

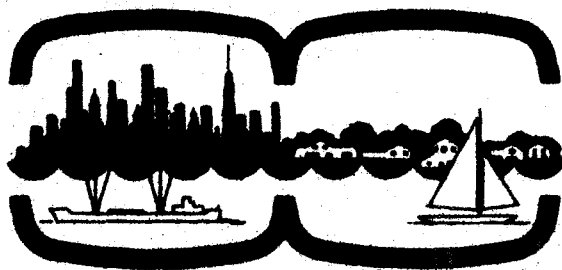
PHYSICAL DATA
for the
ILLINOIS COASTAL ZONE
MANAGEMENT DEVELOPMENT PROGRAM

Prepared by the

ILLINOIS STATE GEOLOGICAL SURVEY

for

FY1976



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**GEOLOGICAL
RECORDS SECTION**
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**ILLINOIS STATE
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PREFACE

In 1974, the State of Illinois became a participant in the U. S. Coastal Zone Management Development Program which is sponsored by the U. S. Department of Commerce, Office of Coastal Zone Management. The program is conducted under the auspices of Public Law 92-583, the U. S. Coastal Zone Management Act of 1972, whereby the states may be assisted in implementing programs to preserve, protect, develop, restore and wisely use their coastal zones.

Under the leadership of the Illinois Division of Water Resources, Illinois Department of Transportation, the State Geological Survey assumed main responsibility for acquisition of scientific data necessary for the formulation of a coastal zone management program for Illinois. The partial products of Fiscal Years 1975 and 1976 are listed below. Those for FY1976 are included in the following pages. Copies of the FY1975 products can be acquired by writing to the Illinois Division of Water Resources, Department of Transportation Building, South Dirksen Parkway, Springfield, Illinois 62764 or to the Illinois State Geological Survey, Urbana, Illinois 61801.

PRODUCTS FOR FISCAL YEAR 1975

- 1 Berg, R. C. and C. Collinson, 1975, Bluff erosion, recession rates, and volumetric losses on the Lake Michigan shore in Illinois: Illinois Coastal Zone Management Development Project FY1975 Report, 39 p.
- 2 Collinson, C., P. L. Drake, and C. K. Anchor, 1975, Inventory of physical characteristics of the Illinois shore north of Chicago: Illinois Coastal Zone Management Development Project FY1975 Report, 50 p.
- 3 Collinson, C., et al.; 1975, Hydrographic maps of the Illinois shore between Wisconsin and Wilmette: Illinois Coastal Zone Management Development Project FY1975 Report Appendix, 32 p.
- 4 Dugas, W. A., Jr., and K. P. Mecum, 1975, Climatic factors and storm episodes in coastal erosion on the Illinois Lake Michigan shore: Illinois Coastal Zone Management Development Project FY1975 Report, 20 p.
- 5 DuMontelle, P. B., K. L. Stoffel, and J. J. Brossman, 1975, Foundation and earth materials of the Lake Michigan till bluffs: Illinois Coastal Zone Management Development Project FY1975 Report, 20 p.
- 6 Larsen, C. E., 1975, Late Holocene lake levels: evidence for future levels in southern Lake Michigan: Illinois Coastal Zone Management Development Project FY1975 Report, 12 p.
- 7 Lineback, J. A., 1975, Observations on movement of sediment in southern Lake Michigan via SKYLAB and LANDSAT satellites: Illinois Coastal Zone Management Development Project FY1975 Report, 22 p.

PRODUCTS FOR FISCAL YEAR 1976

- ✓ 8 Drake, P. L., C. K. Anchor, R. C. Berg and C. Collinson, 1976, Maps of shore and nearshore structures, shore and bluffline positions, the 100-year anticipated recession line and shore ownership: Illinois Coastal Zone Management Development Project FY1976 Report, 56 p.
- ✓ 9 Anchor, C. K., and R. C. Berg, 1976, Catalog of aerial photos and maps of the Illinois shore of Lake Michigan: Illinois Coastal Zone Management Development Project FY1976 Report, 8 p.
- ✓ 10 Anchor, C. K., R. C. Berg, P. L. Drake and C. Collinson, 1976, Catalog of 35 mm colored slides - the Lake Michigan shore in Illinois: Illinois Coastal Zone Management Development Project FY1976 Report, 50 p.
- ✓ 11 DuMontelle, P. B., K. L. Stoffel and J. J. Brossman, 1976, Hydrogeologic, geologic & engineering aspects of surficial materials on the Lake Michigan shore in Illinois: Illinois Coastal Zone Management Development Project FY1976 Report, 96 p.
- 12 Berg, R. C., and C. Collinson, 1976, The effect on coastal processes of large shore structures at Waukegan and Grear Lakes, Illinois: Illinois Coastal Zone Management Development Project FY1976 Report, 31 p.
- 13 Norby, R. D., and C. Collinson, 1976, Coastal processes, resources and geology of the Zion Beach Ridge and Dune Plain: Illinois Coastal Zone Management Development Project FY1976 Report, 85 p.
- 14 Berg, R. C., and P. L. Drake, 1976, Effect of seasonal and climatic variations on lake bluff recession at Lake Bluff and Lake Forest, Illinois: Illinois Coastal Zone Management Development Project FY1976 Report, 20 p.
- 15 Norby, R. D., C. Collinson and P. L. Drake, 1976, Sedimentary characteristics of the Lake Michigan nearshore bottom in Illinois: Illinois Coastal Zone Management Development Project FY1976 Report, 60 p.
- ✓ 16 Drake, P. L., J. M. Schram, R. D. Norby, P. L. Poyner and M. S. Larimore, 1976, Map Appendix: Hydrography of the Lake Michigan nearshore between Evanston and Jackson Park, Chicago: Illinois Coastal Zone Management Development Project FY1976 Report, 28 p.
- 17 Drake, P. L., J. M. Schram, R. D. Norby and Charles Collinson, 1976, Map Appendix: Special hydrographic maps of Waukegan Harbor, Wilmette Harbor and Chicago & Burnhem Harbors: Illinois Coastal Zone Management Development Project FY1976 Report, 2 p. 3 maps (in pocket)

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The Geological Survey portion of the ICZM Development Program began in May 1974 with the implementation of a hydrographic mapping program. The project covered 25 miles of shore during summer 1974, extending from the Wisconsin boundary southward to Wilmette. The 29 hydrographic maps (scale 1/2400) produced by that program, were published as a product of the first year's study. During early 1975, mapping was extended southward as far as Hollywood Avenue in Chicago. In summer 1976, mapping advanced as far south as Jackson Park. These latter maps, 19 in all, are included here. Five maps remain to be completed. Several others will be remapped.

In addition to the hydrographic maps, five special area maps were produced as large single sheets (scale 1/2400). These include the Chicago Harbor & Burnham Harbor areas, Wilmette Harbor, Waukegan Harbor and Trident Harbor on the Illinois-Wisconsin state line. In addition to those maps, other new maps were made of the Zion Nuclear Reactor area, Waukegan Harbor, Great Lakes Naval Training Center Harbor, Wilmette Harbor and Fort Sheridan.

Five hydrographic maps remain to be done during FY1977. They cover the reach from Jackson Park south to the Indiana state line. They will be completed by early summer 1977. Also selected areas will be remapped to determine the effect of lake level lowering on sediment distribution and bottom topography. Areas already chosen for that study are Glencoe, Wilmette, Highland Park, Waukegan Harbor and the Zion Generation Station. At the same time other maps will be upgraded by partial remapping.

A new mapping project was inserted in the FY1976 program during winter 1976. It resulted from the recognition that a detailed planning-scale map showing property ownership, major shore culture and all structures on the shore was sorely needed to support a variety of coastal projects. The maps, 40 in all, were completed by summer 1976. Also included, are areas of active erosion and the anticipated 100-year bluff recession line needed in connection with the U. S. Federal flood insurance program.

Part of the hydrographic mapping program during 1974-1976 consisted of the acquisition of low-level oblique aerial color photographs taken at systematic intervals. These photos contain a detailed seasonal synoptic record of shore events and have been widely used in public meetings, scientific seminars and educational short courses. They also were invaluable in the compilation of the shore structure maps. More than 700 duplicate slides have been provided to the general public, to governmental organizations and to educators. Because the demand for maps as well as for slides was great, catalogues were compiled and distributed.

Another project continued and expanded from the FY1976 program, is that dealing with the effect on bluff and shore stability of ground water and materials characteristics. Nine boreholes and some surface features were studied during FY1975 whereas groundwater levels, numerous bluff outcrops and six additional boreholes were examined for the FY1976 report, "Hydrogeologic"

geology and engineering aspects of surficial materials on the Lake Michigan shore in Illinois."

The immediate need for evaluating potential sediment bypassing schemes at Great Lakes and at Waukegan led to study of the effects of Great Lakes and Waukegan Harbor jetties on longshore sediment drift and on shore recession. The study was made possible by the accumulated file of aerial photographs and by Corps of Engineers maps made during the nineteenth century. Part of the same research effort, but summarized in a separate report, is the study concerning the effect of seasonal weather and of climatic factors on bluff recession. Monthly measurements were made along a large number of traverses. Significant changes in bluff recession were then related to natural events.

The study of the Zion Beach Ridge and Dune Plain was begun for the purpose of measuring detailed littoral drift budgets. However, plans for a large marina there, spectacular shore recession, and the development of new techniques for predicting recession distances led to a great expansion in coverage thereby providing comprehensive information for the active planning phases just now beginning.

One of the major projects for FY1976 was the bottom sediment resource inventory planned to provide maps of sediment distribution and of sediment characteristics, in addition to chemical characteristics, for the entire shore. That project was not completed during the FY1976 program year but will be continued into FY1977. Nevertheless, 48 maps at a scale of 1/2400 were compiled showing the thickness and distribution of sandy sediments between the Wisconsin boundary and Jackson Park in Chicago. The maps are based on a sediment sampling grid, on more than 30 boreholes drilled into the lake floor in cooperation with the Chicago District Corps of Engineers, and more than 400 detailed fathometer tracings.

One project, that proposed for the study of currents, has only begun. Several dozen current drogues have been constructed for study of nearshore storm currents. Plans for studying circulation around harbor jetties and groins have been made. Most of the field studies will be made during late 1976 and early 1977. The final product will not be available until late spring 1977.

One other new study was begun during FY1976. That involves the analysis of wave fronts, their refraction, their reflection and their energy. Large scale aerial photographs, along with low level oblique photos and the lapse ground photos, are being utilized. Results of these studies are being compared to results reached by the hindcasting method and to results from the 1952 Corps of Engineers and Illinois Division of Waterways report.