation, supply, and commercial navigation make them the focus for many types of development (Table 11). Development, in turn, magnifies or creates shoreland problems. The most severe of these problems is shore erosion. Although erosion is a natural geologic process, heavy economic losses are annually incurred due to development which now covers 50 percent of the shore. Because 70 percent of the Great Lakes shore is composed of erodible materials, shore erosion is extensive and especially severe over extended reaches. Higher than average lake levels in recent years have aggravated the problem.

Other shoreland problems stemming from development include shoreland alterations, waterfront blight, inefficient land use due to nonessential and conflicting activities, lack of historic preservation, lack of public access, encroachment on wetlands, and sedimentation.

The 3,470 miles of United States mainland Great Lakes shore are a fragile resource subjected to the pressure of many uses. Great care must be taken to see that the quality of the shorelands is preserved and that the shores serve the greatest benefit to the most people. Towards this end, the Great Lakes Basin Commission recommends the following:

TABLE 11 Great Lakes Shoreline Use, Ownership, and Condition by State, 1970

Great Lakes Shoreline	Total	IL	IN	MI	MN	NY	OH	PA	WI
USE									
Residential, commercial & industrial, public lands & buildings	1,362.4	33.5	27.9	687.5	68.8	188.1	128.1	24.8	203.7
Agricultural & undeveloped	583.6	0.6	0.1	282.3	11.0	134.3	16.4	11.9	127.0
Forest	1,134.4	0	0	900.0	69.7	0	3.5	0	160.3
Recreation (public)	334.8	30.9	17.0	125.3	24.2	38.1	33.6	11.6	54.1
Fish & wildlife wetlands	55.4	0	0	27.3	1.2	0	8.7	0	18.2
OWNERSHIP									
Federal	133.1	3.1	9.3	38.2	20.1	0	5.8	0	56.6
Non-Federal public	466.2	35.8	8.7	217.5	19.0	44.7	24.5	11.6	94.3
Private	2,871.3	26.1	27.0	1,767.6	135.7	315.8	150.0	36.7	412.4
PROBLEM IDENTIFICATION									
No problem	1,666.0	0	0	1,203.4	163.5	106.6	21.7	0	170.8
Critical erosion	203.9	10.5	13.0	103.8	0.5	16.8	14.3	6.0	39.0
Noncritical erosion	993.2	0	9.6	479.2	10.9	179.6	37.9	36.0	240.0
Subject to flooding	289.8	0	0	185.7	0	19.1	10.8	0	74.2
Protected	317.7	54.5	22.4	51.2	0	38.4	105.6	6.3	39.3
TOTAL SHORELAND MILEAGE									
Great Lakes	3,470.6	65.0	45.0	2,023.3	174.9	360.5	140.3	48.3	563.3
Other[2]	521.7	0	0	206.2	31.3	154.0	74.5	0	55.7

[1]Mileages estimated for lake basins and States from tables and small scale maps in *Great Lakes Region Inventory Report, National Shoreline Study*, August 1971, and Appendix 12, *Shore Use and Erosion, Great Lakes Basin Framework Study*.

[2]"Other" includes: MI-St. Marys River 91.2 mi; St. Clair River 37.0 mi; Lake St. Clair 47.0 mi; Detroit River 31.0 mi; MN-Duluth Harbor 31.3 mi; NY-Niagara River 39.0 mi; St. Lawrence R. 115.0 mi; OH-Sandusky Bay 74.5 mi; WI-Superior Harbor 55.7 mi

Shoreline and Streambank Erosion

(1) Support the preparation of a cooperative assessment of shore damages due to high water levels of the 1970s, that will provide a base of information for evaluating the economic justification of damage reduction options.

(2) Continue study for early authorization of the breakwater at Presque Isle, Pennsylvania, recommended for beach protection by the Chief of Engineers.

(3) Support ongoing state and federal shore erosion studies and coastal zone management programs that provide information on both structural and nonstructural methods of reducing shore erosion problems on the Great Lakes.

(4) Institute nonstructural methods of reducing shore erosion damage in undeveloped areas—e.g., zoning and setback requirements—until suitable methods for structural protection have been demonstrated.

(5) Develop a technical assistance program coordinated among appropriate agencies to stabilize severe streambank erosion areas.

Coastal Zone Management

(1) Continue studies for coastal zone management, implement suitable management programs, and coordinate activities of an interstate nature within the context of federal and state laws.

implementation of recommendations

GREAT LAKES BASIN PLAN

A familiarity with the Great Lakes Basin Plan, (the comprehensive coordinated joint plan) of which the Framework Study and recommendations are the first portion, is necessary to an understanding of how the recommendations will be implemented.

In keeping with the mission of the Great Lakes Basin Commission, the Great Lakes Basin Plan's purpose is to enable coordinated, effective natural resource planning and activity in the Great Lakes Basin. To this end, development of the Great Lakes Basin Plan will involve the following: maintenance of an inventory of completed or ongoing plans or programs; identification of problems; assessment of how well these problems are being solved by the plans and programs in the inventory; and recommendation of plans and programs needed to solve problems presently ignored or inadequately treated. The recommended long range plans and programs will be prioritized, with annual updates, and organizations to implement these actions will be suggested.

Projects, programs, and studies throughout the Basin will solve some problems, while different problems will crop up due to changes in resource demand and use and the evolution of national and local priorities and goals. Thus, the Great Lakes Basin Plan's inventory, analyses, priorities, and recommendations will undergo continual modification.

The Great Lakes Basin Commission is responsible for the preparation and maintenance of the Great Lakes Basin Plan and will itself encourage, conduct or coordinate, and participate in studies more detailed than the Framework Study necessary to expand knowledge of and solutions for Great Lakes Basin resources and problems. The Commission will annually publish a report on the progress of the Great Lakes Basin Plan.

The Framework Study is the first phase of the Great Lakes Basin Plan development. Its findings will be continuously updated and its recommendations likewise may be altered as new information is gathered and circumstances change. The expanding Great Lakes Basin Plan will undoubtedly refine some Framework Study recommendations, pinpointing specific locations and resources requiring study or action. The implementation of the Framework Study recommendations will thus take place within the context of new information provided by the Great Lakes Basin Plan.

RESPONSIBILITY FOR IMPLEMENTATION

The implementation of the Framework Study's recommendations will not occur automatically. It will require deliberate effort at many levels of government and by the private sector and the commitment of time, money, and other resources. Implementation will require data collection to provide background information for research and planning; basic research to determine the effects of certain actions; detailed local planning to encourage the best use of resources in the locality; and the adoption of programs to generate specific structures, projects, laws, and other devices for meeting the needs.

Accomplishment of these activities may require changes in existing public law and policy. The historically limited funds for research, data collection, planning, and implementation may have to be increased to meet the challenges identified in the Framework Study.

The activities of data collection, analysis and research are generally the responsibility of specific federal or state agencies, sometimes with local cooperation. Continuation and expansion of these activities under the coordination of the Great Lakes Basin Commission will ensure against deficiencies and duplication. Although the Commission is not a principle funding agency for this kind of work, it can provide support and encourage the necessary authority and funds.

The Great Lakes Basin Commission is analyzing several regional studies (Southeast Michigan Comprehensive Water Resources Study, Kalamazoo-Black-Macatawa-Paw Paw Rivers Basin Study, Grand River Basin Comprehensive Re-

sources Study, and Southeast Wisconsin Rivers Basin Study) which will involve coordinated work by federal and state agencies. Specific project feasibility studies will be performed by the responsible local, state, or federal agency or by industry.

Public acceptance of the Framework Study—as a basis for cooperation and coordination and public insistence on adequate future data collection, research, studies, legislation, and programs—is necessary to ensure that the study findings are used and the recommendations are implemented. A comprehensive effort to increase public understanding of and participation in decisions about water and related land resources is needed.

Educational programs should be provided concerning resource use, conservation, and development. Accordingly, adequate funds for appropriate entities to design and implement continuing education and special study programs should be requested by water resources planning institutions, such as the Great Lakes Basin Commission. The Commission can act as a catalyst to encourage public education by working with existing state and federal agencies, public interest and special interest groups, school systems, the news media, and others.

The local unit of government may be the critical element in project implementation. An aggressive city, county, or improvement district backed by an informed public may be most effective in planning and completing projects.

INSTITUTIONAL PROBLEMS

The political and institutional aspects of resource management in the Basin are very complex. The Basin encompasses one Canadian province and eight U.S. states, each having specific rights, privileges, and responsibilities concerning the Lakes. Both federal governments and county and local governments are also concerned with the Lakes. The resource use policies of the various governmental units and agencies sometimes conflict. Overlapping jurisdictions frequently result in overlapping programs and duplication of effort. These difficulties are magnified by the fact that the Great Lakes are a single physical system in which activities in one part ultimately affect the other parts.

To deal with this situation regional planning agencies and intergovernmental councils have been established to coordinate some of the activities of local governments. Interstate agencies coordinate research, planning, and other activities when performed by two or more states. The Great Lakes Basin Commission provides Basinwide coordination of the activities of the states and local governments, as well as federal government activities in the Great Lakes states.

International agencies also exist. The Great Lakes Fishery Commission and the International Joint Commission (IJC) have the broadest reach.

The Great Lakes Fishery Commission's responsibility is to develop coordinated Great Lakes research programs, recommend measures to permit maximum sustained productivity of fish stock of common concern, and formulate and implement a program to eradicate or minimize Great Lakes sea lamprey populations.

The International Joint Commission is an international investigative, deliberative, regulative, and semi-adjudicative body with lake regulation and water quality monitoring and surveillance authority. It can, at any time, be assigned additional responsibilities agreed upon by the U.S. and Canadian governments.

The IJC is currently responding to the Terms of References under the Great Lakes Water Quality Agreement of 1972 between the United States and Canada. The Agreement assigns responsibility to the IJC to collect, analyze, and disseminate the data relating to the quality of the boundary waters and permits it to advise the federal, state, and provincial governments regarding water quality and related matters. A research advisory board, composed of both Canadian and United States members, was established under the IJC by the Agreement and provides for exchange of information between the two nations and between the province and states. As currently constituted, the IJC prerogatives are not broad enough to accommodate the initiatives needed. The IJC prerogative could be expanded to permit it to investigate on its own the matters of urgent concern to both governments. The Great Lakes Basin Commission could readily assist the IJC, for it is designed to manage multi-agency planning programs. The Commission should be considered for future activities.

There are several things to consider when planning additional institutional arrangements that would provide the needed integration. First, any mechanism that purports to deal with Basinwide issues must be capable of dealing with the problems of multiple-use resources.

Second, a vast range of research, data collection, and analysis must be accomplished to support the decision-making process. Any organizational structure that fails to coordinate information gathering and planning will necessarily be handicapped in its ability to identify problems and formulate policy goals.

Third, any institution that attempts to deal with the entire Great Lakes should have the authority to set priorities. Without such authority it is probable that any agreement on goals and objectives would be a hollow gesture. Such an agreement might offer enough platitudes to satisfy many people, but in the face of a limited budget it would be incapable of supporting hard decisions regarding program priorities.

Finally, the establishment of an agency to integrate public authorities would be difficult because such an agency would have to resolve conflicting goals supported by different political constituencies. Solution of those issues could only be ensured through the political process.

The institutional arrangements affecting water resources will continue to be evaluated during the development of the Great Lakes Basin Plan, and further recommendations will be included when appropriate. When presenting the Great Lakes Basin Plan, the Great Lakes Basin Commission will submit recommendations for implementing the plan, including the management adjustments needed for formulation of new organizations or the realignment of existing organizations.

framework study report: review comments

Section 204 of Public Law 89-80, The Water Resources Planning Act, requires that the Great Lakes Basin Framework Study *Report* undergo review by the heads of the federal, state, and interstate agencies represented on the Great Lakes Basin Commission, and also by the International Joint Commission. Section 102(2)(C) of the National Environmental Policy Act of 1969 (Public Law 91-190) requires that these agencies also review the final Environmental Impact Statement, which incorporates comments made on the draft EIS. All comments received by the Great Lakes Basin Commission in accordance with these requirements are reproduced on the following pages.

The comments are reproduced with no omissions of any kind. International, federal, and state agencies are grouped together, and arranged in alphabetical order with each group.

Photographic copies of the letters are reduced considerably in size in this volume. Original copies are on file with the Great Lakes Basin Commission.

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C 20250

March 17, 1977

Mr. Arthur H. Cratty
Acting Chairman
Great Lakes Basin Commission
3475 Plymouth Road
Post Office Box 990
Ann Arbor, Michigan 48106

Dear Mr. Cratty:

This is in reply to a request of December 15, 1976, from Frederick O. Rouse requesting review and comments on the proposed report, together with pertinent papers and Environmental Impact Statement, on the Great Lakes Basin Framework Study.

The Environmental Impact Statement could be strengthened by inclusion of a brief discussion of Section 108 of Public Law 92-500, "Pollution Control in Great Lakes," and Article II, "General Water Quality Objectives," of the 1972 Great Lakes Water Quality Agreement between the United States and Canada, which is being implemented by the International Joint Commission. This discussion could be included in Sections 3.1.2.1, "Water Quality Programs," and 4.5.2, "Water Quality."

If revisions to the report are made, the enclosed rewrite describing the water program of the Farmers Home Administration should be substituted for the material on page 15 of appendix 6.

Sincerely,

Bob Bergland
Secretary

Enclosure

Department of Agriculture

U.S. Department of Agriculture Comment on

Great Lakes Basin Framework Study

We suggest the reference to the water program of the Farmers Home Administration (FmHA) on page 15 of Appendix 6 be revised to read as follows:

FmHA is authorized to provide loan and grant funds to develop water and waste disposal systems in rural areas and towns of up to 10,000 people. Funds are available for public entities, municipalities, counties, special-purpose districts, and corporations not operating for profit.

Priority will be given to public entities in areas smaller than 5,500 people to restore a deteriorating water supply, improve, enlarge or modify a water system or an inadequate sewer system. Preference will also be given to projects which involve the merging of small systems. In addition, borrowers must:

(1) Be unable to obtain needed funds from other sources at reasonable rates and terms.

(2) Have legal capacity to borrow and repay loans, to pledge security for loans, and to operate and maintain the facilities or services.

(3) Be financially sound and able to organize and manage the system effectively.

(4) Have a financially sound system based on taxes, assessments, revenues, fees, or other satisfactory sources of income to pay operation, maintenance, reserve and retire the debt.

(5) Have a proposal that will not be inconsistent with any development plans of state, multijurisdictional area, counties, or municipalities in which the proposed project is located.

Grant funds may be available for up to 50 percent of eligible project development costs. Such assistance will be made available for projects serving the most financially needy communities to reduce user costs to a reasonable level.

Applications for loans and grants are made at the local county office of the FmHA.

Department of Agriculture, p. 2

FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972

P.L. 92-500

Pollution Control in Great Lakes

Sec. 108.(a) The Administrator, in cooperation with other Federal departments, agencies, and instrumentalities is authorized to enter into agreements with any State, political subdivision, interstate agency, or other public agency, or combination thereof, to carry out one or more projects to demonstrate new methods and techniques and to develop preliminary plans for the elimination or control of pollution, within all or any part of the watersheds of the Great Lakes. Such projects shall demonstrate the engineering and economic feasibility and practicality of removal of pollutants and prevention of any polluting matter from entering into the Great Lakes in the future and other reduction and remedial techniques which will contribute substantially to effective and practical methods of pollution prevention, reduction, or elimination.

(b) Federal participation in such projects shall be subject to the condition that the State, political subdivision, interstate agency, or other public agency, or combination thereof, shall pay not less than 25 percentum of the actual project costs, which payment may be in any form, including, but not limited to, land or interests therein that is needed for the project, and personal property or services the value of which shall be determined by the Administrator.

(c) There is authorized to be appropriated $20,000,000 to carry out the provisions of subsections (a) and (b) of this section, which sum shall be available until expended.

(d) (1) In recognition of the serious conditions which exist in Lake Erie, 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. Prior to the initiation of detailed engineering and design, the program, along with the specific recommendations of the Chief of Engineers, and recommendations for its financing, shall be submitted to the Congress for statutory approval. This authority is in addition to, and not in lieu of, other waste water studies aimed at eliminating pollution emanating from select sources around Lake Erie.

(2) This program is to be developed in cooperation with the Environmental Protection Agency, other interested departments, agencies, and instrumentalities of the Federal Government, and the States and their political subdivisions. This program shall set forth alternative systems for managing waste water on a regional basis and shall provide local and State governments with a range of choice as to the type of system to be used for the treatment of waste water. These alternative systems shall include both advanced waste treatment technology and land disposal systems including aerated treatment-spray irrigation technology and will also include provisions for the disposal of solid wastes, including sludge. Such program should include measures to control point sources of pollution, area sources of pollution, including acid-mine drainage, urban runoff and rural runoff, and in place sources of

Department of Agriculture, p. 3

pollution, including bottom loads, sludge banks, and polluted harbor dredgings.

(e) There is authorized to be appropriated $5,000,000 to carry out the provisions of subsection (d) of this section, which sum shall be available until expended.

1972 GREAT LAKES WATER QUALITY AGREEMENT

Article II

General Water Quality Objectives

The following general water quality objectives for the boundary waters of the Great Lakes System are adopted. These waters should be:

(a) Free from substances that enter the waters as a result of human activity and that will settle to form putrescent or otherwise objectionable sludge deposits, or that will adversely affect aquatic life or waterfowl;

(b) Free from floating debris, oil, scum and other floating materials entering the waters as a result of human activity in amounts sufficient to be unsightly or deleterious;

(c) Free from materials entering the waters as a result of human activity producing colour, odour or other conditions in such a degree as to create a nuisance;

(d) Free from substances entering the waters as a result of human activity in concentrations that are toxic or harmful to human, animal or aquatic life;

(e) Free from nutrients entering the waters as a result of human activity in concentrations that create nuisance growths of aquatic weeds and algae.

Department of Agriculture, p. 4

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C. 20310

24 FEB 1977

Mr. Frederick O. Rouse
Chairman, Great Lakes Basin Commission
P. O. Box 999
3475 Plymouth Road
Ann Arbor, Michigan 48106

Dear Mr. Rouse:

This is in reply to your letter to the Secretary of the Army requesting comments and recommendations on the Great Lakes Basin Framework Study and the final environmental impact statement.

Representatives of the Corps of Engineers have participated in this study and have provided comments on draft material. The Department of the Army has no further comments.

Sincerely,

Charles R. Ford
Acting Assistant Secretary of the Army
(Civil Works)

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

Department of the Army

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the responsible agency would lend emphasis to the overall credence of a completed study.

I again express our gratitude for the opportunity afforded us to review and comment on this excellent Framework Study.

Sincerely,

Kenneth W. Tolo
Director
Office of Policy Development
and Coordination

Enclosure

Department of Commerce, p. 2

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Policy
Washington, D.C. 20230

MAR 2 1977

Honorable Frederick O. Rouse
Chairman, Great Lakes River
Basin Commission
Ann Arbor, Michigan 48106

Dear Mr. Rouse:

I am pleased to reply for Secretary Kreps concerning your Great Lakes Basin Framework Study. Comments on the final environmental impact statement for the Study will be forthcoming from the Office of Environmental Affairs.

A very favorable response, overall, was generated by those in the Department of Commerce who reviewed the Framework Study. I have enclosed a summary for those responses which delineates the Study as a most useful tool in planning and management of the Great Lakes water and related land resources. However, it should be noted in the second paragraph of the comments from the Great Lakes Environmental Research Laboratory (GLERL) that they point to a deficiency in the Report through its failure to relate adequately the Framework Study to the development of a Comprehensive Coordinated Joint Plan (CCJP). Further along, in the third paragraph, GLERL notes a remark in the Report on the relationship between commercial and sport fisheries which is alluded to on page 48 and figure 6, page 50, but a relationship that is not obvious.

In addition, I am apprehensive about how a study such as this adequately addresses conditions associated with extremes, for example, when there are high or low lake levels. When the lakes are at an extreme low level, what conflicts exist on the use of water? Can all needs be met; thus, there are no conflicts? Is there a priority for users during conditions of low lake levels? Then too, what is to be done to alleviate conditions that are caused by disaster? An example is alternative water supplies for such periods. In some cases, such conditions are addressed by specific agencies in their normal functions of responsibility; therefore, addressing these conditions in the plan and then noting

Department of Commerce

COMMENTS FROM THE DEPARTMENT OF COMMERCE ON THE
GREAT LAKES BASIN FRAMEWORK STUDY

Office of the Secretary

Secretarial Representative, Region V

We find the Study is basically a good description of the basin and its problems.

It contains easily understandable material which can be used by educators and interested citizens in trying to develop their knowledge about the Great Lakes Basin.

Furthermore, we believe the Study is a basis on which to begin setting priorities.

National Oceanic and Atmospheric Administration

Great Lakes Environmental Research Laboratory (GLERL)

As Department of Commerce representatives to the Great Lakes Basin Commission since the early stages of development of the Great Lakes Basin Framework Study, we at the Great Lakes Environmental Research Laboratory have participated both in preparation of specific sections and in draft reviews. We had a responsibility for preparation of Appendix 4 - Limnology of Lakes and Embayments - submitted comments on other appendices during their preparation, and were deeply involved in preparation of the present version of the Summary Report. GLERL also reviewed the Draft Environmental Impact Statement and submitted comments for Department review (DEIS 7412.25, January 17, 1975). The Report went through four drafts during 1975-76 at which time it was radically modified to a final version that we feel is an accurate and logically formatted summary of the Framework Study. Recommendations that are relevant to Department of Commerce mission interests were sent for review within the agency and reflect our comments. Similarly, the recommendations were subjected to public scrutiny and review during the Spring of 1976 and public reactions are reflected in this version of the Report.

Public Law 89-80 directs each river basin commission to prepare a Comprehensive Coordinated Joint Plan (CCJP) for water and related land resource development. The Framework Study is described (page 102) as "an assessment of the status of our resources and their ability to meet expected natural and human needs," a first step in development of coordinated planning. The Framework Study is quite satisfactory as a first step in

Department of Commerce, p. 3

-2-

identifying plans, options, and conflicts within the Basin. A deficiency in the Report is the failure to adequately relate the Framework Study to development of a CCJP. Sections 1 and 5 both include discussions of the CCJP but these are restricted to what a CCJP can do rather than to what it actually is and how it will be developed and used in water and related land resource use and management. The intent of this complex effort is certainly not the production of a document, but rather is the production of a dynamic plan (CCJP) that can be modified to fit the changing needs and desires and to place these in a proper perspective for the users and developers. The Report fails to outline a logic and methodology that will be used to analyze and evaluate plans, alternate choices, problems and multiple conflicting uses in the development of an evolving CCJP. Without this, the reader will have difficulty relating to any element of an action plan that could potentially generate an enthusiastic response and desire to participate.

Although specific comments are probably not appropriate at this level of review, one concerning a Department of Commerce mission interest is offered. It addresses a section in the Report describing the relationship between the commercial and sport fisheries in the Great Lakes. The emerging significance of the sport fishery is alluded to on page 48 and figure 6, page 50 is cited as support, but a relationship is not obvious. What percentage of the total fishery does the commercial production represent? Is it really insignificant?

Office of Coastal Zone Management

Several of the staff at the Office of Coastal Zone Management (OCZM) are familiar with the Study, having used it on a number of occasions as a reference source. Overall, it is an excellent compilation of data on the Great Lakes region.

National Marine Fisheries Service

The National Marine Fisheries Service (formerly the Bureau of Commercial Fisheries) participated actively in the earlier phases of this Study. The scope of the participation was reduced following dissolution of the Bureau of Commercial Fisheries and the Great Lakes in 1970. For this reason, we are unable to comment on maximum sustainable yield projections in table 8-79 (p. 278 of appendix 8).

Department of Commerce, p. 4

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We are pleased to note significant contributions of our area inputs. Our position at that time placed heavy emphasis upon: (1) the need for greater habitat protection, (2) the concept of a balanced recreational/commercial fishery as foundation to optimal management of the fisheries resources, and (3) the need for better information on which to base the complex allocation and other management decisions.

The Great Lakes Basin Framework Study will be a most useful tool in planning and management of water and related land resources of the Great Lakes. Even institutional arrangements developed after the Study was initiated will benefit from the consolidated information put forth in the report.

National Ocean Survey

The National Ocean Survey has no further comments on the Great Lakes Basin Framework Study.

We would note, however, that the proposed dredging in connection with extended navigation will require further hydrographic surveying by the National Ocean Survey. We are in close touch with the Corps of Engineers on such matters and will program the needed surveying at the appropriate time.

Maritime Administration

Office of Port and Intermodal Development

In a water and related land resources study, reported to be the largest Great Lakes area investigation of its kind ever conducted, the Maritime Administration played a key role in the research and preparation of the volume known as Appendix C9 - Commercial Navigation. As the Maritime Administration's participation in this Study goes back to its beginning in 1968-69, shortly after creation of the Great Lakes Basin Commission, we are quite familiar with many of the agencies, institutions, and organizations that contributed their labor and support to the water transportation and navigation facilities portions of the Great Lakes Basin Framework Study. Accordingly, because of our long and close association with this Study effort and the Study contributors over a period of 7 1/2 years, we have helped shape many of the proposed Study recommendations for commercial navigation on the Great Lakes.

Department of Commerce, p. 5

-4-

Based on the above working relationship and as one of the principal participants and contributors in the Commercial Navigation Work Group of the Study team organization, this office concurs in the basic Study conclusions and recommendations that pertain to the present and prospective future of commercial navigation on the Great Lakes. Therefore, we anticipate no problems related to the maritime perspectives of the Study investigation as finally published by the Great Lakes Basin Commission.

As further testimony to the effectiveness of the commercial navigation report findings in the Great Lakes Basin Framework Study, it is interesting to note that the recommendations contained in Appendix C9 - Commercial Navigation - are in line with discussion panel recommendations made at the "U.S. Great Lakes-Seaway Port Development and Shipper Conference" held in Dearborn, Michigan, in April 1976. This conference, co-sponsored by the Maritime Administration, U.S. Army Corps of Engineers, St. Lawrence Seaway Development Corporation, and the U.S. Coast Guard, established many high priority recommendations that parallel the recommendations of Appendix C9 - Commercial Navigation - of the Framework Study.

With regard to the overall report, in general, it appears complete; and due to its very comprehensive coverage we believe it has considered all the salient features associated with the broad-based treatment of many diverse subjects which is the characteristic aim of Type I or Level A water resource framework studies. The Study's 26 volumes should be a continuing valuable reference and aid to future studies of Great Lakes water and related land resources problems.

Department of Commerce, p. 6

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

APR 14 1977

Mr. Frederick O. Rouse, Chairman
Great Lakes Basin Commission
P. O. Box 999
Ann Arbor, Michigan 48108

Dear Mr. Rouse:

This is in response to your letter of December 16, 1976, to Dr. Seamans requesting comments on the Great Lakes Basin Commission "Framework Study" and the associated Environmental Impact Statement. As you know, we have commented on past drafts of various portions of these documents and we have no significant new comments to add. We do however agree strongly with the observation on page 104 of the "Report" volume that a major requirement for achieving real future progress on Basin planning is that some institution (such as the Commission) will have to have authority to set priorities on programs, studies and research. Otherwise, the intended "plans" tend to become only a list of vague objectives and already intended projects of the participating organizations. A few minor comments are enclosed for your consideration. Thank you for the opportunity to review this report.

Sincerely,

Walter G. Belter
Assistant Director
for Technology Liaison
Division of Technology Overview

Enclosure:
Comments

cc: W. H. Pennington, NEPA

Energy Research and Development Administration

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION V
230 SOUTH DEARBORN ST
CHICAGO, ILLINOIS 60604

APR 4 1977

Mr. Arthur Cratty, Acting Chairman
Great Lakes Basin Commission
P.O. Box 999
Ann Arbor, Michigan 48106

Dear Mr. Cratty:

The responsibility for providing the U.S. Environmental Protection Agency comments on the Great Lakes Basin Commission Framework Study has been delegated to me by USEPA's former Administrator, Mr. Russell E. Train. My personal involvement in the development of the report recommendations, and our staff participation during the development of the report have made us well aware of the difficulties faced in preparing a broad sweeping document such as the report for the Framework Study.

There is on one hand, the desire to move rapidly to implementation in program areas favorable to our interests, yet there is never enough information to conclusively justify to our satisfaction those programs for which there are potential environmental concerns. It is, therefore, significant to USEPA that this Framework Study has resulted in a report rather than a plan. It appears to USEPA that while few of the recommendations in this report can or should be taken as definitive or perpetual, cumulatively they do set a pattern for the basin and foretell that management of the water resources in the basin, consistent with the desires of the residents, will require continuing planning, as well as substantive monetary investment at all levels. This report is acknowledged as the Framework portion of the Comprehensive Coordinated Joint Plan. The growth of this process will certainly lead to further elaboration of issues and more definitive recommendations. USEPA will use this Report as the basis for continuing work which will integrate environmental planning with water and related land resources planning in the Great Lakes Basin.

Since the report was developed in the spirit of agency consensus, and in the context of readily available data, it does contain components which we feel warrant early evaluation.

A. The economic and demographic rates used in the study are acknowledged as higher than present trends. This clearly impacts the projected demands for water supply and electrical power. The ability to use conservation measures and a thorough evaluation of structural alternatives and site locations could significantly alter the projected responses to these demands.

Environmental Protection Agency

COMMENTS ON GLB FRAMEWORK STUDY AND EIS

1. The age of some of the information in the documents may make some of the report and its conclusions slightly out of date. Perhaps a simple cover letter for eventual distribution of the report could briefly note any major new information that would have to be included in future work and point out any major consequences this would have that should be kept in mind by the reader. For example:
   - Changes (reductions) in power projections.
   - Changing issues in relation to nuclear power, public safety, proliferation, etc.
   - Growth in EPA literature that might preempt much of the referenced PHS-HEW material.
   - Inclusion of data from CEQ and BEIR reports on relevant issues.
   - Finalization of the Safe Drinking Water Act and any related standards.
   - More recent environmental data on status of the Lakes and perceived problems therein.
2. It would be helpful to add a clearer statement of what major differences (if any) in trends for the future underlie the tabulated differences in the NOR and PRO framework. The text generally appears to indicate that no major differences are foreseen but it is hard to tell whether this results from complete agreement of the public (in PRO) with the assumptions of NOR or whether the "public" hasn't yet looked far enough ahead to perceive any projected shifts. Certainly CCJP preparation would have to review these perceptions and assumptions.
3. It is really difficult to find in the report the underlying principles that are assumed to govern each of the problem areas in the future, since these are scattered through so many volumes. Policies for energy problems (p.4 and p.12 of the "Report" for example) are only broadly attended to and, except for general statements in other volumes about the general principle of the Basin remaining more or less self-sufficient, it is hard to find out just where the Basin is expected to be heading. A "single summary page" of all major assumptions, trends, and perceptions would be helpful if it could be added to the front of the report.

EPA, p. 3

APR 4 1977 2

B. While USEPA recognizes the institutional constraint of the Great Lakes Basin Commission to develop the Framework for total land use, future work must utilize what is available to preserve open space, to prevent urban encroachment into prime agricultural lands with its high costs of water supply and pollution control expenditures, and to determine the extent to which increasing demand for agricultural lands will encroach into the wetlands. While the report acknowledges this last conflict and specifies that wetlands should be retained, USEPA feels that the long range key to diversity is in these wetlands and a more substantive program needs to be developed to address this dilemma between food production and natural environment.

C. Since the GLBC is a State-Federal agency, it is natural that the focus is in this perspective. Although the study recognizes that local activity may be most critical in the eventual implementation, the report does not appear to give enough cognizance to the local (i.e., regional planning agency) activity such as is emerging in the fields of water quality, coastal zone, and transportation. Recognizing the diverse nature of this process, it is not suggested that the report be revised at this time, but rather, the CCJP process (particularly locally oriented advisory group participation) can expand this facet of the GLBC program.

In addition to the review of the Framework Study Report, we have reviewed the EIS which accompanied the report and are providing the attached comments. Although the December 15, 1976, review letter addressed this as a final EIS, it is noted that the current version was not provided to CEQ and that the final EIS is to be prepared by the Water Resource Council (WRC) and filed at such time as the report is sent to the Congress and the President (December 11, 1971, Federal Register). Our comments, therefore, are provided as additional information to assist WRC and the GLBC in the review of the report. Our review as a final EIS will be prepared at such time as the EIS is filed with CEQ. At this time we have no major environmental objections to the proposed study and, in general, believe the current draft of the EIS adequately responded to our comments on the previous draft document.

In conclusion, I would like to compliment the GLBC staff (both present and former members) who worked on this report for their extraordinary efforts in providing report and appendix components and in assisting the member agencies in preparation and review of the study documents.

Sincerely yours,

George R. Alexander, Jr.
Regional Administrator

Attachment

EPA, p. 2

-2-

4. In general, the tone of the report is that there is plenty of water (lake, surface, and ground) and that the major problem is "cost" for any level of usage. Much of the treatment seems to deal with "average" flow conditions (p.40 of "Report" for example); it is not clear how much consideration was given to low flow years and their effect on problems and conclusions, although drought flows are given detailed treatment in Appendix 2, p.57-69.

EPA, p. 4

U.S. EPA's Comments on the Environmental Impact
Statement for the Great Lakes Basin Framework Study

As indicated in our February 20, 1975, comments on the Draft Environmental Impact Statement (EIS) we note that the Framework Study, though general by nature, will be used as a reference in establishing priorities for specific resource development plans. In that context, we suggest the following information be incorporated into the final EIS by attaching it to the present printed document.

1. Operation and Maintenance Activities

Several sections within the Final EIS advocate continued maintenance of all navigation channels and deepening of some to 27 or 31 feet. We believe that there are a number of harbors where an evaluation of the need to maintain channels at their present depth is required as part of the continuing studies. For example, if the ferry service is discontinued at Frankfort and Kewaunee, maintenance at present depths should be reassessed. Also, the Michigan City, Indiana harbor is maintained for one ship per year. Each harbor should be evaluated to determine if presently authorized depths are still warranted.

The Final EIS assumes that polluted dredged material will be disposed of in diked or upland disposal areas. It should be recognized that unpolluted sediments may also be open lake disposed and the impacts of such open lake disposal must be considered prior to disposal.

The increased risk of catastrophic spills associated with the use of large carriers should be considered.

The Final EIS states (pg. 27) that removal of dredged material will probably do no harm in the long run. One might speculate that increased dredging could indeed do localized harm in nutrient-poor systems such as Lake Superior and northern Lake Michigan.

2. Water Supply

For the year 2020, the Proposed Framework recommends provision of over 112 billion gallons of water per day for residential, agricultural, commercial, industrial, mining, and power uses in the Great Lakes Basin. The major dependence here will be on inland lakes, streams, and ground water. Provision of 168,000 cfs of water implies a very ambitious program of impoundment construction in the basin.

The Final EIS states (pg. 17) that additional habitat and water area should improve the fishery resources of the basin. It is important to note that impoundments do not necessarily improve fisheries, but simply change them. The change is not always desirable.

Page 19 mentions the value of dams for recreation and aesthetics. We note that impoundments do not make for better recreation, but more intensive recreation than free-flowing rivers. In light of the secondary impacts associated with intensive recreation, it may be better if such a change were avoided.

EPA, p. 5

2

Whether an impoundment is more aesthetically pleasing than a flowing stream is a highly subjective matter. The Tocks Island Dam Project can be reviewed for a good discussion of the pros and cons of this issue.

3. Power Production

Assuming that all steam generating plants projected for the Great Lakes by 2020 use the lakes for once-through cooling, a maximum of 200 miles of shoreline would be required. Since existing mainland shores stretch to some 4000 miles; power generation may require 5% of existing shoreline. As was the case with water supply, there are the ambitious projections which will probably attract a good deal of controversy in the future. Stress on conservation, as recently proposed by the President, may decrease such projections.

The Proposed Framework withdraws condenser cooling water from the Great Lakes for some new steam-electric capacity. Page 25 states "The withdrawals themselves are not judged to have a significant effect upon the quantity or quality of the Lakes." We believe that this is a valid statement only if new capacity is designed to utilize closed - cycle cooling modes. Artificial warming of the Great Lakes has been cited as one factor in their overall decline. The Final EIS recognizes the intense opposition to such discharges on Lake Michigan. Studies supported by EPA have shown a rather severely impacted region in the southeast quadrant of Lake Ontario. Further, EPA has defined cooling towers as best practicable control technology for steam-electric generating stations. This might be especially important on Lake Superior which has been so little impacted by culturally induced thermal changes.

Page 53 states that up to a thirteen fold increase in shoreline allocation for power plant construction might take place on Lake Ontario. Given the existing adverse impacts in the southeast quadrant of the lake, some attention should be given to the desirability of closed cycle cooling in the subsequent planning for this basin.

The Proposed Framework proposes meeting remaining energy needs in the Ontario basin through pumped storage hydroelectric facilities requiring alteration and impoundment of natural water courses. The Final EIS does not recognize the full range of impacts of pumped storage facilities or available alternatives to this method.

4. Flood Control

Even though the study projects decreasing rates of expenditures for flood control from 1970 to 2020, the total is well over one billion dollars. Funding will be spent on reservoir storage, channel modifications, levees, and flood walls. Although it is recognized that these structures and associated development will be highly disruptive to fish and wildlife habitat, nonstructural measures are merely mentioned. As recent State and Federal legislation recognizes, the flood plain is an essential component of riverine ecology. Although GLBC recognized this by encouraging non-structural alternatives, the ongoing planning process must continue to emphasize these alternatives at all levels of decision making, for the program of non-structural control to be effective.

EPA, p. 6

3

In a number of sections, e.g. pages 49 and 17, the EIS implies that "improvement" and "stabilization" of stream flow by impoundments would enhance fishery habitat, as well as minimize flood hazards. While we agree with the latter effect, the former is highly debatable. As previously mentioned, in modern ecology the flood plain is viewed as an essential and (advisedly) integral part of the riverine ecosystem. Streamflow "improvement" by structural measures induces flood plain development and hence degrades habitat.

5. Cropland Drainage

The Normal Framework is defined as the minimum drainage to efficiently supply the basin's share of national food production in 2020. The Proposed Framework is closer to accelerated, than to normal, growth conditions with respect to drainage, envisioning a large-scale channelization program. While the EIS does recognize adverse impacts of channelization, it hedges somewhat by stating that drainage helps solve "localized wetness problems." This is true to the extent that wetlands are viewed as problems. The consensus among ecologists and environmentalists today is that stream channelization should not be undertaken without clear and demonstrable need. The approach taken in the Final EIS may encourage a cavalier approach to stream channelization, to the general detriment of basin water quality.

6. Forest Management

As with the case of cropland drainage, the Proposed Framework, in the areas of forest and agricultural land treatment is much more ambitious than the Normal Framework. The program, according to Appendix 13, provides for enhanced drainage, erosion and sediment control, impoundment, timber production, and management of recreational areas. The Appendix does not indicate the degree to which structural measures, and such questionable methods as clear-cutting will be utilized to meet these objectives.

EPA, p. 7

FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

MAR 16 1977

Chairman,
Great Lakes Basin Commission
3475 Plymouth Road
Post Office Box 999
Ann Arbor, Michigan 48106

Dear Sir:

This is in reply to the letter from former Chairman Rouse, dated December 15, 1976, inviting comments on the proposed report and final environmental impact statement on the Great Lakes Basin Framework Stucy.

The cited report discusses the water and related land resources of the basin, estimates the future demands on these resources through the year 2020, and presents recommendations for actions to ensure the conservation and wise use of these resources. The "Proposed Framework" program would require a capital investment of over $25 billion, about one-half of which would be Federal, and a total expenditure for operation, maintenance, and replacement over the fifty-year period, of $47 billion.

The Federal Power Commission staff, which has participated in the framework study, has reviewed the report and environmental impact statement to determine the relationship of the proposed framework program to matters affecting the Commission's responsibilities. Such responsibilities relate to the development of hydroelectric power and the reliability and adequacy of electric service under the Federal Power Act, and the construction and operation of natural gas pipelines under the Natural Gas Act.

The staff notes that power projections were developed for the framework study, based on data and trend information that was available early in the study period. The study assumed that all needs for power generation would be met, primarily by thermal-electric plants although a few pumped storage hydroelectric developments were also forecast. As noted in the report, however, power load forecasts are being reassessed, particularly in view of the reduced rates of load growth that have been experienced in

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

Federal Power Commission

Chairman -2-

recent years. It is too early to determine to what extent the reduced rate reflects a permanent trend rather than a temporary phenomenon. If the earlier load projections should prove to be on the high side, some of the facilities proposed for development by the year 2020 may be deferred until a later period. Also the recent rapid escalation in fuel costs could affect the future mix of generating capacity. Opportunities for the economical development of conventional hydroelectric power may become more attractive. Recently, increasing interest has been displayed in the rehabilitation or installation of modern units at retired hydro plants.

According to the material presented in the report, water withdrawals for cooling steam-electric plants are projected to increase from about 17,200 million gallons per day (mgd) in 1970 to about 96,500 mgd by the year 2020. This projection is based on the assumption that a mix of flow-through and supplementary cooling systems will be used. The staff notes that the cost of cooling facilities for steam-electric plants installed between 1970 and 2020, was estimated at about $3.4 billion. This figure would be subject to wide variations depending on the types of cooling facilities ultimately selected. It does give some idea, however, of the general order of magnitude of the investment required.

Based on its consideration of the Great Lakes Basin Framework Study, the environmental impact statement, and the studies of its own staff, this Commission concludes that the proposed framework program provides a useful basis for identifying and resolving existing and potential water and related land issues in the Great Lakes Basin. The Commission notes that the questions concerning power load forecasts and means of meeting these load requirements will be matters requiring continual study. The Commission staff will continue working with the Great Lakes Basin Commission to address these issues as they occur.

Sincerely yours,

Richard L. Dunham
Chairman

FPC, p. 2

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

APR 29 1977

Mr. Arthur H. Cratty, Acting Chairman
Great Lakes Basin Commission
P. O. Box 999
3475 Plymouth Road
Ann Arbor, Michigan 48106

Dear Mr. Cratty:

As requested in your letter of December 15, 1976, we have examined the materials relating to the Great Lakes Basin Framework Study. No major problems were identified during this review. Due to the relatively long time period, the study necessarily had to be conducted under the umbrella of rapidly changing planning and policy criteria. We note, for example, that this framework study is based on OBERS Series C projections which are now considered to reflect unrealistically high population numbers. As the report indicates, differences between Series C and E projects would become significant for the year 2000 and beyond.

We appreciate having been able to fully participate in the conduct of this study from the draft phase through the final report. We are sure that the wealth of data and information compiled will assist in more detailed plans and studies in the future for the Great Lakes Basin.

Sincerely yours,

Assistant Secretary
Land and Water Resources

Department of the Interior

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
300 SOUTH WACKER DRIVE, CHICAGO, ILLINOIS 60606

March 22, 1977

REGION V

IN REPLY REFER TO:
5D

Mr. Arthur Cratty, Acting Chairman
Great Lakes Basin Commission
3475 Plymouth Road
P. O. Box 999
Ann Arbor, Michigan 48106

Dear Mr. Cratty:

This is in response to your letter addressed to the Honorable Carla A. Hills, then Secretary of Department of Housing and Urban Development, wherein you request that we provide the Commission with our comment on the completed Great Lakes Basin Framework Study Report and its related Final Environmental Impact Statement.

We believe the Framework Study represents a thorough survey of water resources in the basin, and as such should serve to direct the course of future planning in detail needed to assure availability of supply and resolve conflicts for its use.

The Commission is to be commended for the comprehensiveness of the Report.

Sincerely,

Don Morrow
Regional Administrator

Department of Housing and Urban Development

DEPARTMENT OF STATE
WASHINGTON, D.C. 20520

BUREAU OF OCEANS AND INTERNATIONAL
ENVIRONMENTAL AND SCIENTIFIC AFFAIRS

March 23, 1977

Mr. Arthur H. Cratty
Alternate Chairman
Great Lakes Basin Commission
3475 Plymouth Road
Post Office Box 999
Ann Arbor, Michigan 48106

Dear Mr. Cratty:

The Department of State has reviewed the Final Environmental Impact Statement prepared by the Commission regarding the proposed Framework Study of the Great Lakes Basin.

Recognizing that the jurisdiction of the Commission extends to the portion of the Basin within the U.S., the evolving Comprehensive Coordinated Joint Plan for the Basin, of which the Framework Study is the first stage, will touch numerous areas in which exchanges of information and other cooperation with interested Canadian federal and provincial authorities will prove useful. We trust that the Commission, and the Great Lakes States, will be alert to constructive possibilities for cooperation with Canadian interests, and coordination with related activities of the International Joint Commission, United States and Canada. For our part, the Department of State will be pleased to facilitate appropriate coordination with Canadian authorities and the International Joint Commission.

We look forward to continued work together in this period in which interests on the Lakes in both countries are coming to realize the systemic interdependence of the various factors throughout the Great Lakes Basin which influence the management and utilization of its important resources.

Sincerely,

Herbert Spielman
Office of Environmental Affairs

Department of State

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS
U.S. COAST GUARD (G-WS/73)
WASHINGTON, D.C. 20590
PHONE (202) 426-2262

Mr. Frederick O. Rouse
Chairman
Great Lakes Basin Commission
P. O. Box 999
Ann Arbor, Michigan 48106

Dear Mr. Rouse:

This is in response to your letter of 15 December 1976 addressed to Secretary Coleman concerning your proposed report on the Great Lakes Framework Study.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. We have no comments to offer nor do we have any objection to this report.

The opportunity to review this proposed report is appreciated.

Sincerely,

F. P. SCHUBERT
Captain, U.S. Coast Guard
Deputy Chief, Office of Marine
Environment and Systems

Department of Transportation

STATE OF ILLINOIS
OFFICE OF THE GOVERNOR
CHICAGO 60601

JAMES R. THOMPSON
GOVERNOR

June 10, 1977

Mr. Arthur H. Cratty
Alternate Chairman
Great Lakes Basin Commission
P.O. Box 999
Ann Arbor, Michigan 48106

Dear Mr. Cratty:

This letter is in response to your request for comments on the Framework Study Executive Summary. The affected agencies of the State of Illinois have reviewed this document and have no objections to its publication.

Thank you for this opportunity to comment on the work of the Great Lakes Basin Commission.

Sincerely,

James R. Thompson
GOVERNOR

JRT:ab

cc: Donald Vonnahme
Frank Beal

Illinois

INTERNATIONAL JOINT COMMISSION
United States and Canada
Washington, D.C. 20440

April 20, 1977

Mr. Leonard T. Crook
Executive Director
Great Lakes Basin Commission
P.O. Box 999
3475 Plymouth Road
Ann Arbor, Michigan 48106

Dear Mr. Crook:

In response to your letter of April 11, 1977, please be advised that the International Joint Commission does not intend to comment on the Great Lakes Basin Framework Study which your agency has conducted. Nevertheless, the opportunity to comment is greatly appreciated.

Sincerely,

William A. Bullard
Secretary, U.S. Section

WAB/mr

International Joint Commission

OFFICE OF THE GOVERNOR
INDIANAPOLIS, INDIANA 46204

OTIS R. BOWEN, M.D.
GOVERNOR

February 9, 1977

Mr. Frederick O. Rouse, Chairman
Great Lakes Basin Commission
3475 Plymouth Road
P.O. Box 999
Ann Arbor, Michigan 48106

Dear Mr. Rouse:

The Great Lakes Basin Framework Study Report, 25 appendices and Environmental Impact Statement, have been reviewed by the appropriate officials of the State of Indiana.

I am pleased to express the concurrence of the State of Indiana with the Study's recommendations.

Kindest personal regards,

Otis R. Bowen, M.D.
Governor

ORB:mm

Indiana

STATE OF MICHIGAN
OFFICE OF THE GOVERNOR
LANSING

WILLIAM G. MILLIKEN
GOVERNOR

March 21, 1977

Mr. Leonard Crook
Executive Director
Great Lakes Basin Commission
3475 Plymouth Road
Box 999
Ann Arbor, Michigan 48106

Dear Mr. Crook:

I have reviewed the final report and environmental impact statement of the Great Lakes Basin Framework Study pursuant to Mr. Rouse's request of December 15, 1976.

The framework study represents an exhaustive and comprehensive compilation of data on a resource base for the Great Lakes Region. This will be of considerable benefit in future studies and decisions relating to present and future problems confronting Michigan and the other Great Lakes States.

The framework study findings and recommendations underwent extensive technical review by State Agencies in recent months. However, there is one issue that has surfaced in this most recent review. The report (page 60) notes that the resource base is more than adequate to meet future food and livestock production needs for the region. As you know, Michigan, as well as the other Great Lakes States, is concerned about the continued loss of farmlands to more intensive uses. This, combined with the uncertainties associated with food production, raises the question whether the resource base is adequate to meet future food and livestock production needs of the Basin.

Thank you for the opportunity afforded Michigan to participate in the study and to review and provide comments.

Kind personal regards.

Sincerely,

William G. Milliken

Governor

Michigan

STATE OF NEW YORK
EXECUTIVE CHAMBER
ALBANY 12224

DAVID W. BURKE
SECRETARY TO THE GOVERNOR

March 11, 1977

Dear Mr. Rouse:

This is in further response to your letter of December 15, 1976, requesting comments and recommendations on the Great Lakes Basin Framework Study Report and Environmental Impact Statement.

New York State has participated in the study since its inception and we are generally satisfied with the results. By using a coordinated and comprehensive approach the Commission has seriously considered and has recommended responsive and effective actions at the framework level to meet water and related resources problems and needs of the residents of the basin.

In addition, the Commission has actively sought and considered the opinions and recommendations of the states and their residents in order to insure effective implementation of the study recommendations.

Regarding the specific recommendations in the report, it is imperative that energy conservation be stressed. In regard to the winter navigation demonstration project, we believe that a significant amount of funding for environmental studies must be a part of an overall program that more fully explores the environmental, economic, power generation and recreational implications of the navigation season extension. We emphasize the need for improved water levels for Lake Ontario in any further studies by the IJC together with the involvement of the State and concerned public in developing future plans. Also a special emphasis should be placed upon the immediate monitoring of industrial and municipal wastes and refuse disposal areas so that toxic pollutants can be detected and their discharge or disposal prevented.

New York

STATE OF MINNESOTA

STATE PLANNING AGENCY
100 CAPITOL SQUARE BUILDING
550 CEDAR STREET
ST. PAUL, 55101

June 13, 1977

Mr. Arthur H. Cratty, Alternate Chairman
Great Lakes Basin Commission
3475 Plymouth Road
P.O. Box 999
Ann Arbor, Michigan 48106

Dear Mr. Cratty:

Throughout the preparation of the Great Lakes Basin Framework Study the State of Minnesota has had numerous opportunities to provide comments and suggestions for modification of the various drafts. When deemed necessary or desirable, we have taken advantage of those much appreciated opportunities and, generally, our concerns have been accommodated.

The State of Minnesota has no further comments at this time on the Framework Study and we support its transmittal to the U.S. Water Resources Council.

Thank you.

Sincerely,

Archie D. Chelseth

Archie D. Chelseth, Minnesota Commissioner
Great Lakes Basin Commission

ADC:pj

cc: Governor Rudy T. Perpich
Joseph E. Sizer
Leonard T. Crook

"AN EQUAL OPPORTUNITY EMPLOYER"

Minnesota

-2-

The Great Lakes Basin Framework Study has provided New York with a valuable tool for guiding the management and development of water and related resources in the Great Lakes portion of New York State.

Sincerely,

David W. Burke

Honorable Frederick Rouse
Chairman
Great Lakes Basin Commission
P. O. Box 999
Ann Arbor, Michigan 48106

New York, p. 2

OhioEPA

RE: Final EIS - Great Lakes Basin Framework Study - GLBC

Frederick D. Rouse
Chairman
Great Lakes Basin Commission
3475 Plymouth Road
P.O. Box 999
Ann Arbor, Michigan 48106

February 10, 1977

Dear Chairman Rouse:

The Ohio Environmental Protection Agency, acting as lead agency and review coordinator on Federal Environmental Impact Statements, has solicited comment from other State agencies on the adequacy of the above referenced Final EIS.

To date, the only comments received have been from the Ohio Department of Natural Resources. They note that information provided by them in our review letter of the Draft EIS was erroneous. This error became incorporated in the OEPA comments reproduced in Annex 3 (page 141) of the Final EIS.

The erroneous statement in comment no. 10 of the review letter reads: "According to Carter, some 60 million tons/year of sediment are due specifically to shore erosion."

That sentence should read: According to Carter, the total fine grained sediment load derived from the Lake Erie shore is estimated at 15 to 16 million tons/year.

Should there be further comments on the Final EIS, we will forward them to your Agency upon receipt. We appreciate the opportunity to review the Final EIS.

Very truly yours,

Ned E. Williams, P.E.
Director

NEW/mah

State of Ohio Environmental Protection Agency
Box 1049, 361 E. Broad St., Columbus, Ohio 43216 - (614) 466-8565

James A. Rhodes, Governor
Ned E. Williams, P.E., Director

Ohio

STATE A-95 REVIEW AGENCIES

1. [X] DEPARTMENT OF AGRICULTURE (✓A ✓B)	13. [X] GOVERNOR'S ENERGY COUNCIL (✓A ✓B)
2. [ ] STATE COUNCIL OF CIVIL DEFENSE	14. [ ] GOVERNOR'S OFFICE FOR HUMAN RESOURCES
3. [X] DEPARTMENT OF COMMERCE	15. [ ] GOVERNOR'S OFFICE FOR HUMAN RELATIONS COMMISSION
4. [ ] DEPARTMENT OF COMMUNITY AFFAIRS	16. [ ] GOVERNOR'S OFFICE OF STATE PLANNING AND DEVELOPMENT
5. [ ] DEPARTMENT OF EDUCATION	17. [X] DEPARTMENT OF HEALTH
6. [X] DEPARTMENT OF ENVIRONMENTAL RESOURCES	18. [ ] HISTORICAL & MUSEUM COMMISSION
7. [ ] FISH COMMISSION	19. [ ] DEPARTMENT OF JUSTICE
8. [ ] GAME COMMISSION	20. [ ] DEPARTMENT OF LABOR & INDUSTRY
9. [ ] DEPARTMENT OF GENERAL SERVICES	21. [ ] PENNSYLVANIA HOUSING FINANCE
10. [ ] GOVERNOR'S OFFICE	22. [X] DEPARTMENT OF PUBLIC WELFARE
11. [ ] GOVERNOR'S OFFICE OF SPECIAL ASSISTANT FOR AGING	23. [X] DEPARTMENT OF TRANSPORTATION
12. [ ] GOVERNOR'S COUNCIL ON DRUG AND ALCOHOL ABUSE	[ ] OTHER _____
[ ] OTHER _____	

✓A = Review Agency Received A-95 Submission.

✓B = Review Agency Provided Comments Attached Hereto.

Pennsylvania, p. 2

Pennsylvania State Clearinghouse

P.O. BOX 1323 — HARRISBURG, PA. 17120 — (717) 787-2036
783-3133

Commonwealth of Pennsylvania
GOVERNOR'S OFFICE OF THE BUDGET

PROJECT CLEARANCE
RECOMMENDATION FOR APPROVAL

PSC SAI # 770403001

The Pennsylvania State Clearinghouse of the Governor's Budget Office for the Commonwealth of Pennsylvania certifies that, in regard to the A-95 submission identified by the above PSC SAI # and the attached Standard Form 424, the applicant has complied with the requirements of OMB Circular A-95, Revised, by notifying the State Clearinghouse of its intention to submit this application for Federal funding consideration.

Based upon the documentation provided to the State Clearinghouse by the applicant and the comments made on same by our State A-95 Review Agencies, the Pennsylvania State Clearinghouse takes the following disposition concerning this A-95 submission:

THE PENNSYLVANIA STATE CLEARINGHOUSE RECOMMENDS APPROVAL OF THIS A-95 SUBMISSION.

The applicant has demonstrated to the satisfaction of the Pennsylvania State Clearinghouse that the project is in conformance with policies and/or plans developed or being developed for the Commonwealth. The applicant should file this project clearance with all attached comments and the completed application with the Federal Government for funding consideration.

Please see the reverse side of this card which identified those State A-95 Review Agencies which received this A-95 submission and also those which provided comments on same.

Thank you for your cooperation.

Carl R. Fine, Supervisor

APR 13 1977
DATE

Pennsylvania

STATE OF WISCONSIN
OFFICE OF THE GOVERNOR
MADISON, 53702

MARTIN J. SCHREIBER

July 20, 1977

Arthur Cratty, Alternate Chairman
Great Lakes Basin Commission
3475 Plymouth Road
P.O. Box 999
Ann Arbor, MI 48106

Dear Mr. Cratty:

The State of Wisconsin has completed its review of the Great Lakes Basin Framework Study and the final environmental impact statement. This comprehensive study reflects the view of federal, state, and local agencies toward the water resources of the basin, including Wisconsin which participated throughout the nine-year study process. The information contained in the 27 volumes of the study has been, and will continue to be a help to the state identifying Great Lakes resources problems and their causes, despite some shortcomings mentioned below and in the attached comments.

Enclosed are comments on the study and a copy of a resolution passed by the Natural Resources Board. The resolution and comments made by the Wisconsin Department of Natural Resources' staff suggest some changes are advisable in future basin commission planning activities. I agree with the Natural Resources Board that all alternatives should have been fully explored and presented in the Framework Study. Also, the Great Lakes Basin Framework Study does not address a number of major issues, some of which have developed recently. It appears a portion of the basic data is difficult to use as it is either outdated or displayed on an unsuitable geographical basis.

To mitigate these problems in future studies, I recommend future study plans contain sufficient detail to enable the state and public to envision the end product and judge whether the study warrants state participation, or should even be undertaken by the basin commission. I would also suggest all studies should be designed in a format which makes them easier to update, eliminates collection of unnecessary data, and provides more useful information for the various governmental planning needs. This will reduce duplication, will facilitate data contributions from states (or review of study data), use of data in day-to-day state and local planning, and adoption of data by states for their water resources plans.

We hope these, and the enclosed comments, will be helpful to your commission, both on the subject of this comprehensive study and on future commission activities.

Sincerely,

MARTIN J. SCHREIBER

MJS:ded

Wisconsin

Resolution
by the
Wisconsin Natural Resources Board
Regarding
The Great Lakes Basin Framework Study
April 21, 1977

The Natural Resources Board acknowledges receipt of the Great Lakes Basin Framework Study. The Study represents a useful compendium of benchmark data regarding the Basin. The Board is disappointed that the options of limited and accelerated growth were not more fully explored and presented, and directs the Department to explore these alternatives in any further, more detailed studies that may follow.

Wisconsin, p. 2

State of Wisconsin

Comments on the
Great Lakes Basin Framework Study

General Comments

The Great Lakes Framework Study, a joint effort of state and federal agencies, is the first basinwide planning document that can be used as a coordinated management tool for the entire Great Lakes Basin. Although states can choose to implement the recommendations, the study will be primarily useful to federal agencies in their planning activities, many of which have impact on Wisconsin. At the same time, most of the appendices to the study have been and will continue to be good sources of general information for the State of Wisconsin.

The study's value to specific on-going water and land resource related programs in Wisconsin is limited by two major factors: the general nature of the study and the fact that over the nine-year period of the study, much of the information has become outdated. These points and others are highlighted below in comments on the individual volumes of the study.

Specific Comments

REPORT and APPENDIX 1, ALTERNATIVE FRAMEWORKS

According to the Introduction to the Report ". . . the purpose of a Level A framework study is to make a general survey of resources, identify problems, and determine future needs . . . It does not include detailed data collection or planning." With such limitations, one can *only ask if the surveys, identification and determination efforts were* thorough.

Problems arise when the study apparently attempts to become a plan. For example, the entire Section 4 of the Report, and Appendix 1, Alternative Frameworks purport to present the GLBC "view of how to best meet the needs for natural resources in the Basin during the next 50 years in a way that reflects both principles of wise resource use and the desires of the people." If this is really so, then the criteria by which the study is judged changes considerably.

A general reaction to these volumes is that there is a lot of material gathered together here that is so general that one cannot analyze its validity, nor draw any firm conclusions from it. This would be a very serious problem if one believed that anything would happen directly as a result of the Framework Study. However, as the report itself says, *Level B and Level C studies are expected to provide detailed recommendations* that would most likely have direct effects.

Wisconsin, p. 3

- 2 -

Appendix 1, Alternative Frameworks seems to take all existing government programs at face value and applies them to the Basin's problems. This leads, as it often has on the ground, to inconsistencies and conflicts. For example, on page 108, section 6.2.4.1 (3) it states, "For the treatment of agricultural land and forest land, the programs consist of a continuation of present practices of conservation, drainage of the agricultural land and land treatment on the forest land. Not all the opportunities for enhancement of these lands have been accepted." Two paragraphs farther down we read, "Streambank erosion is severe on about one-third of the total bank mileage subject to erosion, and this severe portion is treated under the programs by conventional structural methods." Drainage of ag lands is one of the major contributors to the accelerated erosion. Also, no recognition is given to all the studies and tests made by the red clay interagency committee, which certainly don't rely solely on structural methods to reduce erosion.

APPENDIX 2, SURFACE WATER HYDROLOGY

This appendix has been developed to the detail and scope required to determine only basic information needed to formulate a comprehensive framework plan for management of water and related land resources of the Great Lakes Basin within the United States. Hydrologic determinations formulated in this appendix were based on current information already available for the Great Lakes Basin. No new basic data were gathered for the appendix.

The appendix summarizes the programs of agencies involved in collecting data and the existing data collection program. This is probably the *most useful aspect of this appendix.*

Quantitative information on the magnitude, distribution and variability of surface runoff, water availability, reservoir sites, and runoff forecasting were presented with a methodology that simulates conditions in ungaged areas based upon data gathered in similar hydrologic areas. *Thus, the appendix is a useful tool for generating hydrologic data* representative of conditions for areas generally devoid of streamflow records.

APPENDIX 3, GEOLOGY AND GROUNDWATER

The comments below pertain mainly to Wisconsin's saline water zone, factors that regulate excessive pumpage, and statements about Wisconsin law.

Page 9, 2nd paragraph - Well disposal of wastes is prohibited in Wisconsin. All groundwater in the state is either now usable or may be usable with some treatment.

Page 9, last paragraph - Economics may restrain groundwater pumpage in the future, with further reliance on Lake Michigan water. (Same comment applies to page 21, paragraph 7 and page 27, paragraph 3.5.1.)

Wisconsin, p. 4

- 3 -

Page 10, paragraph 1.3.2 - Wisconsin has a new groundwater law, established by the Supreme Court in 1973. The decision changed the state law from the common law absolute right to the modified American doctrine of reasonable use. Under the new law, all users located over a common aquifer have a right of reasonable use; those pumping at a disproportionately higher rate than the normal pumping by other owners might have to assist the other users if their wells are detrimentally affected. Those affected must seek relief in court.

Page 13, paragraph 1 - In the Wisconsin Lake Superior Region sandstone is quite a principal aquifer.

Page 21, paragraph 2 - There are saline waters in shallow rock aquifers in Wisconsin, particularly the eastern part of state near Lake Winnebago.

Page 25, 1st full paragraph - High salinity in the Silurian dolomite is not extensive in the Milwaukee area.

Page 26, paragraph 6 and page 29, next to last paragraph - Where is the salinity in Wisconsin south of Milwaukee below 2,000 feet?

Page 28, 2nd full paragraph - There are other places in Wisconsin where H_2S occurs in water.

Page 28, number paragraph 3 - The Door County study has been completed and is in an open file at the U.S.G.S. A water supply paper is being printed for this study.

Page 29, top of 2nd column - Wauwatosa, not Milwaukee, reduced pumpage by going to lake supply.

Page 31, paragraph 6 - Artificial recharge of groundwater through wells is not permitted, nor is it a practice in Wisconsin, although it has been tried several times experimentally. These experiments showed a constant frequent backwashing of the well by pumping.

Page 108, Figure 3-16 - Recent information shows a greater extent of total dissolved solids around Lake Winnebago than illustrated. Also, in these areas, high sulfates and chlorides account for the higher than normal dissolved solids.

APPENDIX 4, LIMNOLOGY OF LAKES AND EMBAYMENTS

This is a most detailed and interesting report, with which Wisconsin has no major technical quarrel. Although the state's Inland Lake program does not include the Great Lakes, this will be an excellent document for many bureaus within the Wisconsin Department of Natural Resources.

APPENDIX 5, MINERAL RESOURCES

In general, Appendix 5 provides dated, but useful, background data on the status of mineral resources in the Great Lakes Basin counties. (This document was printed nearly three years ago and is based on data which is nine years old.)

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Paragraph 1.1 - Wisconsin has no basis upon which to object to any of the material presented relating to Plan Area 1.0. This background data will prove useful in state public information efforts.

Paragraph 2.1.1.1 - It appears that the data presented in Table 5-17 may be misleading. The number of active sand and gravel pits or rock quarries in an area is often only a fraction of those which are actually present and may be used over a period of several years. For example, there are significantly more limestone and dolomite quarries in Door County than are reported. There is also doubt whether there are granite and basalt quarries in Manitowoc County. These observations lead one to question much of the data relating to nonmetallic mining in Subarea 2.1.

Paragraph 2.1.1.2 - Since the report was published, Noranda Exploration Company has announced a discovery of a copper-zinc ore body in Oneida County, just west of Subarea 2.1, and Exxon Company, USA has announced a major zinc-copper ore body in Forest County.

Paragraph 2.2.1.1 - In 1976 the Waukesha County Park and Planning Commission published a report entitled "Waukesha County Sand and Gravel Utilization Plan." The inventory data incorporated in that report shows significantly more nonmetallic mines than are reported in the appendix under review.

APPENDIX 7, WATER QUALITY

The appendix is generally well written and it presents a broad overview of water quality conditions in the entire basin. Due to the overview nature of the narrative and the generalized assumptions used in the data preparation, it is difficult to comment on either the accuracy or the usefulness of the material for Wisconsin.

Although the information in this appendix was apparently accurate at the time it was written, certain parts are now out of date. Specifically, the description of the Wisconsin grant program on page 20 refers to a 25 percent grant. Subsequent to the writing of that section the grant was changed to primarily a 5 percent grant to supplement the 75 percent federal grant. More recently, this grant fund was exhausted and there is no pending legislation to review or replace it.

The water quality standards described on pages 40-44 are generally accurate, but they do not reflect recent revisions, such as the small stream classification system.

On page 18 there is a statement that, "In accordance with the recommendations of the Lake Michigan Enforcement Conference, all existing combined sewerage systems must be corrected on or before October 1, 1977." This recommendation will not be met. In fact, it will be some time before all of the existing combined sewers are corrected. It is questionable whether anyone has a reliable estimate on when it will be accomplished.

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The introduction notes the enactment of PL 92-500 in October of 1972. However, the body of the appendix does not generally reflect the changes which were brought about by this law. In order to incorporate these changes, a major rewrite would have been necessary.

APPENDIX R-9, RECREATIONAL BOATING

There is no practical, affordable way to review all the detailed figures presented here. However, Saxon Harbor was omitted in Table R9-18. Objection is also raised to the statement on page 6, last sentence, that seiches are insignificant on Lake Superior. It depends on the activity of the user. To smelt fishermen, they may be quite significant.

APPENDIX 10, POWER

Unfortunately, insofar as the appendix is concerned, events both political and in the area of power supply and demand have changed since its publication in 1975. This tends to make obsolete some of the projections. Rather than try to update this work, it should be made clear that the conclusions and projections are based on the situation as it existed in early 1975.

A few instances where present conditions deviate from the report are as follows. In the Synopsis, there is a statement that nuclear-generated power will supply a major portion of the power needs by the year 2000. In view of the questions which have been raised about nuclear power and the fact that the largest utility in the Basin, American Electric Power, is largely coal-based, this statement is probably no longer valid. On page 61 under the general heading Environmental Considerations, the permitting process described for the State of Wisconsin (Section 6.6.8) does not include the new siting bill which, of course, was not law at the time of the writing. On page 162 the chart entitled "Power Requirements and Supply--Wisconsin" probably does not reflect the projections contained in the long-range plans, however, since this information was apparently supplied by the FPC, if any revision is made it should probably be made by that agency so that there is consistency from state to state.

APPENDIX 12, SHORE USE AND EROSION

This appendix has proven to be valuable in the development of a state program under the Coastal Zone Management Act of 1972 and as amended in 1976. The format of the report and data contained therein have provided much needed base line information. Accordingly, trends of change in the use and erosion of the shoreline are most readily visible when the appendix is compared to data collected during the past two years of the Coastal Management Program.

APPENDIX 14, FLOODPLAINS

Although the information in this appendix may be very useful in the context of the entire Great Lakes Basin, it lacks sufficient detail for much of the work that is done on a local level by the Wisconsin Department of Natural Resource's Floodplain Section. Its use as a working tool is therefore limited.

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APPENDIX 16, DRAINAGE

The appendix addresses the benefits of drainage to crop production, but does not take into account possible adverse affects on water quality from drainage. This is a rather singular approach to land use. Also, the definition of lands needing drainage seems to be based on what has already happened, i.e., currently farmed lands should be drained and present wetlands (not being farmed or not capable of being farmed) should not be drained. This is rather arbitrary and requires a more comprehensive evaluation of drainage policy - both needs and benefit/risk.

APPENDIX 18, EROSION AND SEDIMENTATION

This appendix seems to get confused as to whether it is addressing erosion or the effect of sedimentation on water quality. It is really not much more than an evaluation of the 1967 Conservation Needs Inventory. Unless this 10-year old data is updated and supplemented to reflect land management practices and the identification of critical areas, it is difficult to relate to water quality. It also does not address itself to the extent to which conservation practices are being removed due to changes in cropping practices, ownership, etc. In Section 12, it states that even if current soil loss standards were met, "Three or four tons of eroded soil material would be entering the drainage system . . ." This assumes a delivery ratio of 100 percent, which is a gross overestimation.

The information contained in Appendices 16 and 18 is useful for an overview of current problems in the Great Lakes Basin. However, they both need to go an additional step in order to be utilized in the development of action programs, namely, better ties to water quality effects and better detailing of critical areas and needs.

APPENDIX 21, OUTDOOR RECREATION

On page 28, the statement that the average person now travels 5,000 miles per year, and is expected to travel at least 9,000 miles per year by the year 2000 seems to fly in the face of our energy problems. The suggestion on page vi that government developments are expected to satisfy 80 percent of requirements in 1980 and 2000 and 74 percent in 2020 raises some questions. The 2020 statement seems like pure speculation, but who decided that 80 percent is the "right" figure for 1980 or 2000? This seems excessively high. Most of this appendix is "old stuff" -- what it doesn't answer is who will do what with whose money?

APPENDIX 22, AESTHETIC AND CULTURAL RESOURCES

Unfortunately, no definitions or criteria for what constituted significant aesthetic or cultural resources were ever developed, or at least spelled out in the report.

The recommendations are so general that they do not vary significantly from region to region. Protection of the resources themselves seemed slighted compared to concern over the environment in which they're located.

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The maps which constitute the bulk of the Appendix, are of very little value. They are difficult to use, since the scale is small, the symbols do not always bear any relation to real locations, and it is necessary to use an index map to locate anything.

APPENDIX 23, HEALTH ASPECTS

There appears to be some repetition of the material contained in Appendix 6, Water Supply, but this may be desirable considering both appendices are concerned with public health.

ENVIRONMENTAL IMPACT STATEMENT

As would be expected with an EIS on a conceptual (Level A) study, the document is very general, both in terms of "proposed actions" and "anticipated environmental impacts". However, it appears that the EIS adequately addresses the major concerns which will develop with the future growth of population, industrial, commercial and recreational use pressures on the resources of the Great Lakes Basin. Furthermore, the "proposed framework" appears to both encompass and espouse a rate of population and economic growth, and consequently resource utilization, which is reasonable and realistic.

More detailed and specific comments will be provided when environmental assessments or impact statements are prepared on individual recommendations or projects contained within the Framework Study. Wisconsin requests that all such documents pertaining to matters of jurisdictional interest to this Department and the State of Wisconsin be forwarded to this bureau for review.

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framework study availability

If you wish to examine the Framework Study further, you may be able to find it in the library of a federal, state, or regional agency near you or in a local public library. You can also order copies of the entire set or individual volumes from the Great Lakes Basin Commission, P.O. Box 999, Ann Arbor, Michigan 48106.

The Commission will send you free upon request a brochure describing each Framework Study volume. This brochure also lists the libraries at which the Framework Study is available. Just ask for the *Great Lakes Basin Framework Study Brochure.*

framework study volumes

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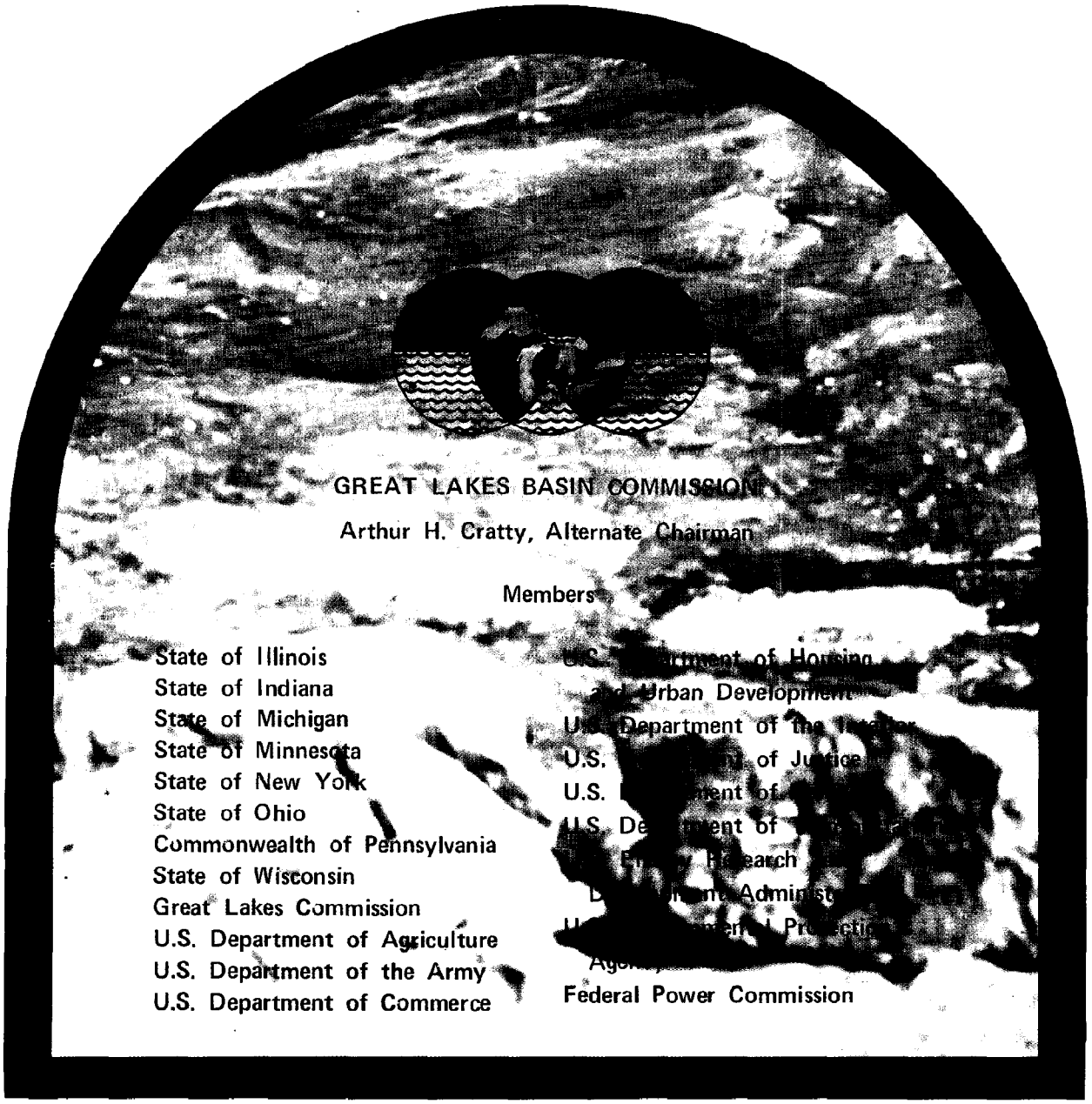
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