USGS Coastal Research, Studies, and Maps—A Source of Information For Coastal Decisionmaking

U.S. GEOLOGICAL SURVEY CIRCULAR 883

Cover: California–Santa Barbara County. View looking northwest at end of Summerland field, showing Pliocene beds below and horizontal Pleistocene beds above. October 15, 1906.

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J. T. SUN, editor

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A directory of USGS coastal activities 1976–1981

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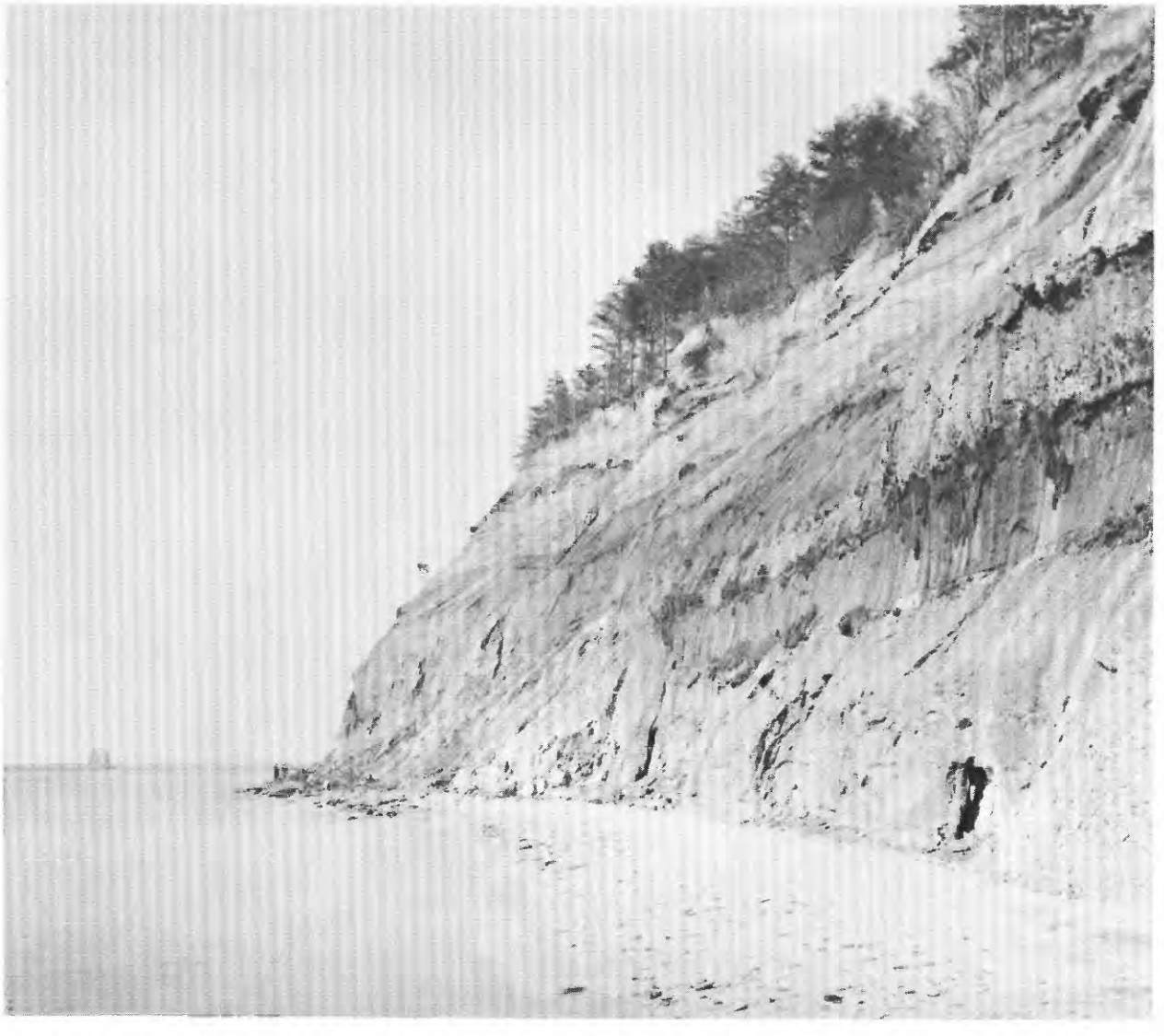


Maryland–Calvert County. Chesapeake formation on the shore of Chesapeake Bay at Cove Point, looking south. ca. 1891.

USGS Coastal Research, Studies, and Maps—A Source of Information for Coastal Decisionmaking

By J. T. Sun, Editor

INTRODUCTION

The U.S. Geological Survey (USGS), a bureau of the U.S. Department of the Interior, is the Federal Government's leading earth science programs and research agency. It carries out numerous activities in the Nation's coastal zone, with the overall objective of providing better information about earth resources, in order to enable more informed decisions to be made on their use and conservation.

During 1970–80, in part because of the Coastal Zone Management Act of 1972 (CZMA), there have been unprecedented increases in Federal and State programs designed specifically for managing land and water resources in the coastal zone. Consequently, there now exists an established network of coastal zone decisionmaking processes that have demonstrated needs for earth science information.

Under the CZMA, Federal agencies having activities in the coastal zone are required to participate in the development of State coastal management programs by providing needed information and available technical assistance. In addition, Federal agencies are required to review and comment on the final drafts of State programs when they are submitted for Federal approval to the Department of Commerce. Furthermore, after a State program has received Federal approval, Federal agencies are required to conduct activities directly affecting the coastal zone in a manner consistent with the State's program. To meet these responsibilities, the U.S. Geological Survey in September 1976 established a new office for coordinating its involvements with the CZMA. Through this office, which has been staffed since March 1977, the USGS has responded to the needs for close coordination with the coastal States and other key Federal agencies on activities relating to or stemming from the CZMA.

The primary purpose of this publication is to inform those engaged in coastal zone management programs about USGS projects and activities that may be helpful to their decisionmaking needs. As a directory, description of USGS activities in this publication is meant to serve only as initial leads to those with further interest in the details of various USGS projects and activities. It is hoped that, through the use of this publication, anyone with information needs relating to the projects and activities described herein will be provided with a clear source from which useful information can be obtained or developed.

This publication is an update of U.S. Geological Survey Bulletin 1428, Directory to U.S. Geological Survey Activities in Coastal Areas, 1974–76, published in July 1976. Information in this publication was compiled prior to October 1, 1981 and, therefore, all references to USGS and State programs and project status were current only as of that date. Users of this publication are encouraged to consult the earlier document for similarly useful information.

COASTAL ZONE MANAGEMENT—AN OVERVIEW

The development of the coastal zone began with the first contingent of colonists arriving on American shores. Through the years, the coastal zone has remained the most populated and developed sector of the Nation.

Coastal areas attract development because of their natural amenities. Ironically, coastal ecosystems such as beaches, wetlands, and estuaries are also susceptible to permanent damage when altered by development. Such damage frequently means destruction of habitat or breeding grounds for economically important fishery and wildlife resources. More significantly, improper development may also contribute to unwarranted losses of properties and lives in areas of flooding or other coastal hazards.

As development in the coastal zone grew in intensity and complexity, governments at all levels responded with programs to deal with various developmental problems. By the mid-1960's, however, there was increasing public recognition that piecemeal and uncoordinated actions were not sufficient and that a comprehensive national effort would be needed for proper management of the coastal zone.

In 1967, President Johnson responded to the call for Federal involvement in comprehensive coastal zone management by establishing the Stratton Commission to develop recommendations for legislation and programs. Based substantially on the Stratton Commission recommendations, Congress considered several alternative coastal zone management bills during 1970–72. In October 1972, the CZMA was finally passed and signed into law by President Nixon. Subsequently, in November 1973, Federal funds for development and implementation of coastal zone management programs by coastal States were made available.

The CZMA underwent significant amendment in 1976 and 1980. During the same time, 26 of the 35 States and territories eligible to receive Federal funding under the CZMA have put into place Federally approved coastal zone management programs. In these 26 States and territories (see part 2 of this publication for details), decisionmaking processes are being implemented by designated State and local agencies regarding the use and protection of coastal land and water resources. In the near future, several of the remaining States are also expected to receive Federal approval for their coastal zone management programs. Even States which do not yet have federally approved programs have nevertheless developed coastal decisionmaking processes similar to those prescribed in the CZMA. In short, major decisions on the use and conservation of coastal resources today, unlike in times prior to the CZMA, cannot be made without first becoming involved in one or more of the State or local coastal zone management processes.

CZMA AND EARTH SCIENCE INFORMATION NEEDS

The CZMA, as amended through 1980, calls upon coastal States to accomplish a wide variety of management objectives through their CZM programs. These include

(a) protection of natural resources, including wetlands, floodplains, estuaries, beaches, dunes, barrier islands, coral reefs, and fish and wildlife habitats; and

(b) management of coastal developments in flood-prone, storm- surge, geological-hazard, and erosion-prone areas and other areas of subsidence and saltwater intrusion in order to minimize loss of property and life.

While it is beyond the scope of this circular to ascertain the specific earth-science requirements of each State's coastal zone management program, the information it provides will be useful to the coastal States in meeting their management objectives as follows:

- inventory of coastal land and water resource areas of special scientific and biological significance;
- identification of areas with existing and (or) potential excessive runoff, sedimentation, and pollutants discharge;
- identification of areas with erosion and flooding problems;
- an assessment of the effects on water quality of dredging, filling, spoil disposal, and construction activities, in wetlands, estuaries, and other coastal water resource areas;
- identification and evaluation of areas with coastal hazards, including information on characteristics of soils, bluff or beach erosion rates, wave and tidal action, ground and surface water conditions and variations, and potential for earthquakes, landsliding, slumping, and subsidence.
- information and/or maps relating to shoreland areas including slope stability, habitats, basic geology, littoral drift, coastal flooding, and erosion and subsidence hazards;
- identification of areas with significant oil and gas, sand and gravel, and other mineral deposits of strategic and (or) economic value.

ORGANIZATION OF THIS CIRCULAR

USGS activities are described in two parts in this circular: Part 1 describes "National and Regional Activities"; Part 2, "Activities Applicable to States."

Although USGS activities are described in two parts, the parts are not mutually exclusive. Most national and regional programs cover geographic areas broader than the coastal zone, but many nonetheless have special focus on or application in a particular coastal State. In addition, although USGS activities are intended primarily to address national needs and concerns, certain programs or projects may also help to meet the needs of a State or locality. Furthermore, some USGS activities, although parts of national or regional programs, are performed with the participation or cooperation of State and (or) local agencies that have shared objectives.

Activities described in part 1 include topographic mapping and related research, geologic and water-resources investigations and research, interdisciplinary earth-science application efforts, and regulatory functions relating to the Outer Continental Shelf (OCS) and other Federal lands.

Part 2 describes specific projects or information products that may be applicable to the coastal management needs of the States. In most cases, these projects and products will be more useful to State and local management agencies with further interpretation and analysis. The specific purpose of part 2, therefore, is to assist State and local planners and managers in determining whether, and if so how, their information needs may be derived or developed from USGS projects or products applicable to their States.

Four categories of USGS activity are described in part 2: (1) topo-bathy maps, (2) geologic studies, (3) water-resources studies, and (4) earth-sciences application studies. In some States, however, there may be no applicable activities in one or more of the categories.

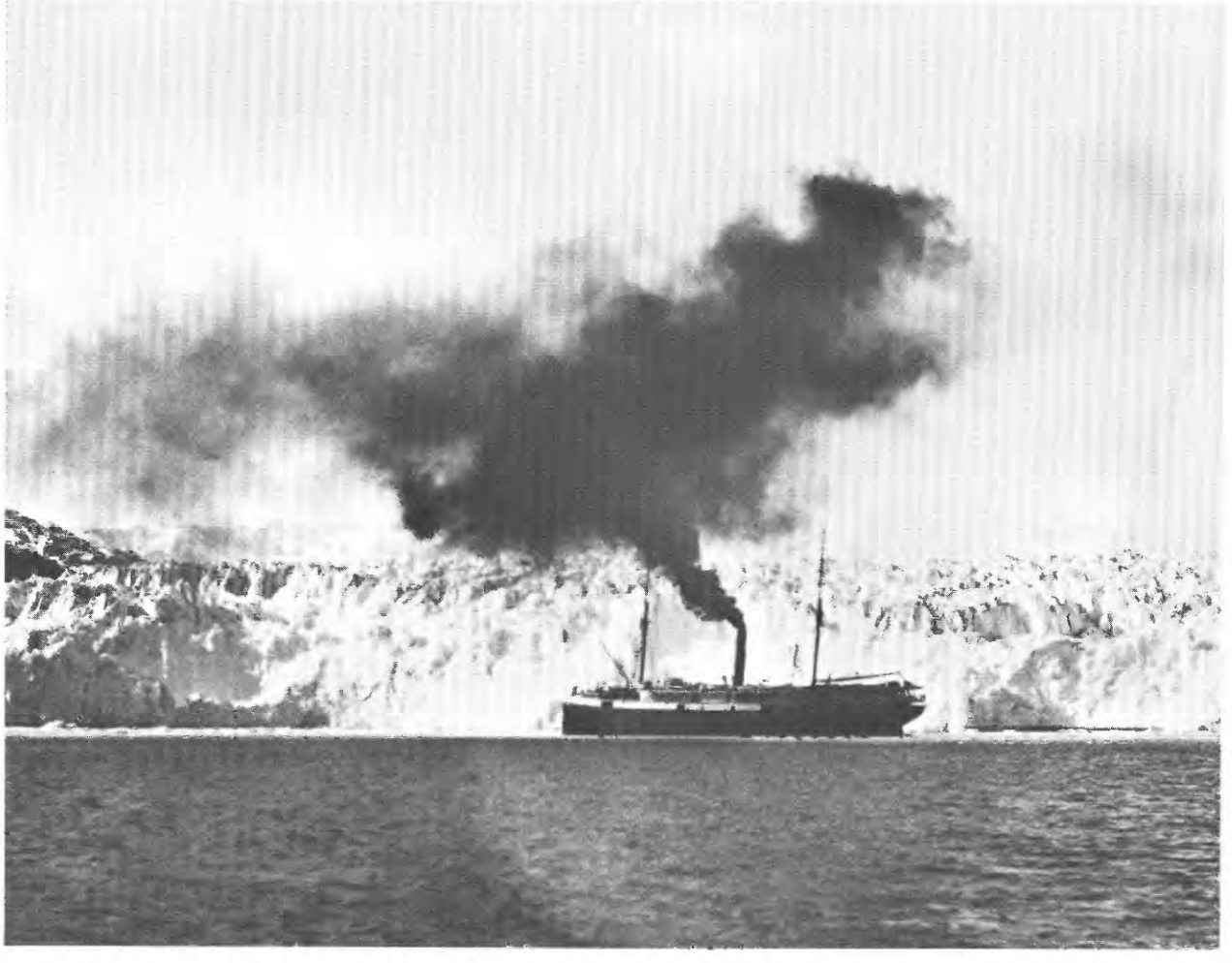
To assist those interested in obtaining further information about the USGS activities described for each State, an initial contact source is identified for each category of activity listed. This contact can, when necessary, refer inquiries to the office or staff person directly responsible for the study from which further information is being requested.

Information on the organizational structure of the USGS and the division of its earth-science responsibilities is provided in the appendix. Circular readers will be able to use the information to obtain additional data or other relevant information on activities covered in this directory.

ACKNOWLEDGEMENTS

This circular is the product of teamwork by many USGS staff members. John T. Sun coordinated the overall preparation and, in addition, provided descriptions of national and State coastal management activities. Contributions by Raymond L. Beittel, Gilbert Corwin, Melvin Y. Ellis, and Warren G. Leve were essential to adequate description of USGS earth science activities. Others whose efforts were vital are Joyce Bachman, Paul F. Clarke, Pamela Hatfield, Judy Wilson, and Robert Schoen. Perry F. Narten, Priscilla W. Woll, and Louis A. Yost also provided invaluable advice and assistance.

PART I



Alaska–Alaska Gulf Region–Valdez District. Columbia Glacier, Prince William Sound. The *George W. Elder*. June 25, 1899.

TABLE 1. -- TOPOGRAPHIC MAP SERIES

Series	Scale	Ground distance represented by 1 in	Format (latitude x longitude)	Area (mi2)
7½-minute	[1]1:20,000 1:20,000	About 1,667 About 1,667	7½ x 7½ min [3]7½ x 7½ min	71 71
	1:24,000	2,000 ft	[3]7½ x 7½ min	49-71
	1:25,000	About 2,083 ft	7½ x 7½ min	71
	1:25,000	About 2,083 ft	7½ x15 min	98-142
15-minute	1:50,000	About .8 mi	15 x 20-36 min	207-281
	1:62,500	Nearly 1 mi	15 x 15 min	197-182
	[2]1:63,360	1 mi	15 x 20-36 min	207-281
County	1:50,000	About .8 mi	County	Varies
	1:100,000	About 1.6 mi	County	Varies
1:100,000 (Metric)	1:100,000	About 1.6 mi	30 min x 1°	1,590-2,163
1:250,000	1:250,000	Nearly 4 mi	[3]1° x 2°	[3]6,221-8,669
1:500,000	1:500,000	Nearly 8 mi	State	Varies
1:1,000,000	1:1,000,000	Nearly 16 mi	[3]4° x 6°	[3]73,734-102,759

1 Puerto Rico
2 Maps of Alaska and Hawaii vary from these standards.
3 Alaska

PART I
NATIONAL AND REGIONAL ACTIVITIES

NATIONAL MAPPING

The USGS under its National Mapping Program publishes a number of standard and special map series. All map series contain coastal zone coverage, although the extent of coverage in each coastal State varies. One special product, the topographic–bathymetric map, is specifically designed for coastal areas.

TOPOGRAPHIC MAPS

Topographic maps are designed for general use. They show the shape of the land, drainage patterns and woodland, transportation networks and facilities, and other cultural features. Table 1 lists the major categories of topographic maps and their scales.

Except for the Trust Territories of the Pacific and parts of Alaska, the coastal areas not yet covered by 7½–min maps are covered by less up–to–date 15–min topographic maps; most of which are more than 25 years old. However, some more recent maps have been compiled to 7½–min accuracy standards. Except in Alaska, new 7½–min maps are being compiled for nearly all coastal areas currently covered only by 15–min maps. Revision of 7½–min maps is underway in about a dozen coastal States. In Alaska, 7½–min mapping is in progress in the Kenai Peninsula and on Kodiak Island. New 15–min mapping is in progress from the Granite Range to Yakutat Bay and around Pavlof Bay. The majority of the Aleutian Islands are not yet covered by either series.

The intermediate scale maps include the 1:50,000– and 1:100,000–scale county–format maps, the 1:100,000–scale quadrangles covering 30 min of latitude and 1° of longitude, and 1:50,000–scale 15–min quadrangles in selected areas. Published topographic maps of coastal counties are

1:50,000–scale
- Delaware, Pa.
- Erie, Pa.
- Fairfield, Conn.
- Middlesex, Conn.
- New Haven, Conn.
- New London, Conn.
- Stafford, Va.

1:100,000–scale
- King, Wash.
- Sonoma, Calif.

Topographic county maps at the 1:100,000 scale are in progress for Hawaii and for coastal areas in the conterminous States except North Carolina and Oregon. Planimetric county maps at the 1:100,000 scale are in progress for many coastal areas in the conterminous United States. These planimetric maps are published by the U.S. Soil Conservation Service, but diazo copies are available from the USGS.

Currently there are published 1:200,000–scale quadrangles of coastal areas in Alabama, California, Florida, Louisiana, Minnesota, Oregon, Washington, and Wisconsin. A few planimetric versions are available for California, Connecticut, Delaware, Florida, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New York, Oregon, Pennsylvania, Rhode Island, and Texas. New 1:100,000–scale topographic mapping of areas not yet covered at that scale is in progress along the west coast and along nearly all of the east and gulf coasts from Massachusetts through Texas, with scattered projects in Maine and in the Great Lakes States.

Nationwide coverage, including the complete coastal zone, is provided by the 1:250,000–scale topographic map series. Revision is in progress on 1:250,000–scale topographic maps that cover coastal areas in Alabama, Alaska, California, Connecticut, Delaware, the District of Columbia, Florida, Georgia, Illinois, Indiana, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New York, North Carolina, Pennsylvania, Oregon, Rhode Island, Texas, Virginia, Washington, and Wisconsin.

Other series include 1:500,000– and 1:100,000–scale State maps, the 1:1,000,000–scale International Map of the World (IMW) sheets, and national park maps at various scales. The State maps are available in three editions—base or planimetric, topographic, and shaded relief (for a three–dimensional effect) in areas with sufficient ranges of elevation. The IMW sheets are topographic quadrangles that use color gradients to distinguish ranges of elevation and that show topography and bathymetry in metric units. The national park series provides coverage for selected national parks, monuments, seashores, and historical sites. Many of these maps are available with shaded relief. National

park maps (published or in progress) of coastal areas include

Acadia National Park, Maine
Channel Islands National Monument, Calif.
Colonial National Historical Park, Va.
Indiana Dunes National Lakeshores, Ind.
Isle Royale National Park, Mich.
Olympic National Park, Wash.
Potomac River area parks, District of Columbia, Maryland, Virginia
Point Reyes National Seashore, Calif.

Besides the standard topographic maps, a number of special items and byproduct maps are available, which include aerial photographs, satellite images and products, slope maps, and large-scale maps (1:1,200 to 1:6,000); aerial photographic coverage for areas of 7½-min topographic and orthophotographic quadrangle maps; and reproducible copies of each of the separate drawings that were combined to make the published maps.

LAND-USE AND LAND-COVER MAPS

The USGS is currently engaged in a nationwide effort in land-use and land-cover mapping and data compilation. While most of the maps are based on the 1:250,000-scale quadrangles, a few are at the scale of 1:100,000, and experimentation is underway on land-use and land-cover mapping at larger scales. Research in the design of automatic techniques for land-use and land-cover mapping using remotely sensed data will probably improve the efficiency of land-use and land-cover mapping and the detection of land-use change.

Land use and land cover are categorized according to the classification presented in U.S. Geological Survey Professional Paper 964 (Anderson and others, 1976). All urban and built-up features, feedlots, water surfaces, and strip mines, quarries, and gravel pits are being mapped using 10-acre (4-ha) minimum mapping units, while other land features are being mapped in 40-acre (16-ha) minimum mapping units.

Land-use and land-cover maps are available at 1:250,000 scale for all of the Atlantic and gulf coast quadrangles, for most of the west coast quadrangles, and for about 40 percent of the Great-Lakes-area quadrangles. Gaps in the 1:250,000-scale coverage of the west coast are filled by 1:100,000-scale maps. Also, Hawaii is covered by 1:100,000-scale land-use and land-cover maps. The Alaskan coast, American Samoa, Guam, Puerto Rico, the Trust Territories of the Pacific, and the Virgin Islands are not covered.

In addition to land-use and land-cover maps, some areas are covered by associated overlays showing political units, hydrologic units, census county subdivisions, and Federal or State land ownership.

TOPOGRAPHIC–BATHYMETRIC MAPS

The USGS and the National Ocean Survey (NOS) are combining topographic and bathymetric information on coastal-area maps. These topographic-bathymetric (topo-bathy) maps contain the bathymetric contours, mean high-water line, mean low-water line, and other hydrographic data normally depicted on NOS products. Topo-bathy maps are designed to serve the specific needs of users in management of the coastal zone, the wetlands, and the offshore environment. Because they were developed for coastal areas, published topo-bathy maps are listed under individual State names in Part 2.

ORTHOPHOTOGRAPHIC PRODUCTS

Orthophotographic products include orthophotomaps and orthophotoquads prepared from aerial photographs in the 7½-min format. Images are processed to eliminate distortion and to display each feature in its correct geographic position. Orthophotomaps combine these images with topographic data, and are published as part of the standard 7½-min topographic map series. Orthophotoquads usually are monochrome and contain little or no cartographic drawing or lettering. Orthophotoquads are used as interim products for unmapped areas and as companions to published maps. They often show the subtle changes in vegetation that may identify the margins of wetlands and certain other vegetative communities. Specific land-use patterns can also be identified and delineated with a great degree of accuracy.

Although not all orthophotoquads are published, photographic and (or) diazo copies are available. Currently some type of orthophotoquad is available for the entire coastal area of Connecticut, Massachusetts, North Carolina, and Rhode Island and for some coastal areas in Alabama, California, Florida, Georgia, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, New Hampshire, New York, Oregon, Texas, Virginia, Washington, and Wisconsin.

MAP BYPRODUCTS AND SERVICES

DIGITAL MAP DATA

Digital cartographic data for some of the 1:250,000-scale topographic maps are available. A digital base with two data categories is being developed for the 7½-min quadrangles. The first category, digital line graph (DLG), includes planimetric base categories such as transportation, hydrography, and boundaries. The second, digital elevation model (DEM), consists of a sampled array of elevations for a number of ground positions that are usually, but not always, at regularly spaced intervals. Currently available data-base files for coastal areas include areas around Biloxi, Miss.; Cape Flatery, Wash.; the Columbia River Basin, Oreg.-Wash.; Klamath, Malibu Beach, San Mateo, and Santa Rosa, Calif.; Newark, N.J.; Toledo, Oreg.; and Cape Cod, Mass.

Land-use and land-cover information is being recorded on digital tapes to facilitate handling of the data in conjunction with other data sets for the study of problems related to land use. Computer programs for geographic information systems are being developed to support land-use data processing and techniques for the manipulation and overlay of other information, such as census data, on the digitized land-use data sets. Summary tabulations of land use are produced for the data presented in the associated maps compiled in conjunction with the land-use and land-cover maps.

CARTOGRAPHIC AND GEOGRAPHIC INFORMATION

A major element of the National Mapping Program is the National Cartographic Information Center (NCIC), which provides a central location from which to obtain information about cartographic and geographic data available for the U.S. NCIC collects, organizes, and distributes, without charge, information about the maps, charts, aerial photographs, survey monuments, and related cartographic and geographic data available from Federal and State Government agencies and private sources. Information can be obtained by writing to the National Cartographic Information Center, U.S. Geological Survey, 507 National Center, Reston, VA 22092, or by telephoning (703) 860–6045 (FTS 928–6045) from 8:00 a.m. to 4:15 p.m. e.s.t., Monday through Friday. A telephone answering and recording service is provided at all other times. Regional and State affiliates are listed in appendix 2 of this circular.

MAP SALES INDEXES

Indexes showing published topographic and land-use and land-cover maps are available free of charge. There are indexes to topographic maps in each State and American Samoa, Guam, Puerto Rico, and the Virgin Islands. These indexes contain lists of special maps and addresses of local map reference libraries, local map dealers, and USGS map distribution centers. Indexes can be obtained from the map distribution centers listed in appendix 2.

COASTAL MAPPING HANDBOOK

Developed jointly with the National Oceanic and Atmospheric Administration (NOAA), the Coastal Mapping Handbook provides information about mapping products and sources of data and technical assistance. It assists coastal users in determining their mapping requirements, selecting the best maps and charts for their particular needs, and communicating effectively with data-producing organizations. The handbook is sold by the U.S. Government Printing Office, over the counter by USGS Public Inquiries Offices, and by the USGS text products section (see appendix 2).

GEOLOGIC AND WATER–RESOURCES INVESTIGATIONS AND RESEARCH

In general, these activities may fall into one or more of the following categories: mineral and energy resources appraisals; studies of earthquakes and other catastrophic geologic events; environmental conditions and geologic hazards; general hydrologic studies and data collection; water quality, sedimentation, and geochemical studies; estuarine and marine studies; ground-water investigations; surface-water studies; and regional geologic and hydrologic surveys and mapping. Each is discussed below.

MINERAL AND ENERGY RESOURCES APPRAISALS

The USGS conducts resource appraisals of three types: (1) national inventories of the distribution and development of geologic resources for use in formulating minerals policies and identifying areas that merit more detailed study; (2) regional appraisals of resource potentials for use in making decisions on general land use and guiding mineral

prospecting; and (3) detailed geoscience investigations for use in gaining a better understanding of the geologic conditions that form mineral deposits, improving the efficiency of exploration methods, meeting specific national needs, and classifying public lands.

National inventories require the maintenance of data banks, maps, and graphics that provide information on such important mineral resources as oil; gas; beach placers of gold, thorium and chromium; geothermal steam; and sand and gravel. Geologic agencies of several coastal States currently participate in maintenance of these national inventories.

Many regional appraisals are devoted to large areas of special mineral potentials, while others involve the systematic study and resource mapping of lands within the limits of a specific USGS quadrangle map. Of the former, a focus of particular interest in the coastal zone is assessment of the Nation's Outer Continental Shelf (OCS) oil and gas potentials, adding to the background information needed to plan for the possible onshore and nearshore impact of future exploration, development, and production efforts. On land much of the regional appraisal effort has recently been consolidated into a "Conterminous United States Mineral Resources Assessment Program (CUSMAP)" and the companion "Alaska Mineral Resources Assessment Program (AMRAP)." The purpose of these two programs is to update and increase the detail of the Nation's mineral–resources inventory through systematic quadrangle mapping. Current work on specific maps applicable to individual coastal States is described in part 2 of this circular. Several States have interest in regional energy–resource appraisals of OCS areas along the Atlantic, Gulf of Mexico, Pacific, and Alaskan coasts.

These detailed resource investigations include specialized geophysical, geochemical, paleontologic, and geotechnical research. Also investigated are specific mineral deposits in areas and at sites that have been nominated for wilderness or other special use and must be classified with regard to their mineral values. Some examples of these investigations are listed below.

NATIONAL AND REGIONAL MINERAL RESOURCE STUDIES

Initial contact: Geologic Inquiries Group, 907 National Center, Reston, VA 22092; (703) 860–6517.

Title: a. Offshore U.S. Oil and Gas Resource Assessment
b. Onshore Oil and Gas Resource Assessment
Status: Continuing
Investigators: a. R. B. Powers
b. G. L. Dolton

Title: Petroleum Potential of the U.S. Atlantic Continental Margin
Status: Continuing
Investigator: R. E. Mattick

Title: Petroleum Geology of the U.S. Atlantic and Gulf Coast Shelves
Status: Continuing
Investigator: M. M. Ball

Title: Resource Assessments of the Northern, Central and Southern Atlantic Continental Margins
Status: Continuing
Investigators: J. S. Schlee, J. A. Grow, and D. W. Dillon

Title: Resource Assessments of the U.S. Pacific Continental Margin
Status: Continuing
Investigators: J. G. Vedder, S. H. Clark, P. D. Snavely, Jr., and D. S. McCulloch

Title: Resource Assessments of the Alaskan Continental Margin
Status: Continuing
Investigators: T.R. Bruns, G. Plafker, R.E. Von Huene, D. W. Scholl, A. K. Cooper, M. S. Marlow, M. A. Fisher, and A. Grantz

Title: Petroleum Geology of the U.S. Pacific Continental Margin
Status: Continuing
Investigators: D. G. Howell, H. E. Cook, H. McLean

Title: Petroleum Geology of the Alaskan U.S. Continental Margin
Status: Continuing
Investigators: K. J. Bird and L. B. Magoon

Title: Resource Assessment of the Gulf of Mexico Continental Margin of the U.S.
Status: Continuing
Investigator: R. G. Martin

STUDIES OF EARTHQUAKES, AND OTHER CATASTROPHIC GEOLOGIC EVENTS

Earthquakes, volcanic eruptions, and landslides occur frequently in many areas of the coastal zone where foundation conditions tend to be less stable. In recent years, coastal Alaska, California, and Washington have experienced damaging earthquakes. Both Oregon and Washington were affected seriously as debris from the May 1980 eruption of Mt. St. Helens flooded into the estuary of the Columbia River.

USGS conducts studies of earthquakes and other catastrophic geologic events. It also oper-

ates active earthquake observatories (including the long-established Hawaiian Volcano Observatory and the new center near Mt. St. Helens in Washington) and represents U.S. interests in worldwide monitoring of seismic events. USGS studies of catastrophic geologic events and the environmental conditions they affect are designed to provide information and help mitigate the devastation of natural disasters. Major activities include acquisition and dissemination of information about occurrences of earthquakes and volcanic eruptions; preparation of maps showing the vulnerability of various regions to future catastrophic events and on development of the capability to predict the time, place, and intensity of such events. Detailed information on the national earthquake and volcanic programs and specific events may be obtained by contacting the National Earthquake Information Service, U.S. Geological Survey, Box 25046, Federal Center, Mail Stop 967, Denver, CO 80225—Phone: (303) 234-3994.

The USGS reports pertinent earthquake occurrences directly to the Pacific Tsumani Warning System, and, through the National Earthquake Information Service (NEIS), provides information on the location and magnitude of earthquakes, using data of the USGS and cooperating observatories in the global seismic network. Working with others, the USGS has made considerable progress toward forecasting some types of catastrophic geologic events, as, for example, on Hawaii where prediction of volcanic outbursts has resulted in timely evacuation of many endangered sites, and at Mt. St. Helens, where the knowledge gained is expected to be useful in lessening future losses of life and property near volcanoes in the western coastal states and Alaska. Currently much USGS study of potentially catastrophic geologic events focuses on high-risk areas in southern California. An example of particular relevance to the coastal zone is a study in progress of "Coastal Tectonics of the Western United States," in which displaced coastal features to determine the rates, frequencies, and degrees of deformation are associated with that region's earthquakes. Other studies seek to measure the amounts and rates of change of stresses in the Earth's crust that are thought to give rise to earthquakes.

ENVIRONMENTAL CONDITIONS AND GEOLOGIC HAZARDS

In addition to studying catastrophic geologic events, the USGS also conducts studies designed to identify and evaluate environmental conditions that may offer risks or prove hazardous during earthquakes, volcanic eruptions, and other catastrophic events. In earthquake regions, such conditions include unstable slopes, foundation sediments that amplify shock waves or liquefy when shaken, and fractures in rocks along which movement may take place. The frequency and nature of eruptions, locations of potential vents, and presence of valleys or other channels to influence the direction of avalanching and lava emplacement are important factors in volcanic regions. Elsewhere, geologic hazards of concern include subsurface caverns that may collapse, bluffs that may be undercut by waves or other processes, soft subsurface layers that flow when overloaded, among others. Subsidence of ground surfaces and movement or deposition of large volumes of sediment in streams, along the shore, and over the seafloor constitute perils to structures in many coastal areas.

Knowledge of the nature and distribution of geologic hazards is critical to the selection of safe sites for energy facilities and other projects in the coastal zone, especially for installations such as nuclear powerplants, where failure to consider and design around unstable foundation conditions could lead to spills of dangerous radioactive materials. The incentives for building taller and heavier structures such as city skyscrapers and offshore deepwater oil platforms, and for artificially developing land masses such as scenic hillsides for homes, have created needs for hazards information in coastal decisionmaking.

Most USGS investigations of environmental conditions and geologic hazards are focused on local areas, as described in part 2 of this Circular. These investigations include studies of (1) urban areas, such as Boston, New York, Los Angeles, San Francisco, and Seattle; (2) areas at high risk in major earthquakes, such as those around the San Francisco Bay, Charleston, S.C.; the Puget Sound; and Anchorage, Alaska; and (3) special areas, such as the land near Dallas, Texas, where subsidence is a problem, and proposed nuclear-facility sites at various places along the west coast. The national and regional studies listed below are examples of studies applicable to the interests of several coastal States. They include compilations of maps of regions of present or potential earth fracturing, landslide investigations, and OCS environmental assessments being conducted in support of the Department of the Interior's Oil and Gas Lease Management Program.

Title: Active Fault Map of the United States
Status: Completed 1980
Investigator: K. A. Howard

Title: Miscellaneous Landslide Investigations
Status: Continuing
Investigator: R. W. Fleming

Title: OCS Seismic Risk
Status: Completed 1981
Investigator: D. M. Perkins

Title: Environmental Assessments; North, Middle, and South Atlantic Continental Margin
Status: Continuing
Investigators: D. M. O'Leary, J. M. Robb, and Peter Poponoe

Title: Stratigraphy of the Atlantic Outer Continental Shelf to 300m
Status: Continuing
Investigator: J. C. Hathaway
Product(s): Hathaway, J. C., and others, 1979, U.S. Geological Survey core drilling on the Atlantic Shelf: Science, v. 206, p. 515–527.

Title: Marine Geotechnical Investigations
Status: Continuing
Investigators: J. S. Booth, M. A. Hampton, H. J. Lea, and B. D. Edwards

Title: Environmental Assessments of the U.S. Gulf of Mexico Continental Margin
Status: Continuing
Investigators: E. A. Martin, H. L. Berryhill, C. W. Holmes, G. L. Shideler, and L. E. Garrison

Title: Environmental Assessments of the Pacific Continental Margin of the U.S.
Status: Continuing
Investigators: H. G. Green, M. E. Field, D. M. Rubin, H. E. Clifton, and R. L. Phillips

Title: Environmental Assessment of the Alaskan Continental Margin
Status: Continuing
Investigators: B. F. Molnia, P. R. Carlson, T. L. Vallier, C. H. Nelson, R. E. Hunter, P. A. Barnes, E. Reimnitz, and G. R. Hess

Title: Nearshore and Continental Margin Sedimentary Dynamics
Status: Continuing
Investigators: A. A. Sallenger, J. R. Dingler, D. E. Drake, D. A. Cacchione

Title: Nearshore and Estuarine Benthic Process Related to Biogenic Activity in Sediments
Status: Continuing
Investigators: F. H. Nichols and G. W. Hill

Title: Great Lakes Research
Status: Begun 1976, continuing
Investigator: R. J. Wold

GENERAL HYDROLOGIC STUDIES AND DATA COLLECTION, ANALYSIS, AND DISSEMINATION

Comprehensive regional or basinwide studies covering all phases of the hydrologic cycle are being conducted in many areas of the coastal zone. These studies are designed to provide data, information, and methods required to manage water resources of a region or local area. Practically all comprehensive regional studies are made in highly urbanized areas to identify developmental impact on various parts of the hydrologic cycle. Urban and agricultural land uses have been rapidly replacing the original natural ecosystems. The resulting greatly increased demand for water has created imbalances along freshwater–saltwater boundaries. These imbalances cause contamination of freshwater aquifers by landward–moving salty water.

Some of the general hydrologic studies emphasize a particular bay or estuary. Intensive land changes due to both urban and agricultural development have greatly increased contamination from sewage, sediment, nutrients, and toxic trace elements. The bulk of these contaminants are dumped directly into bays and estuaries or are carried by rivers and streams.

To obtain the basic data needed by these and other water–resources studies, the USGS maintains various networks of stream–gaging stations, observation wells, and water quality and quantity sampling locations. Many of these networks are established in cooperation with State and local agencies. At present, each coastal State has at least one such data–collection network, and many of them are located in the coastal zone.

Some of the data–collection stations have been in operation for many years and provide seasonal and long–term records that aid in predicting future trends in quantity and quality of the water. Others are operated for varying intervals of time to obtain data for more intensive investigations of the water resources in a particular area or to identify specific problems. Many such stations are discontinued when sufficient data have been collected.

The hydrologic data collected are published annually in local or State reports and are available in each of the subdistrict, district, or regional offices of the Water–Resources Division. Most of these data are also stored in computerized files of the U.S. Geological Survey's Water Data Storage and Retrieval System (WATSTORE).

Currently (1981) these files contain data from approximately 16,000 stream-gaging stations, 1,000 lakes and reservoirs, 5,200 surface water-quality stations, 1,020 sediment stations, 30,000 water-level observation wells, and 12,500 ground-water quality wells. This information can be retrieved at almost all Water Resources Division district offices either as computer-printed tables, computer-printed graphs, or in machine-readable form for use on other computers or for use as input to user-written computer programs. WATSTORE can also provide various statistical analyses of data in storage such as regression analysis, the analysis of variance, transformations, and correlations.

In fiscal year 1978 the USGS began a nationwide program to systematically collect and disseminate information on water use, such as how much water is used by different categories of users (municipal, domestic, industrial, thermoelectric, and agricultural), the source of this water, how much water is consumed during use, where the water is returned after use, and the effect of use on water quality. This program is being carried out in cooperation with States and other Federal agencies. At present, all coastal States except New Hampshire, the Virgin Islands, and the Territories in the Pacific have a water-use data-collection program maintained in cooperation with the Geological Survey. Detailed water-use data are also handled by WATSTORE.

WATER QUALITY, SEDIMENTATION, AND GEOCHEMICAL STUDIES

The USGS has been engaged in water-quality studies since 1911. Currently, water-quality measurements of streamflow to the Great Lakes, the Gulf of Mexico, and the oceans are collected at numerous gaging stations. Periodic measurements of suspended-sediment concentration are made at numerous sites in the coastal zone to define stream scour and deposition, beach replenishment and erosion, and reservoir and lake siltation. Sediment production from land developments is being actively studied at several sites in the coastal zone, as are changes in water chemistry due to suspended waterborne matter.

An expanding part of the USGS's water-quality research has been directed toward understanding the role of organic chemicals in water. In the coastal zone, this research focuses primarily on wetlands and estuaries. Particular emphasis is placed on defining the impact of these chemicals on aquatic biology. Organic substances contain compounds of carbon and hydrogen and are important in water for many reasons. The bacteriological oxidation of organic carbon from natural sources and from municipal, industrial, and agricultural wastes is a major factor leading to the depletion of life-supporting oxygen in streams and estuaries.

One of the major national water-quality programs presently conducted by the USGS is the River Quality Assessment Program. This program is designed to systematically assess the character, interrelationships, and causes of river quality problems, determine better alternatives for areawide management of river quality, and demonstrate that substantial savings may be achieved when water-quality planning and management is based on sound technical information. The program provides information to aid in (1) control of urban and rural non-point sources of pollution, (2) determination of levels of treatment required to produce safe drinking water, and (3) maintenance of environmentally desirable stream conditions.

ESTUARINE AND MARINE STUDIES

Urbanization and developmental activities in the coastal zone have resulted in increasing stresses on estuaries and nearshore coastal waters. For example, storm runoff, sewage disposal, dredging and navigation improvements, construction, and energy-facilities siting have all resulted in hydraulic, water-quality, and biotic changes in estuaries and the nearshore marine environment. The USGS conducts numerous studies to identify and evaluate these changes and their effects. Such studies may cover a specific location in the coastal zone, but their results are applicable to problem solving in estuaries and marine coastal waters nationwide. At present, various studies are being conducted in two major estuaries, the Potomac River Estuary and the San Francisco Bay. In each of these two estuary systems, detailed investigations are being made of circulation patterns, sedimentation, water chemistry, aquatic vegetation, biological productivity, and the effects of manmade or natural changes on these processes. All of this information should be helpful to management decisionmaking on estuaries and marine environment elsewhere in the coastal zone.

Marine environmental investigations are, in part, oriented to support oil and gas resource appraisals in proposed lease areas. Environmental studies relating to ocean mining, seabed drilling, and coastal research are also being conducted. Objectives of these studies are (1) to characterize geologic hazards in the marine environment, namely, earthquakes, faulting, slumping, excessive erosion, and weak foundation strength, and (2) to identify sources, pathways, and sinks for contaminants on the ocean floor and their effect on the marine biota. A major part of this work is the study of coastal geologic processes such as sediment transport, water circulation, and pollutant dispersal. Engineering properties of the sea floor are being investigated in areas where tectonic events are frequent and where subaqueous sediments are unstable, in order to define the hazards associated with siting of drilling platforms and pipelines. Other efforts are directed toward the identification and distribution of nonpetroleum resources such as sand and gravel, gold, phosphates, manganese, and heavy minerals by means of geophysical, geochemical, and sedimentological methods.

GROUND–WATER STUDIES

A substantial quantity of rain and snow falling on level ground filters into the ground and recharges ground–water reservoirs. Intensive ground–water development in coastal areas, particularly when it is compounded with the loss of natural recharge due to construction, will probably induce salty ground water to move landward and thereby contaminate freshwater supplies. The problems of salt–water intrusion are of serious concern to State and local agencies responsible for controlling development activities. In 1979, the USGS completed a study designed to investigate the circulation of water between submarine aquifers and nearshore coastal waters. This study (entitled "Hydrologic–Oceanographic Interrelations") focused on the North Atlantic OCS, but its results may be applicable elsewhere in appraising the impact of offshore drilling on ground–water resources in the coastal zone. People interested in further details about this study may contact the Northeastern Regional Office, USGS Water Resources Division, 433 National Center, Reston, VA 22092.

USGS ground–water studies are usually done in close collaboration with State and county officials who frequently supply funds, manpower, facilities, and data to assist USGS personnel.

A major ground–water study conducted by the USGS at present is the Regional Aquifer Systems Analysis (RASA) program. This program is developing information on the quality and quantity of ground water in 12 regional ground– water systems, 5 of which are located in the coastal zone. Specific studies done under this program are listed in part 2 of this circular under the various States, where applicable.

Although each investigation is designed to fit the particular problems of each study area, the overall approach is to develop a general computer model of the aquifer system in each area supported by more detailed simulations of local or subregional problems. For example, a generalized model is being developed for the entire Southeastern carbonate aquifer system, with detailed models developed in Savannah, Ga., in Jacksonville, Fla., and other areas where the aquifer is being stressed by large ground–water withdrawals. These simulations assist in forming an understanding of the natural (prepumping) ground–water conditions and the changes brought about by human activities; they also provide a means of predicting effects of future pumpage, artificial recharge, waste disposal, and other stresses, and will thus supply much of the basic information important to water management.

SURFACE–WATER STUDIES

The USGS measures surface–water discharge to the Great Lakes, the Gulf of Mexico, and the oceans, and publishes the results annually for each State. Information contained in annual surface–water–data reports is used for such purposes as evaluating the available water supply, determining the impact of urbanization on storm–water runoff, and assessing flood potential along a particular watercourse.

Of particular significance to the coastal zone are surface–water studies relating to estuaries, bays, and coastal waterways. Because of tidal currents, shifting winds, and varying amounts of freshwater inflow, water movement in these water bodies is difficult to measure. For example, diverting a large supply of freshwater into an estuary may

completely alter its flow patterns, resulting in shoaling, siltation of ship channels, and unwanted changes in the aquatic ecosystem. Consequently, the USGS has developed many computer-based models for measuring flow in complex water bodies.

In many areas in the coastal zone, effluent from sanitary and industrial waste treatment plants is discharged into surface streams or directly into the ocean. The Federal Pollution Control Act of 1972, amended in 1977, was enacted to protect streams and coastal waters from degradation of water quality by waste discharge. The Environmental Protection Agency established overall water-quality standards, and equal or more stringent water-quality standards have been established by each individual State.

The amount of waste that can be discharged into streams without degrading the water to a substandard level often depends on the amount of flow in the stream, and particularly on the minimum, or lowest, flow that will occur during a specific time period. For example, streams with relatively high minimum flows can assimilate more waste than streams with relatively low minimum flows. The Survey conducts investigations to determine the flow characteristics of streams, including investigations of minimum (low) flows. This information can aid engineers and water managers in establishing the amount of waste that can be discharged into streams and coastal waters without violating water-quality standards.

A derivative product of surface-water studies that is of special significance to the coastal zone is the "flood-prone area" maps program, designed to help delineate approximate flood zones as required by the National Flood Insurance Act of 1968. The boundaries of the 100-year flood were prepared on 1:24,000-scale USGS topographic quadrangle maps. The 100-year flood boundary is used by the Federal Insurance Administration to determine areas which qualify for a federally supported flood-insurance guarantee. Maps of flood-prone areas covering nearly all urbanized parts of the Nation's coastal zone have been prepared, and are frequently used by planners, developers, State and local officials, and the general public as aids in resolving future flood-plain management problems. Copies of flood-prone-area maps may be obtained free from district offices of the USGS, Water Resources Division, located in each State.

In response to the needs declared in the Federal Disaster Protection Act of 1973 for highly detailed flood data to assist the Federal Insurance Administration in enforcing the Act's provisions, the USGS conducted flood studies of selected urban areas. These detailed studies are summarized in reports which provide 100- and 500-year flood boundaries on the most accurate large-scale maps available, as well as profiles of selected floods from 10-year to 500-year recurrence intervals. The study areas are divided into zones, each having a specific flood potential or hazard. The special flood-flow characteristics of each zone are clearly outlined in the reports.

REGIONAL GEOLOGIC AND HYDROLOGIC SURVEYS AND MAPPING

A fundamental aspect of all earth-science studies is the production of maps that display geologic or hydrologic data such as the distribution of rocks, soils, streams, and ground-water and their age, origin, and physical and structural interrelationships. Information summarized in this manner is useful in assessing resources, predicting environmental impacts, and planning rational use of the land. Several agencies of the State of California, for example, used USGS geologic and hydrologic inventory maps in their formulation of coastal zone planning and legislation.

The geologic mapping program produces geologic maps in various scales depending on their purpose and intended use. Common scales are 1:2,500,000, 1:500,000, 1:250,000, 1:100,000, and 1:24,000; less common maps are produced at scales of 1:63,360, 1:62,500, and 1:20,000.

Hydrologic investigation atlases that summarize the water resources of a specific basin or depict areas inundated by past floods are designed to display detailed hydrologic information using maps, geologic profiles, tables, graphs, and block diagrams. These atlases also include short bibliographies. Information is provided on a variety of hydrologic topics, including local flood stages due to extraordinary storms, profiles of water surfaces during floods, availability of ground and surface water, and the concentration of a given chemical element or compound in a particular aquifer or watercourse. Map scales vary widely, depending on the size of the study area and the need to focus on a particular hydrologic feature.

REGULATORY RESPONSIBILITIES AND RELATED PROGRAMS

Until January 1982 the USGS, through its Conservation Division, performed regulatory activities relating to the exploration, development, and production of mineral resources from leased Federal, Indian and Outer Continental Shelf (OCS) lands. On January 19, 1982, Secretary of the Interior James G. Watt, through secretarial order No. 3071, established a Minerals Management Service (MMS) that assumed all functions formerly performed by the Conservation Division. For the purpose of this circular, however, descriptions of these regulatory activities are retained in order to ensure uninterrupted information flow to users of this circular.

The regulatory mission of the new MMS is to assure orderly and timely development of mineral resources, receipt of fair market value for the resources produced, and protection of the environment. Minerals now produced from federally leased lands include oil, gas, coal, uranium, potash, sodium, phosphate, asphaltic minerals, and sulfur. Except for oil and gas from the OCS, virtually all of these minerals are produced from leases located outside of the coastal zone.

For administrative purposes, regulatory activities of the MMS are divided into onshore and offshore categories. Offshore regulatory activities, because of their focus on the OCS, are of particularly great interest to the coastal States. The principal law governing these offshore activities is the Outer Continental Shelf Lands Act, as amended (Public Law 95–372), enacted in 1978. Supervision of OCS exploration, development, and production activities is carried out through a set of regulations and OCS operating orders that are implemented by both inspecting field operations and reviewing OCS plans and drilling applications before approval.

These OCS regulatory activities are closely coordinated with the coastal zone management efforts of the coastal States through the following related programs:

OCS OIL AND GAS INFORMATION PROGRAM

The OCS Oil and Gas Information Program (OCSIP) is mandated by the OCS Lands Act of 1978. Under OCSIP, the MMS is preparing regional indexes of OCS information and summary reports on current and anticipated levels of OCS activity for each OCS planning region.

The OCS information indexes are intended to provide affected States and other interested parties with a comprehensive listing of all programs, plans, reports, environmental impact statements, nominations information, and other lease – sale information for OCS leasing regions. Each regional index contains detailed information on the OCS leasing process and on the 5 – Year OCS Oil and Gas Leasing Schedule. Each step in the OCS leasing process is described in detail and includes a list of relevant documents for every lease sale in the region.

The summary reports are designed to provide the States with current information on OCS activities that can be used for planning purposes. Each report contains information on the most recent OCS oil and gas resource and reserve estimate for the region; the magnitude and timing of OCS exploration, development, and production activity; oil and gas transportation strategies; and the nearshore and onshore activities that are occurring or probably will occur as a result of current and projected offshore activity for each of the lease sales.

To date, index and summary reports have been published for the North Atlantic, South Atlantic, Gulf, Pacific and Alaska (Gulf of Alaska and Beaufort Sea) OCS regions. Copies of these reports may be obtained from the OCS Oil and Gas Information Program, Minerals Management Service, Mail Stop 640, 12203 Sunrise Valley Drive, Reston, VA 22091.

ACTIVITIES TO FACILITATE CONSISTENCY WITH THE COASTAL ZONE MANAGEMENT ACT

The Coastal Zone Management Act (CZMA), Section 307(c)(3)(B), provides coastal States having federally approved CZM programs with the opportunity to review and concur with proposed OCS oil and gas activities that affect their coastal zones. This review process prohibits MMS from granting permits to conduct OCS oil and gas activities until each affected State finds those activities consistent with the provisions of its coastal zone management program.

To facilitate consistency determinations, the MMS provides the affected States with much of the information needed to determine whether the activities proposed by OCS lessees are consistent with objectives of their CZM programs. This information includes copies of OCS plans developed by lessees to conduct specific activities, reports on the potential environmental effects of the pro-

posed activities, and certifications that the activities proposed in the OCS plans are consistent with the objectives of the State programs.

OCS activities have been subjected to the Federal consistency process in all major OCS leasing areas. In some areas, the MMS has consulted with the coastal States to determine precisely what information they need with respect to OCS activities. Such consultations have resulted in revisions of the information requirements imposed by the MMS on OCS lessees in part of the western Gulf of Mexico, and the approach may be employed in other OCS areas in the future.

RESEARCH AND DEVELOPMENT PROGRAM FOR OIL AND GAS OPERATIONS

This program supports research and development that the MMS considers necessary for insuring safe and pollution-free OCS operations. Studies in this program are grouped into three categories: offshore structures and pipelines, well control, and environmental concerns. Examples of existing studies include development of improved blowout prevention procedures for deepwater drilling operations and toxicity of drilling muds on coral. Most of these studies are technical and focus primarily on engineering aspects of oil and gas operations in the marine environment. While most have no direct application in shoreline areas, they do help to insure that OCS operations are safe and do not result in unacceptable threats to the environment of the coastal zone.

A summary of current research efforts relating to this program is compiled annually by the program manager and published by the MMS.

EARTH SCIENCES APPLICATION ACTIVITIES

In response to an increasing need for readily applicable earth-sciences information, the USGS carries out many multidisciplinary programs concerned directly with techniques, methodologies, and strategies for transfer of the results of its earth-science research to public decisionmaking processes. These earth-science application programs include development of resource-planning methods to facilitate use of earth science by public agencies, studies and analyses to enhance implementation of and compliance with environmental laws, research into and application of remote-sensing technology and data in support of resources, and environmental analyses. In addition, visual aids and products are developed to inform the public about the relationship between earth-science information and various environmental management problems.

Examples of this type of national/regional projects include the following:

Title: Land Use Development on Barrier Islands
Status: Completed in 1980
Purpose: To determine the location, types, and magnitude of land-use and land-cover changes on barrier islands; for use in estimating future land-use trends by a Department of the Interior study group engaged in the assessment of barrier island resources.
Location(s): Atlantic and Gulf coasts
Contact: Chief, Earth Sciences Assistance Office, USGS, 720 National Center, Reston, VA 22092—Phone: (703) 860-6961
Product(s): Lins, H. F., 1980, Patterns and trends of land use and land cover on Atlantic and Gulf coast barrier islands: U.S. Geological Survey Professional Paper 1156, 164 p.

Title: Puget Sound Regional Study
Status: Begun in 1977, ongoing
Purpose: To gather, analyze, and interpret earth-science data of the Puget Sound region for use in public decisionmaking processes on land use; energy supply; avoidance or mitigation of geologic hazards; safeguarding the quantity and quality of water, minerals, and other unique and valuable resources of the region.
Location(s): Counties bordering on Puget Sound, Wash.
Contact: Chief, Puget Sound Project Office, 1107 NE 45th Street, Suite 125, Seattle, WA 98105—Phone: (206) 442-7300
Product(s): Bortleson, G. C., Wilson, R. T., and Foxworthy, B. L., 1977, Study of water-quality effects on Baker Lake of recent volcanic activity at Mount Baker: U.S. Geological Survey Professional Paper 1022-B, 30 p.
Frank, D., 1980, The availability of Puget Sound region ground-water data and its uses: U.S. Geological Open-File Report 80-430, 1 sheet.
Gillion, R. J., 1980, Study of the phosphorus concentration in the lakes of the Puget Sound region: U.S. Geological Survey Open-File Report 80-328, 25 p.
Heller, P. L., 1979, Study of landsliding and slope stability in lower Skagit and Baker Valleys, Cascade Mountains: U.S. Geological Survey Open- File Report 79-963, 30 p.
Keuler, R. F., 1980, Study of the potential effects of an oilspill on the shore-line near Port Townsend: U.S. Geological Survey Open-File Report 80-724, 22 p.

Title: Inundation Changes in Shark River Slough, Everglades National Park
Status: Completed in 1978
Purpose: To inventory and evaluate changes in the hydrologic characteristics of coastal wetlands on a seasonal or annual basis.
Contact: Chief, Earth Resources Observation Systems Office, USGS, 730 National Center, Reston, VA 22092—Phone: (703) 860-7881.

Product(s): Rose, P. W., and Rosendahl, P. C., 1980, Applications of Landsat digital data for classification of wetland areas in Shark River Slough, Everglades National Park, Fla.: U.S. National Park Service Open – File Report, 18 p.

Title: Detection of Oil in Coastal Waters
Status: Begun in FY 1976; resumed in FY 1980
Purpose: To determine whether oil spills and natural oil seeps could be detected on Landsat imagery.
Location(s): Santa Barbara Channel, Calif., Gulf of Mexico—international waters
Contact: Chief, Earth Resources Observation Systems Office, USGS, 730 National Center, Reston, VA 22092—Phone (703) 860–7881
Product: Deutsch, M., and Estes, J., 1977 Landsat detection of oil from natural seeps: PhotograMMETRIC Engineering and Remote Sensing, v. 46, no. 10, p. 1313–1322.
Deutsch, M., Volhmers, R. R., and Deutsch, J. P., Landsat tracking of oil slicks from the 1979 Gulf of Mexico oil well blowout: Ann Arbor, Environmental Research Institute of Michigan, Proceedings of the 14th International Symposium on Remote Sensing, p. 1197–1211.

Title: Impact of Offshore Oil and Gas Development on Land Resources
Status: Completed
Purpose: To analyze the distribution and magnitude of changes in land use resulting from offshore oil and gas development
Location: Kenai Peninsula, Alaska
Contact: Chief, Earth Sciences Assistance Office, USGS, 720 National Center, Reston, VA 22092 – Phone (703) 860–6961
Product(s): Lins, H. F., 1979, Energy development at Kenai, Alaska: Annals of the Association of American Geographers, v. 69, no. 2, p. 289–303.

Title: Coastal Land and Environmental Dynamics
Status: Begun in 1978, continuing
Purpose: To analyze the effects of storms and shoreline erosion on Atlantic barrier islands
Contact: Chief, Earth Sciences Assistance Office, USGS, 720 National Center, Reston, VA 22092—Phone: (703) 860–6961.
Product(s): Dolan, R., Hayden, B., and Lins, H. F., 1980, Barrier islands: Scientist, v. 68, no. 1, p. 16–25.
Dolan, R., Lins, H. F., and Stewart, J., 1980. Geographical analysis of Fenwick Island, Maryland, a middle Atlantic coast barrier island: U.S. Geological Survey Professional Paper 1177–A, 24 p.

Title: Environmental Studies of Cape Cod
Status: Begun 1970, continuing
Purpose: To demonstrate the use of remote sensing, especially satellite imagery, for monitoring environmental changes Location(s): Cape Cod, Mass.
Contact: Chief, Earth Resources Observation Systems Office, USGS, 730 National Center, Reston, VA 22092—Phone: (703) 860–7881.
Product(s): Oldale, R. N., Friedman, J. D., and Williams, R. S., Jr., 1971, Changes in coastal morphology of Monomoy Island, Cape Cod, Massachusetts: U.S. Geological Survey Professional Paper 750–B, p. B101–B107.
Williams, R. S., Jr., 1976, Cape Cod and Cape Cod National Seashore, Massachusetts: U.S. Geological Survey Professional Paper 929, p. 307–309.

Title: Barnegat Bay Study
Status: Begun 1980, continuing
Purpose: To determine the effects of chemicals, sediments, and other pollutants on the water quality of Barnegat Bay, N.J.
Location(s): Barnegat Bay, N.J.
Contact: Chief, Earth Sciences Assistance Office, USGS, 720 National Center, Reston, VA 22092 – Phone: (703) 860–6961

Title: Application of Remote Sensing to the Great Lakes
Status: Completed 1981
Purpose: To determine the utility of remote – sensing data in assessing the water resources, water quality, and hydrogeology of the Great Lakes
Location(s): Lake Ontario Basin, N.Y.
Contact: Chief, Earth Resources Observation Systems Office, USGS, 730 National Center, Reston, VA 22092—Phone: (703) 860–7881
Product(s): Falconer, A., Deutsch, M., and Myers, L., 1981, Lake Ontario dynamics and water quality observations using thematically enhanced Landsat data: Minneapolis, Minn., American Water Resources Assn., Proceedings of the 5th W. T. Pecora Memorial Symposium, p. 655–661.

PART II

Maryland–Worcester County. A fleet of bulldozers were used on a round-the-clock basis throughout much of the 1977–78 winter at Ocean City, to preserve the resort's precious beach, severely denuded by a relentless series of "northeaster" storms.

PART II

ACTIVITIES APPLICABLE TO COASTAL STATES

The Coastal Zone Management Act (CZMA) defines coastal States as those States and territories bordering on the Atlantic, the Pacific, the Gulf of Mexico, or one of the Great Lakes. According to this definition, there are 35 coastal States in all.

In this circular, coastal States and territories are grouped into three large regions: the Pacific States and Alaska, the Atlantic and Gulf region, and the Great Lakes. States included in the Pacific and Alaska region are Alaska, California, Hawaii, Oregon, and Washington. Territories in this region are American Samoa, Guam, and the Northern Marianas.

States falling within the Atlantic and Gulf region are Alabama, Connecticut, Delaware, Florida, Georgia, Louisiana, Maine, Maryland, Massachusetts, Mississippi, New Hampshire, New Jersey, New York (a part of whose coastal zone also borders on the Great Lakes), North Carolina, Rhode Island, South Carolina, Texas, and Virginia. Territories in this region are Puerto Rico and the Virgin Islands.

The Great Lakes region includes the States of Illinois, Indiana, Michigan, Minnesota, Ohio, Pennsylvania, and Wisconsin.

For each State or territory, the status and geographic boundaries of existing coastal management programs are briefly described in order to clarify the context of earth science information for use in coastal decisionmaking. Following this description, existing USGS activities located in or relating to that State's coastal zone are listed in the following three categories, as applicable:

1. Topo-bathy maps—Only published maps are listed.
2. Geologic studies—These studies are listed by and referred to in four types:
   a. Regional Geologic and Mineral Resources Investigations—These studies usually entail analysis and mapping of the geohistorical structure of large areas for purposes that include identification of mineral potentials.
   b. Special Mineral Investigations—These studies usually focus on a special mineral resource such as petroleum and are frequently carried out to support Federal lease-sale activities.
   c. Environmental Conditions and Geologic Hazards Investigations—These studies are designed to determine the source and characteristics of such problems as sedimentation in marine or estuary waters, bluff erosion, land subsidence, and unstable slopes and ground in areas of frequent earthquakes.
   d. Marine Investigations—These studies focus on either minerals assessment or environmental conditions of the continental shelves and margins of the United States, but their results may relate to such coastal zone problems as beach erosion caused by sediment movement.
3. Water-resources studies—Since these studies are often done in cooperation with State or local agencies, there are usually more water-resources projects listed for each State than any other category of USGS activity. Frequently the focus of these studies is similar to that of many of the issues a State coastal management agency is attempting to address. Because of the relatively more direct relationship between USGS water-resources studies and State CZM programs, the types of water-resources studies available are described in detail below (projects listed under each State are referred to by types).
   a. Areal Appraisals—These are local, county, or statewide investigations to determine the source, quality, quantity, and availability of water supplies. The investigations may address ground water, surface water, or both, and may be simply for reconnaissance or involve a very detailed and technical appraisal. Most of these appraisals result in comprehensive reports describing the water supplies important to planning for large-scale developments.
   b. Planning and Management—These provide generalized descriptive information on water resources in local, county, basin, or statewide areas for water management and (or) planning purposes, published as data reports or map atlases at various scales and showing such information as depth to aquifers, quality of water, and streamflow.

c. Aquifer Delineation—Test drilling, seismic surveys, geophysical logging, aquifer tests, and geologic and other mapping investigations to determine the physical and water-bearing properties of aquifers. Some of these properties are areal extent, depth, thickness, geology, permeability, storage capacity, and yields of wells. Aquifer delineation investigations generally result in maps, cross sections, and geologic information for use in defining the water-bearing zones of ground-water supply systems and facilities and predicting the quantity of water available for development.

d. Effects of Development—Investigations of the effect of manmade stresses on the quantity and quality of water resources, including assessments or statements that describe the effects of urbanization, mining, or other significant activities affecting the environment.

e. Waste Disposal and Contamination—Investigations of the effects on water resources of waste disposal, including sanitary landfills, radioactive-waste disposal sites, and various types of liquid waste disposal such as spray irrigation and deep-well injection. These investigations are often used in evaluating alternative methods of waste disposal.

f. Aquifer Models—Investigations utilizing computer or analog models to simulate the response of aquifers to various stresses. For example, models may be used to predict future decline in water levels due to pumpage or the effect of lack of rainfall (recharge) on water levels. These models are also capable of predicting changes in water quality due to water-level declines.

g. Streamflow Characteristics—Investigations to determine the hydraulic and physical characteristics of surface streams, which may include estuaries, bays, and adjacent coastal waters. Descriptions and measurements of such characteristics as stage discharge, velocity of movement, circulation patterns, drainage areas, size and shape of stream channels, and rate of sedimentation may be included in these investigations. Such information can be utilized in evaluating the adequacy of water supply available from surface streams, designing bridges and culverts, or assessing flood potential along a particular watercourse. It may also be used in conjunction with water-quality information to assess the effects of disposing various types of waste into surface streams.

h. Streamflow Models—Investigations utilizing models to simulate the response of surface streams to various stresses. For example, models may be used to predict the stage and velocity of streamflow due to changes in rainfall or urbanization in a basin. They may also be used to show circulation and water-quality patterns in bays and estuaries under various tidal and flow conditions.

i. Water-quality Investigations—Investigations examining surface and (or) ground water chemical composition and the areal or vertical extent of various chemical elements in the water. They also may be used to identify and explain past or present water-quality problems as well as to predict future changes in water quality.

j. Environmental Assessment—Investigations designed to identify and describe the environmental factors that control or influence the water resources. They may include studies of the effects of vegetation, topography, geology, or volcanoes on the quality and quantity of ground and surface water, or the relationship between erosion and sedimentation in streams, or the effects of glacier and snow melt on future water supplies.

PACIFIC STATES AND ALASKA

ALASKA

States in this region are generally concerned with protecting land and water resources of significant biological and scientific value, providing access to coastal recreation, siting of energy facilities, and monitoring geological and other coastal hazards. Their approach to CZM decisionmaking emphasizes implementing State policies and guidelines and defining them in detail through local management programs. Usually, local governments are authorized to issue special permits for coastal developments. This local control, however, is balanced by the availability of a State-level appeal mechanism created and operated as an integral element of the overall CZM decisionmaking process.

Territories in the Pacific are concerned primarily with islandwide economic development. Since

they do not have functioning local units of government similar to those existing in a typical State, their CZM decisionmaking processes are operated centrally by the territorial government, usually as a part of its overall developmental planning and management function.

The Alaska CZM program is based on the Alaska Coastal Management Act (ACMA) of 1977, which established shared local and State coastal management responsibilities. Federal approval was granted in July 1979.

The ACMA requires that local governments develop coastal management programs under State guidelines and standards. The Act sets up a Coastal Policy Council to oversee the development of such programs and to resolve conflicts during their implementation. Approval of local programs, however, requires actions by the State legislature in addition to the Coastal Policy Council.

After a local program is approved, State and local agencies exercising police powers are bound by the policies, standards, and other applicable requirements of the program. There is, however, no special coastal use permit system created by the ACMA.

The Division of Policy Development and Planning (DPDP) of the Governor's Office is designated by the ACMA to provide staff support to the Coastal Policy Council. Through its Office of Coastal Management, the DPDP administers the federally approved CZM program and serves as the focus of all activities relating to Federal consistency.

The ACMA enunciated only generalized policies and objectives for coastal management but instructed the Coastal Policy Council to issue specific rules for accomplishing the purposes of the Act. Consequently, the Council has issued, and the State legislature has adopted, guidelines and standards for the following categories of coastal uses and activities:

- coastal development
- geophysical hazard areas
- recreation
- energy facilities
- transportation and utilities
- fish and seafood processing
- timber harvest and processing
- mining and mineral processing
- subsistence

In addition, there are also official State guidelines and standards for inventorying and managing "habitats," including offshore areas, estuaries, wetlands and tidelands, rocky islands and seacliffs, barrier islands and lagoons, exposed high-energy coasts, rivers, streams, lakes, and upland areas. The State's coastal management guidelines and standards must be followed by local governments in developing their district coastal management programs.

CZM BOUNDARY

Because of the unique characteristics of the Alaska coastal zone, the ACMA leaves the task of defining the exact boundaries of the CZM program to the Coastal Policy Council and the various local governmental districts in coastal areas. The Coastal Policy Council initially defined zones of "direct interaction" and "direct influence," consisting of coastal areas where physical and biological processes are a function of direct contact between land and sea and areas affected and influenced by the close proximity of land and sea. The final boundaries will result from redefinition by the local districts in accordance with State guidelines.

Final boundaries of the coastal area subject to the district program may diverge from the initial boundaries if they (a) extend inland and seaward to the extent necessary to manage uses and activities that have or are likely to have a direct and significant impact on marine coastal waters; and (b) include all transitional and intertidal areas, salt marshes, saltwater wetlands, islands, and beaches. If the criteria in (a) and (b) are met, final boundaries of the coastal area subject to the district program may be based on political jurisdiction, cultural features, planning areas, watersheds, topographic features, uniform setbacks, or the dependency of uses and activities on water access.

USGS ACTIVITIES AND INFORMATION PRODUCTS

As the Nation's largest and least explored State, and the one with the greatest amounts of Indian and public land, Alaska serves as the focus of a major, integrated USGS effort to examine the State's environment and mineral resources and resolve associated problems. This effort involves application of nearly the full breadth of the Agency's interests and expertise, as well as a variety of special skills. Special activities include management of an exploration program for the National Petroleum Reserve in the northwest part of Alaska.

The USGS issues an annual two-part set of pamphlets summarizing (1) the organization and status of the Alaska program and (2) major accomplishments and brief reports on results of studies for the preceding year. For added details

concerning the scope, status, and products of the Alaskan coastal zone activities listed below and elsewhere in this report, the reader is referred to the pamphlets below.

The U.S. Geological Survey in Alaska: A. Organization and Status of Program; B. Accomplishments of the Preceding Year
1977—Circular 751–A, 751–B, K. M. Bleau, Editor
1978—Circular 772–A, 772–B, K. M. Johnson, Editor
1979—Circular 804–A, 804–B, K. M. Reed, Editor
1980—Circular 823–A, K. M. Reed, Editor
Circular 823–B, N. R. D. Albert and Travis Hudson, Editors
1981—Circular 843, K. M. Reed, Editor

These reports are free and available from the USGS information and distribution offices listed in appendix 2.

The following are listings of specific activities and information products applicable to Alaska:

Geologic Studies

Initial contact: Chief, Branch of Alaskan Geology, 1209 Orca Street, Anchorage, AK 99501—Phone: (907) 271–4150

Title: Geologic Map of Alaska
Status: Completed 1978
Type(s): Regional Geological and Mineral Resources Investigations
Location(s): Statewide
Investigator(s): H. M. Beikman
Product(s): Beikman, H. M., compiler, 1978, Preliminary geologic map of Alaska, scale 1:2,500,000, 2 sheets.

Title: The Alaska Mineral Resources Assessment Program
Status: Begun 1975, continuing
Type(s): Regional Geological and Mineral Resources Investigation
Location(s): Statewide
Investigator(s): H. C. Berg
Product(s): 1:250,000 quadrangle mapping completed through 1981 for Goodnews, Hagemeister Island, Seward, Blying Sound, Ketchikan, and Prince Rupert quadrangles. Mapping in progress for Ugashik, Chignik, Sutwik, Karluk, Valdez, and Bradfield Canal quadrangles.

Title: Craig Quadrangle Geologic Map
Status: Begun 1973, continuing
Type(s): Regional Geological and Mineral Resources Investigation
Location(s): Craig
Investigator(s): G. D. Eberlein
Product(s): 1:250,000 map of the geology of Craig, southeastern Alaska

Title: Geology and Mineral Resources of Petersburg Quadrangle
Status: Begun 1978, continuing
Type(s): Regional Geological and Mineral Resources Investigation
Location(s): Petersburg, Prince of Wales and Kuiu Islands
Investigator(s): D. A. Brew

Title: Geology and Mineral Resources of Juneau
Status: Continuing
Type(s): Regional Geological and Mineral Resources Investigation
Location(s): Juneau
Investigator(s): D. A. Brew
Product(s): Maps issued distinguish 21 belts and areas of intrusive rocks ranging in age from Precambrian to Tertiary

Title: Geology and Resources of the Norton Sound Region
Status: Begun 1979, continuing
Type(s): Regional Geological and Mineral Resources Investigation
Location(s): Norton Sound, including the Yukon delta
Investigator(s): W. W. Patton
Product(s): Patton, W. W., Jr., and Csejtey, Bila, Jr., 1980, Geologic map of St. Lawrence Island, Alaska: U.S. Geological Survey Miscellaneous Investigation Map I–1203, scale 1:250,000

Title: Petroleum Assessment Geology, North Slope Provinces
Status: Begun 1980, continuing
Type(s): Special Purpose Mineral Resources Investigation
Location(s): Areas in and adjacent to the National Petroleum Reserve in Alaska
Investigator(s): K. J. Bird

Title: Petroleum Geology of Cook Inlet Basin – Shelikof Strait
Status: Begun 1970, continuing
Type(s): Special Purpose Mineral Resources Investigation
Location(s): Cook Inlet Basin and Shelikof Strait, including Cape Douglas and Seldovia areas
Investigator(s): L. B. Magoon
Product(s): Fisher, M. A., and Magoon, L. B., 1978, Geologic framework of Lower Cook Inlet, Alaska: American Association of Petroleum Geologists Bulletin, v. 62, no. 3, p. 373–402.

Title: Geotectonics, Metallogenesis, and Resource Assessment of Southeastern Alaska
Status: Begun 1970, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Southeastern Alaska
Investigator(s): H. C. Berg
Product(s): Berg, H. C., Jones, D. L., and Coney, P. J., 1978, Map showing pre – Cenozoic tectonic – stratigraphic terranes of Southeastern Alaska and adjacent areas: USGS Open – File Report 78–1085, 2 sheets, scale 1:1,000,000.

Title: Tin, Tungsten and Molybenum Deposits in Alaska
Status: Begun 1976, continuing
Type(s): Special Purpose Mineral Resources Investigation
Location(s): Seward Peninsula, Southeastern Alaska, and the Nome area
Investigator(s): Travis Hudson

Title: Mineral Potentials Appraisal of the Glacier Bay National Monument Wilderness Study Area
Status: Begun 1975, continuing

Type(s): Special Purpose Mineral Resources Investigation
Location(s): Glacier Bay
Investigator(s): D. A. Brew

Title: Mineral Potentials Appraisal of the West Chicagof – Yakobi Wilderness Study Area
Status: Begun 1978, completed 1981
Type(s): Special Purpose Mineral Resources Investigation
Location(s): Chicagof and Yakobi Islands
Investigator(s): B. R. Johnson

Title: Uranium Potential, Tertiary Basins
Status: Begun 1980, continuing
Type(s): Special Purpose Mineral Resources Investigation
Location(s): Statewide
Investigator(s): K. A. Dickinson

Title: Arctic Environmental Studies
Status: Begun 1974, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Arctic coastal areas
Investigator(s): O. J. Ferrians

Title: Geologic Hazards Related to Petroleum Operations in Northern and Western Alaska
Status: Begun 1974, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Coastal and continental shelf areas of northern and western Alaska
Investigator(s): D. M. Hopkins
Product(s): Hopkins, D. M., and Hartz, R. W., 1978, Coastal morphology, coastal erosion, and barrier islands of the Beaufort Sea, Alaska: U.S. Geological Survey Open – File Report 78–1063, 54 p.
Hopkins, D. M., 1979, Landscape and climate of Beringia during late Pleistocene and Holocene time, in Laughlin, W. S., and Harper, A. B., eds., The first Americans: Origin, affinities, and adaptations: New York, Gustave Fischer, p. 15–41.

Title: Alaska Geologic Earthquake Hazards Study
Status: Begun 1963, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Statewide, with special emphasis on areas affected by the 1964 earthquake
Investigator(s): George Plafker
Product(s): Plafker, G., Hudson, T., Bruns, T., and Rubin, M., 1978, Late Quaternary offsets along the Fairweather fault and crustal plate interaction in Southern Alaska: Canadian Journal of Earth Science, v. 15, no. 5, p. 805–816

Title: Earthquake Hazards Mapping, Upper Cook Inlet – Susitna Lowland, Alaska
Status: Begun 1977, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Upper Cook Inlet and Sustina Lowland region, including Anchorage
Investigator(s): O. J. Ferrians

Title: Quarternary Climate History and Tephrochronology, South – Central Alaska
Status: Begun 1981, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Upper Cook Inlet region
Investigator(s): T. A. Ager

Title: Geological Framework and Resource Assessments
Status: Begun 1975, continuing
Type(s): Marine Investigation—Resources
Location(s): Beaufort and Chukchi Seas; Aleutian – Bering Sea area; eastern and western Gulf of Alaska
Investigator(s): Arthur Grantz, M. S. Marlow, M. A. Fisher, George Plafker, and Roland von Huene

Title: Continental Margin Petroleum Resources Framework
Status: Begun 1976, continuing
Type(s): Marine Investigation—Resources
Location(s): Norton Sound, Beaufort and Chukchi Seas (also northern Puget Sound, Wash.)
Investigator(s): T. H. McCulloh

Title: Geo – Environmental Studies of the Continental Shelf and Adjacent Seafloor of Alaska
Status: Begun 1975, continuing
Type(s): Marine Investigation—Environmental
Location(s): Beaufort and Chukchi Seas, Western and Eastern Gulf of Alaska
Investigator(s): P. W. Barnes, Erik Reimnitz, M. A. Hampton, B. F. Molnia, C. H. Nelson, R. E. Hunter, and R. L. Phillips

Title: Geologic Hazards in Navarin Basin Province
Status: Begun 1980, continuing
Type(s): Marine Investigation—Environmental
Location(s): Navarin Basin Province, Bering Sea
Investigator(s): P. R. Carlson
Product(s): Carlson, P. R., and Karl, H. A., 1981, Seafloor geologic hazards, sedimentology, and bathymetry: Navarin Basin province, northwestern Bering Sea: U.S. Geological Survey Open – File Report OF 81–1217, 151 p.

Title: Sedimentation within the Alaskan Coastal Environments
Status: Begun 1972, completed except final reports
Type(s): Marine Investigation—Environmental
Location(s): Upper Cook Inlet, with emphasis on Knik and Turnagain Arms
Investigator(s): S. Bartsch – Winkler
Product(s): Ovenshine, A. T., Bartsch – Winkler, S. R., O'Brien, N. R., and others, 1976, Intertidal sedimentation in upper Turnagain Arm, Alaska, in Miller, T. P., ed., Recent and ancient sedimentary environments in Alaska: Anchorage, Alaska Geological Society, 26 p.

Title: Resource Geology and Environmental Assessment of Aleutian Ridge and Shelf
Status: Begun 1979, continuing
Type(s): Marine Investigation—Environmental
Investigator(s): D. W. Scholl, T. L. Vallier, and H. McLean

Water Resources Studies

Intial Contact: USGS/WRD District Chief, 218 E Street, Anchorage, AK 99501—Phone: (907) 277–5526

Title: Geohydrology of the Anchorage Area, Alaska
Status: Ongoing FY 81
Type(s): Areal Appraisal; Effects of Development—Urbanization; Waste Disposal; Planning and Management
Location(s): Anchorage, Alaska
Product(s): Freethey, G. W., 1979, Sources of water for a confined aquifer system at Anchorage, in Johnson, K. M., and Williams, J. R., eds., The U.S. Geological Survey in Alaska—Accomplishments during 1978: U.S. Geological Survey Circular 804–B, p. B106.

Title: Water Resources Investigation of the Kenai Peninsula Borough Area, Alaska
Status: Ongoing FY 81
Type(s): Areal Appraisal; Effects of Development—Urbanization
Location(s): Kenai Peninsula, Alaska
Product(s): Howland, Mark, and Freethey, G. W., 1978, Selected hydrologic data related to water table aquifer of north Kenai area, Alaska: State of Alaska DGGS Open – File Report 112, 1 pl.

Title: Hydrology of Cordova Area, Alaska
Status: Completed FY 79
Type(s): Areal Appraisal; Aquifer Delineation
Location(s): Southeastern Alaska
Product(s): McCoy, G. A., and Freethey, G. W., 1978, Water resources of the Cordova area: U.S. Geological Survey Open – File Report 78–310, 2 p.

Title: Municipal Water Supply Investigations
Status: Terminated FY 78
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Alaska statewide
Product(s): Dearborn, L. L., Anderson, G. S., and Zenone, Chester, 1979, Water – resources data of the Seward area, Alaska: U.S. Geological Survey Water – Resources Investigations 79–11, 45 p.

Title: Water Resources Investigations (Salmon – Rearing Sites)
Status: Completed FY 79
Type(s): Areal Appraisal; Quality of Water Investigations—Lakes
Location(s): Alaska statewide
Product(s): McCoy, G. A., Wiggins, W. W., and Schmidt, A. E., 1977, Limnological investigations of six lakes in southeast Alaska: U.S. Geological Survey Water – Resources Investigations 76–122, 1 pl.

Title: Alaska Glaciology
Status: Ongoing FY 81
Type(s): Glacier Investigations
Location(s): Alaska statewide
Product(s): Mayo, L. R., 1977, Glacier research, in Blean, K. M., ed., The United States Geological Survey in Alaska—Accomplishments during 1976: U.S. Geological Survey Circular 715–B, p. B5–8, 6.
Mayo, L. R., 1978, Identification of unstable glaciers intermediate between normal and surging glaciers: Moscow, Academy of Sciences of the USSR, Data of Glaciological Studies, Publication 33, p. 47–56 (Russian), p. 133–135 (English).
Mayo, L. R., and Trabant, D. C., 1978, Surface studies of ice balance and dynamics, in Columbia Glacier Team, 1978, Columbia Glacier Progress Report—December 1977: U.S. Geological Survey Open – File Report 78–264, p. 20–24.
Meier, M. F., Mayo, L. R., Post, Austin, Sikonia, W. G., and Trabant, D. C., 1979, Stability of Columbia Glacier, Alaska, in Johnson, K. M., and Williams, J. R., eds., The United States Geological Survey in Alaska—Accomplishments during 1978: U.S. Geological Survey Circular 804–B, p. B106–B107.
Meier, M. F., Post, Austin, Rasmussen, L. A., Sikonia, W. G., and Mayo, L. R., 1979, Retreat of Columbia Glacier, Alaska—A preliminary prediction: U.S. Geological Survey Open – File Report 80–10, 11 p.

Title: Columbia Glacier
Status: Completed FY 78
Type(s): Glacier Investigations
Location(s): Southeastern Alaska
Product(s): Columbia Glacier Team: 1978, Columbia Glacier progress report—December 1977: U.S. Geological Survey Open – File Report 78–264, 56 p.
Post, Austin, 1978, Interim bathymetry of Columbia Glacier and approaches, Alaska: U.S. Geological Survey Open – File Report 78–449, 1 p.

Title: Hydrologic Studies and Data Collection Related to Water Availability and Quality for the Alaskan Air Command
Status: Terminated FY 77
Type(s): Areal Appraisal; Aquifer Delineation
Location(s): Alaska statewide
Product(s): Feulner, A. J., Zenone, Chester, and Reed, K. M., 1976, Geohydrology and water supply, Shemya Island, Alaska: U.S. Geological Survey Open – File Report 76–82, 1 sheet.

Title: Arctic Water Resources and Environmental Studies, Alaska
Status: Ongoing FY 81
Type(s): Areal Appraisal; Planning and Management; Effects of Development; Environmental Assessment
Location(s): Alaska statewide
Product(s): Childers, J. M., Kernodle, D. R., and Loeffler, R. M., 1979, Hydrologic reconnaissance of western arctic Alaska, 1976 and 1977: U.S. Geological Survey Open – File Report 79–699, 70 p.

Title: Summary Appraisals of the Nation's Ground – Water Resources—Alaska Region
Status: Completed FY 79
Type(s): Areal appraisal; Planning and Management; Effects of Development—General
Location(s): Alaska statewide
Product(s): Zenone, Chester, and Anderson, G. S., 1978, Summary appraisals of the Nation's ground – water resources—Alaska: U.S. Geological Survey Professional Paper 813–P, 28 p.

Title: Water Resources and Water Quality Compilation for the Cook Inlet Hydrologic Unit, Alaska
Status: Completed FY 80

Type(s): Areal Appraisal; Planning and Management; Environmental Assessment
Location(s): Northwest Cook Inlet, Alaska
Product(s): Freethey, G. W., and Scully, D. R., 1980, Water resources of Cook Inlet Basin, Alaska: U.S. Geological Survey Hydrologic Investigations Atlas HA–620, 4 sheets.

Title: Water Resources of National Petroleum Reserves
Status: Completed FY 80
Type(s): Areal Appraisal; Planning and Management
Location(s): Western Arctic Slope, Alaska
Product(s): National Petroleum Reserve in Alaska Task Force, 1978, National Petroleum Reserve in Alaska, physical profile: U.S. Department of the Interior, National Petroleum Reserve in Alaska 105(C) Land Use Study, Study Report 1, 124 p.

Title: Frequency of Recurrence of Lake George on Knik Glacier
Status: Ongoing FY 81
Type(s): Environmental Assessment—Lakes
Location(s): Southeastern Alaska

Title: Hydrology of the Capps Creek Coal Area, Alaska
Status: Ongoing FY 81
Type(s): Areal Appraisal; Aquifer Delineation
Location(s): South–central Alaska

Title: Water Resources of the National Petroleum Reserve in Alaska
Status: Ongoing FY 81
Type(s): Areal Appraisal; Environmental Assessment—Snow Depth and Density, Water Supply for Drilling Sites
Location(s): Western Arctic Slope, Alaska
Product(s): Glude, W. J., and Sloan, C. E., 1980, Reconnaissance snow survey of National Petroleum Reserve in Alaska, April–May 1979; U.S. Geological Survey Water–Resources Investigations 80–49, 13 p.

Title: Hydrology, Sediment and Channel Morphology of the Kenai River Between Skilak Lake and the Mouth
Status: Completed FY 80 (except report)
Type(s): Environmental Assessment—Morphology and Sedimentation; Streamflow Characteristics
Location(s): South–central Alaska

Title: Water Resources Reconnaissance of St. Paul Island, Pribilof Islands, Alaska
Status: Completed FY 80
Type(s): Areal Appraisal; Aquifer Delineation
Location(s): St. Paul Island, Pribilof Islands, Alaska
Product(s): Feulner, A. J., 1980, Water–resources reconnaissance of the southeastern part of St. Paul Island, Pribilof Islands, Alaska: U.S. Geological Survey Water–Resources Investigations 80–61, 12 p.

Title: Ground–Water Resources of the Middle Eagle River Valley Near Eagle River, Alaska
Status: Ongoing FY 81
Type(s): Areal Appraisal; Aquifer Delineation
Location(s): South–central Alaska

Title: Water–Quality Characteristics of Surface–Water Runoff in Campbell and Chester Creeks, Anchorage, Alaska
Status: Ongoing FY 81
Type(s): Quality of Water Investigations; Streamflow Analysis; Effects of Development—Urbanization
Location(s): Southern Alaska

CALIFORNIA

The California CZM program is based on the California Coastal Act, which became effective on January 1, 1977, and the McAteer–Petris Act, which became effective in 1965. Federal approval of the program took place in November 1977.

For management purposes the California coast is divided into two segments. Except for the San Francisco Bay and its tributaries, the coastal zone is managed by the California Coastal Commission. The San Francisco Bay, tributary waterways and shoreline, and the Suisun Marsh are managed by the San Francisco Bay Conservation and Development Commission (BCDC). While the two programs are similar, there are also important differences between them.

The California Coastal Act establishes 14 groups of resources planning and management policies and requires their implementation by local governments. Local governments in the coastal zone are authorized and required by the Act to prepare local coastal programs for approval and certification by the designated State coastal management agency, the California Coastal Commission.

Before approval of a local coastal program (LCP) for a particular jurisdiction, the Coastal Commission issues coastal development permits for that area. After LCP certification, this permit authority is delegated to the local government with provisions for appeal of projects to the commission. The Commission is also responsible for determining the consistency of Federal activities with that portion of the California CZM program that applies to the coast.

Policies created by the California Coastal Act cover the following categories:

- shoreline access
- recreation and visitor–serving facilities
- housing
- water and marine resources
- dredging, filling, and shoreline structures
- commercial fishing and recreational boating
- environmentally sensitive habitat areas
- agriculture

- hazards
- forestry and soils resources
- locating and planning new development
- coastal visual resources and special communities
- public works
- industrial and energy development

For implementation, the California Coastal Commission has issued guidelines on types of developments in certain areas as well as on what specific information local coastal programs should contain to reflect each group of coastal policies.

Policies for the San Francisco Bay are found in the McAteer–Petris Act (California Government Code, Title 7.2), Division 14 of the California Administrative Code and the Bay Plan. Special policies apply to the Suisun Marsh. Major policy groups for the Bay are listed below.

- public access
- fish and wildlife
- water surface area and volume
- water pollution
- marshes and mudflats
- smog and weather
- shell deposits
- freshwater inflow
- safety of fills
- dredging
- water–related industry
- ports
- airports
- recreation
- transportation
- salt ponds and other managed wetlands
- appearance, design and scenic view

BCDC issues permits for work and uses within and adjacent to San Francisco Bay. The Commission is also responsible for determining the consistency of Federal activities with the part of the California CZM program that applies to BCDC jurisdiction.

CZM BOUNDARY

The California Coastal Act defines "coastal zone" to include the territorial sea, all off–shore islands, and to extend inland generally 1,000 yards from the sea's mean high tide line. In significant coastal estuarine, habitat, and recreational areas, the coastal zone extends inland to the first major ridgeline paralleling the sea or 5 mi from the mean high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yd. The jurisdiction of the San Francisco Bay Conservation and Development Commission includes generally all areas of the Bay subject to tidal action and the first 100 ft of the shoreline.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Western Mapping Center, USGS, 345 Middlefield Road, Menlo Park, CA 94025—Phone: (415) 323–8111

1:250,000

Crescent City
Eureka
Long Beach
Los Angeles
Monterey
San Clemente Island
San Diego
San Francisco
San Luis Obispo
Santa Ana
Santa Rosa
Santa Rosa Island
Ukiah

Geologic Studies

Initial contact: Regional Geologist, USGS, 345 Middlefield Road, Menlo Park, CA 94025—Phone: (415) 323–2214

Title: Geologic Structure and Resource Assessment of California Continental Margin
Status: Begun 1975, continuing
Type(s): Marine Investigation—Resources
Location(s): California continental margin
Investigator(s): J. C. Vedder, D. S. McCulloch
Product(s): Page, B. M., Wagner, H. C., McCulloch, D. S., and others, 1979, Geologic cross section of the continental margin off San Luis Obispo, the southern Coast Ranges, and the San Joaquin Valley, California: Geological Society of America Map Chart Series No. MS–286, 12 p.

Title: Continental Margin Basin Formation and Petroleum Potentials
Status: Begun 1976, renewed 1980, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): California continental margin
Investigator(s): D. G. Howell
Product(s): Howell, D. G., McCulloch, D. S., and Vedder, J. G., 1978, General geology, petroleum appraisal and nature of environmental hazards, Eastern Pacific Shelf, Latitude

28° to 38° North: U.S. Geological Survey Circular 786, 29 p.

Title: Petroleum Geology and Geophysics of Siliceous Shale and Related Rocks
Status: Begun 1979, as successor to studies on mass properties of oil field rocks begun in 1972, continuing
Type(s): Regional Geologic and Mineral Resources Investigation—Onshore – Offshore
Location(s): California continental margin
Investigator(s): L. A. Beyer

Title: Tectonics of Central and Northern California
Status: Begun 1973, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Central and northern California, between the continents and ocean basins
Investigator(s): W. P. Irwin
Product(s): Irwin, W. P., and Dennis, M. D., 1979, Geologic structure section across southern Klamath Mountains, coastal ranges, and seaward of Point Delgada, California: Geological Society of America Map and Chart Series MC–28D, scale 1:250,000

Title: Onshore – Offshore Geologic Framework of Eel River (Humboldt) Basin
Status: Begun 1981, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Northern California – southern Oregon continental shelf
Investigator(s): S. H. Clark

Title: Geo – Environmental Setting and Geologic Hazards of the California Continental Margin
Status: Begun 1974, extended 1981, continuing
Type(s): Marine Investigation—Environmental
Location(s): Offshore areas of California
Investigator(s): D. S. McCulloch, H. G. Greene, and M. E. Field
Product(s): Field, M. E., Gardner, J. V., Jennings, A. E., and Edwards, B. D., 1981, Seafloor failures caused by the November 8, 1960, earthquake off northern California: U.S. Geological Survey Open – File Report 81–0393, 27 p.

Title: Geology and Mineral Potentials of Los Padres National Forest
Status: Begun 1979, continuing
Type(s): Special Mineral Resources Investigation
Location(s): Los Padres National Forest
Investigator(s): D. M. Morton and N. O. Fredericksen

Title: Geology and Mineral Potentials of Ventana Wilderness
Status: Begun 1980, continuing
Type(s): Special Mineral Resources Investigation
Location(s): Ventana Wilderness, with emphasis on Bear Mountain and Bear Canyon
Investigator(s): V. M. Seiders

Title: Quaternary Framework for Earthquake Studies, Los Angeles Basin
Status: Begun 1976, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Los Angeles Basin
Investigator(s): J. C. Tinsley

Title: Earthquake Hazards of the Los Angeles Region
Status: Begun 1980, as renewal of earlier studies, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Los Angeles Metropolitan areas
Investigator(s): R. F. Yerkes
Product(s): Lee, W. H., Johnson, C.E., Henyey, J. L., and Yerkes, R. F., 1979, A preliminary study of the Santa Barbara earthquake of August 13, 1978: U.S. Geological Survey Circular 979, 18 p.

Title: Geologic Maps of Pacific Palisades Landslide Areas
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Los Angeles
Investigator(s): J. T. McGill

Title: Regional Tectonics of the Nacimiento Block
Status: Begun 1975, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Coastal areas between Santa Barbara and Monterey
Investigator(s): V. M. Seiders

Title: Tectonic Framework and Areal Slope Stability of the San Francisco Bay Region
Status: Begun 1975, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Investigator(s): E. E. Brabb and S. D. Ellen

Title: Neotectonics of the San Francisco Bay Region
Status: Begun 1976, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Investigator(s): D. G. Herd

Title: Earthquake Induced Ground Failures, San Mateo County
Status: Begun 1975, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): San Mateo County
Investigator(s): E. L. Harp

Title: Interactions Between Ground Motion and Ground Failure
Status: Begun 1979, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): San Mateo County
Investigator(s): R. C. Wilson

Title: Relationships Between Marine and Estuarine Sediments
Status: Begun 1978, continuing
Type(s): Marine Investigation—Environmental

Location(s): Sacramento – San Joaquin Delta
Investigator(s): B. F. Atwater

Title: Characteristics of Sediments Along the Pacific Coast
Status: Begun 1980, continuing
Type(s): Marine Investigation—Environmental
Location(s): Offshore areas of California
Investigator(s): R. E. Hunter

Title: Nearshore Sedimentary Dynamics
Status: Begun 1980, continuing
Type(s): Marine Investigation—Environmental
Location(s): Monterey Bay
Investigator(s): A. H. Sallenger

Title: Depositional Processes and Facies in Coastal Embayments
Status: Begun 1980, continuing
Type(s): Marine Investigation—Environmental
Location(s): Morrow Bay and Tamales Bay
Investigator(s): R. L. Phillips

Title: Continental Margin Sediment Dynamics
Status: Begun 1975, renewed 1981, continuing
Type(s): Marine Investigation—Environmental
Location(s): Offshore areas of California
Investigator(s): D. A. Cacchione

Title: Peninsula Ranges Tectonics
Status: Begun 1975, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Statewide
Investigator(s): V. R. Todd

Title: Dynamics of Sedimentary Bedforms
Status: Begun 1978, continuing
Type(s): Marine Investigation—Geologic Processes
Location(s): San Francisco Bay
Investigator(s): D. M. Rubin

Title: Continental Margin Processes
Status: Begun 1978, continuing
Type(s): Marine Investigation—Geologic Processes
Location(s): Offshore San Francisco to Russian River
Investigator(s): J. V. Gardner
Status: Begun 1978, continuing
Type(s): Marine Investigation—Geologic Processes
Location(s): Offshore San Francisco to Russian River
Investigator(s): J. V. Gardner

Water Resources Studies

Intitial contact: WRD District Chief, USGS, 218 Oak Grove Avenue, Menlo Park, CA 95023—Phone: (415) 323–8111

Title: Geology and Ground Water in Santa Cruz County, California
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Planning and Management
Location(s): Central Coastal California
Product(s): Johnson, M. J., 1980, Geology and ground water in north – central Santa Cruz County, California: U.S. Geological Survey Water – Resources Investigations, 80–26, 33 p.

Title: Water – Resources Studies in Redwood National Park, California
Status: Completed FY 79 (except final report)
Type(s): Areal Appraisal; Quality of Water; Aquifer Delineation
Location(s): Northwestern California
Product(s): Akers, J. P., 1978, Potential potable water supplies in Redwood National Park, California: U.S. Geological Survey Open – File Report 78–970, 27 p.

Title: San Francisco Bay Region Environmental Studies
Status: Completed FY 77
Type(s): Environmental Assessment; Effects of Development; Areal Appraisal; Waste Disposal and Contamination
Location(s): San Francisco Bay Region
Product(s): Waananen, A. O., Limerinos, J. T., Kockelman, W. J., Spangle, W. E., and Blair, M. L., 1977, Flood – prone areas and land – use planning in the San Francisco Bay region, California: U.S. Geological Survey Professional Paper 942, 75 p.

Title: Assessment of Water Quality in California Streams
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water
Location(s): California statewide
Product(s): Bowers, L. C., and Irwin, G. A., 1978, Water – quality investigations, upper Santa Clara River basin, California, November 1976 through August 1977: U.S. Geological Survey Open – File Report 78–735, 53 p.

Title: Geohydrology of Round Valley, Medocino County, California
Status: Completed FY 77
Type(s): Areal Appraisal; Aquifer Model; Aquifer Delineation
Location(s): Northern California
Product(s): Muir, K. S., and Webster, D. A., 1977, Geohydrology of the Round Valley Indian Reservation, Medocino County, California: U.S. Geological Survey Water – Resources Investigations 77–22, 95 p.

Title: Updating Ground Water Information in the Eureka, California, Area
Status: Completed FY 79
Type(s): Areal Appraisal—Ground Water
Location(s): Northern California
Product(s): Johnson, M. J., 1979, Ground water conditions in the Eureka area, Humboldt County, California, 1975: U.S. Geological Survey Water – Resources Investigations 78–127, 45 p.

Title: Sources of Emergency Water Supplies in Santa Clara County, California
Status: Completed FY 77
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Central Coastal California
Product(s): Akers, J. P., 1977, Sources of emergency water

supplies in Santa Clara County, California: U.S. Geological Survey Water – Resources Investigations 77–51, 30 p.

Title: Initial Assessment of Ground – Water Quality Degradation in the Monterey Bay region, California
Status: Completed FY 77
Type(s): Areal Appraisal—Ground Water
Location(s): Central Coastal California
Product(s): Muir, K. S., 1977, Initial assessment of the ground – water resources in the Monterey Bay region, California: U.S. Geological Survey Water – Resources Investigations 77–46, 84 p.

Title: Appraisal of Ground – Water Resources in San Antonio Creek Ground – Water Basin, Santa Barbara County, California (With Emphasis on Potential Overdraft at Vandenberg Air Force Base)
Status: Ongoing FY 81
Type(s): Areal Appraisal; Effects of Development—Irrigation
Location(s): Coastal southern California
Product(s): Hutchinson, C. B., 1980, Appraisal of ground – water resources in the San Antonio Creek Valley, Santa Barbara County, California: U.S. Geological Survey Open – File Report 80–75, 48 p.
Mallory, M. J., 1980, Potential effects of agricultural development on the ground – water system in the vicinity of Barka Slough, San Antonio Creek Valley, Santa Barbara County, California: U.S. Geological Survey Water – Resources Investigations 80–75, 25 p.

Title: Seawater Intrusion and Ground – Water Yield of the Soquel – Aptoc Area, Santa Cruz County, California
Status: Completed FY 80
Type(s): Areal Appraisal—Ground Water; Contamination—Seawater Intrusion
Location(s): Central Coastal California
Product(s): Muir, K. S., 1980, Seawater intrusion and ground – water yield of the Soquel – Aptoc area, Santa Cruz County, California: U.S. Geological Survey Water – Resources Investigations 80–84, 40 p.

Title: Ground – Water Resources of the Santa Barbara Area
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Effects of Development; Aquifer Model; Aquifer Delineation
Location(s): Southern coastal California
Product(s): Hutchinson, C. B., 1979, Ground – water monitoring at Santa Barbara, California, phase 1—coastal monitoring well installation and initial measurements: U.S. Geological Survey Open – File Report 79–923, 24 p.

Title: Digital Model of Carmel Valley
Status: Completed FY 80 (except report)
Type(s): Aquifer Model
Location(s): West – central California

Title: Evaluation of Ground Water Quality in the Santa Ynez Valley, California
Status: Ongoing FY 81
Type(s): Water Quality—Ground Water; Contamination: Effects of Development—Withdrawals
Location(s): South coastal California

Title: Ground – Water Potential, Pescadero Area, San Mateo County, California
Status: Completed FY 80
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water
Location(s): West – central California
Product(s): Akers, J. P., 1980, The potential for developing ground – water supplies in the Pescadero area, San Mateo County, California: U.S. Geological Survey Water – Resources Investigations 80–6, 8 p.

Title: Ground Water in the Seaside Area, Monterey County, California
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): West – central California

Title: Tracing the Movement of Treated Wastewater and Determining Its Effect on Aquifer Hydraulics and Water Quality in an Injection – Extraction System at Palo Alto, California
Status: Ongoing FY 81
*Type(s):*Waste Disposal and Contamination; Quality of Water—Ground Water
Location: West-central California

Title: Ground Water in Northern Monterey County, California 1980
Status: Completed FY 80 (except report)
Type: Areal Appraisal—Ground Water; Aquifer Deliniation
Location: West-central California

Title: Hydrodynamics and Mathematical Modeling of Circulation and Transport Phenomena in a Tidal Estuary
Status: Ongoing FY 81
Type(s): Research to develop models of the circulation patterns of water in tidal estuaries and to show the effects of river inflow, winds, tides, and other dynamic forces on these patterns
Location(s): San Francisco Bay, Calif.
Product(s): Conomos, T. J., Nichols, F. H., Cheng, R. T., and Peterson, D. H., 1978, Field and; modeling studies of San Francisco Bay: American Society of Civil Engineers, Proceedings of Coastal Zone 78, p. 1917–1927

Title: Plankton Dynamics in Tidal Estuaries
Status: Ongoing FY 81
Type(s): Research to determine the ecological conditions that control the productivity and distribution of phytoplankton and zooplankton in tidal estuaries and the effect of man – induced conditions on the plankton
Location(s): San Francisco Bay, Calif.
Product(s): Cole, B. E., and Herndon, R. E., 1979, Hydrographic properties and primary productivity of San Francisco Bay waters, March 1976–July 1977: U.S. Geological Survey Open – File Report 79–983, 120 p.

Title: Circulation Patterns and Sediment Transport in San Francisco Bay and Adjacent Ocean
Status: Ongoing FY 81
Type(s): Research to evaluate the tidal and seasonal variations in the water quality in San Francisco Bay and to determine the amount and type of sediments and water that is

being exchanged between San Francisco Bay and the ocean

Location(s): San Francisco Bay, Calif.

Product(s): Conomos, T. J., 1979, San Francisco Bay: The urbanized estuary: Pacific Division, American Association for the Advancement of Science, 494 p.

Title: Geochemistry of Estuarine Waters and Sediments

Status: Ongoing FY 81

Type(s): Research to define the dominant processes that influence water and sediment chemistry in the San Francisco Bay estuarine system and to evaluate the rates of some of these processes. Some of these processes include sedimentation, changes in salinity, phytoplankton productivity, and seasonal distribution of biologically reactive substances

Location(s): San Francisco Bay, Calif.

Product(s): Smith, R. E., Herndon, R. E., and Harmon, D. D., 1979, Physical and chemical properties of San Francisco Bay waters, 1969–1976: U.S. Geological Survey Open – File Report 79–511, 606 p.

HAWAII

Hawaii's CZM program is based on the Hawaii Coastal Zone Management Act of 1977 (Act 188), which establishes basic coastal policies for implementation by State agencies and county governments. Federal approval of the program was received in September 1978.

There are seven categories of CZM objectives and policies relating to recreational resources, historic resources, scenic and open – space resources, coastal ecosystems, economic uses, coastal hazards, and developments. These objectives, in effect, evolved from an earlier statute, the Shoreline Protection Act of 1975, which requires county governments to designate special management areas (SMA's) around the perimeter of each island and to issue SMA permits for developments within these areas. State agencies with land and water uses regulatory authorities are also required to conduct their activities in conformance with the policies of Act 188.

The State's Department of Planning and Economic Development (DPED) is designated as the lead CZM agency. It insures compliance by State agencies and local governments with the CZM program through administrative reviews. DPED is not authorized to issue SMA permits, but it is responsible for review and approval of SMA boundary refinements. It is also the designated agency for determining Federal consistency matters.

CZM BOUNDARY

At the time the Hawaii CZM program received Federal approval, an interim coastal zone was defined, which included the territorial sea and all land areas except those designated as State forest reserves. This was because a 2 – year SMA boundary review and amendment process for the purpose of defining the final inland boundary of the permanent CZM areas was anticipated by June 1979. These provisions, however, were modified in 1979 to recognize the interim coastal zone as Hawaii's coastal management area regardless of the SMA boundaries location.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Geologic Studies

Initial contact: Regional Geologist, USGS, 345 Middlefield Road, Menlo Park, CA 94025—Phone: (415) 323–2214

Title: Properties of Submarine Volcanic Rocks

Status: Ongoing

Type(s): Marine Investigations—Volcanic Processes

Location(s): Hawaii

Investigator(s): J. G. Moore

(NOTE: The USGS also maintains a volcano observatory on the island of Hawaii from which warnings and investigations of volcanic eruptions, tsunami, and other events of coastal concern are issued on a continuing basis for a wide area surrounding the Pacific, including Alaska, Guam, and other U.S. territories. For further information, contact Scientist in Charge, Hawaiian Volcano Observatory, Hawaii National Park, Hawaii 06718—Phone: (808) 967–7328.)

Water Resources Studies

Initial contact: WRD District Chief, USGS, 18 Kalakava Avenue, Honolulu, HI 96815—Phone: (808) 955–0251

Title: Water Resources of Kipahulu District, Haleakala National Park, Maui, Hawaii

Status: Ongoing FY 81

Type(s): Areal Appraisal—Ground Water; Aquifer Delineation

Location(s): Maui Island, Hawaii

Product(s): Saroos, R. L., 1979, Reconnaissance of potential for potable ground – water supply at Kipahulu District, Haleakala National Park, Maui, Hawaii: U.S. Geological Survey Open – File Report 79–749, 9 p.

Title: Hydrology and Sedimentation in Moanalua Valley, Oahu, Hawaii

Status: Completed FY 78 (except report)

Type(s): Environmental Assessment Sedimentation; Streamflow Characteristics

Location(s): Oahu Island, Hawaii

Title: Ground Water in the Kekaha Mana Area, Kauai, Hawaii
Status: Completed FY 79
Type(s): Areal Appraisal—Ground Water; Effects of Development—Ground Water Withdrawals
Location(s): Kauai Island, Hawaii
Product(s): Burt, R. J., 1979, Availability of ground water for irrigation on the Kekaha Mana coastal plain, Island of Kauai, Hawaii: State of Hawaii, Department of Natural Resources Report R53, 50 p.

Title: Hawaii Water Resources Regional Study
Status: Completed FY 77
Type(s): Areal Appraisal—General; Environmental Assessment; Planning and Management
Location(s): Hawaii statewide

Title: Ground – Water Availability in the Waialua Area, Island of Oahu, Hawaii
Status: Completed FY 79
Type(s): Aquifer Delineation; Contamination—Saltwater Intrusion; Areal Appraisal—Ground Water
Location(s): South Coastal Oahu, Hawaii
Product(s): Dale, R. H., 1978, A ground – water inventory of the Waialua basal water body, Island of Oahu, Hawaii: U.S. Geological Survey Open – File Report 78–24, 71 p.

Title: Regional Ground – Water Appraisal, Hawaii Region
Status: Completed FY 78
Type(s): Areal Appraisal—General; Planning and Management
Location(s): Hawaii statewide
Product(s): Takasaki, K. J., 1978, Summary appraisals of the nation's ground – water resources—Hawaii Region: U.S. Geological Survey Professional Paper 813M, 29 p.

Title: Biological and Morphologic Survey of Selected Reaches of the Wailuka River, Island of Hawaii
Status: Completed FY 78 (except report)
Type(s): Environmental Assessment—Biological and Sediment; Streamflow Characteristics; Quality of Water—Surface Water
Location(s): Island of Hawaii

Title: Monitoring of Critical Ground – Water Areas, Hawaii
Status: Ongoing FY 81
Type(s): Effects of Development—Ground – Water Withdrawals; Planning and Management—Protection and Control of Ground Water
Location(s): Oahu, Maui, and Kauai Islands, Hawaii
Product(s): Saroos, R. L., and Ewart, C. J., 1979, Ground – water status report, Pearl Harbor area, Hawaii, 1978: U.S. Geological Survey Water – Resources Investigations 79–1542, 3 sheets.

Title: Water Resources of Southeastern Oahu, Hawaii
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Southeastern Oahu, Hawaii

Title: Water Resources, Kawailoa, Oahu, Hawaii
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Kawailoa, Oahu, Hawaii

Title: Aquifer Identification and Characterization, State of Hawaii
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Waste Disposal and Contamination; Planning and Management
Location(s): Hawaii statewide

OREGON

Oregon's CZM program is a subset of its statewide efforts based on the Oregon Land Use Act of 1973, commonly referred to as ORS 197. The Act created the Land Conservation and Development Commission (LCDC) and its administrative arm, the Department of Land Conservation and Development (DLCD). DLCD developed statewide land use goals and guidelines for implementation through local governments. In December 1976, a special set of goals and guidelines on coastal resources (including estuarine resources, coastal shorelands, beaches and dunes, and ocean resources) was adopted. Subsequently, Federal approval of the State CZM program was received in June 1977.

Cities and counties in the coastal zone are required by ORS 197 to develop and implement a comprehensive land and water uses plan, zoning, and subdivision ordinances in accordance with adopted State coastal resources goals and guidelines. State agencies with planning and regulatory activities affecting coastal resources are also required to conform with such goals and guidelines. The DLCD, as the designated State CZM agency, is responsible for review and coordination of State and local compliance with the requirements of State goals and guidelines. It is also the agency for determining the consistency of Federal activities with the CZM program.

CZM BOUNDARY

Oregon's coastal zone includes its territorial sea and extends from the Pacific shoreline inland to the crest of the coastal mountain range, excluding the Umpqua, Rogue, and Columbia River basins that penetrate the coastal mountains but originate in the Cascades or interior lands.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Western Mapping Center, 345 Middlefield Road, Menlo Park, CA 94025—Phone: (415) 323–8111)
1:250,000
Salem

Geologic Studies

Initial contact: Regional Geologist, USGS, 345 Middlefield Road, Menlo Park, CA 94025—Phone: (415) 323–2214

Title: Geology of Southwestern Oregon Coastal Region
Status: Begun 1973, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Southwestern Oregon, with emphasis on Coos Bay and the Medford area
Investigator(s): M. C. Blake and J. G. Smith

Title: Geologic Framework and Resource Assessment of Oregon – Washington Continental Margin
Status: Begun 1980, as continuation of similar studies begun in 1971
Type(s): Marine Investigation—Resources
Location(s): Coastal region west of the Olympic Peninsula, Wash., and southern Oregon
Investigator(s): P. D. Snavely, Jr.

Title: Onshore – Offshore Geologic Framework of Eel River (Humboldt) Basin
Status: Begun 1981, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Northern California – southern Oregon continental margin
Investigator: S. H. Clarke

Title: Sediment and Resource Potential of Beach Placers
Status: Ended 1978
Type(s): Mineral Resource Investigation
Location(s): Southern Oregon beaches
Investigator(s): H. E. Clifton and R. E. Hunter

Water Resources Studies

Initial contact: WRD District Chief, USGS, P.O. Box 3203, 830 N.E. Holladay Street, Portland, OR 97208—Phone: (503) 234–3361

Title: City of Reedsport Water Supply
Status: Completed FY 80
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation
Location(s): Western Oregon
Product(s): Rinella, J. F., Frank, F. J., and Leonard, A. R., 1980, Evaluation of water resources in the Reedsport area, Oregon: U.S. Geological Survey Open – File Report 80–444, 37 p.

Title: Water Resources of Western Douglas County, Oregon
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation
Location(s): Western Oregon

Title: Hydrology of Estuarine Intertidal Environments
Status: Completed FY 80
Type(s): Regional Estuary Research
Location(s): Northwestern Oregon (Tillamook Embayment), Maryland, and Virginia (Potomac River Estuary)
Product(s): Glenn, J. L., 1978, Sediment sources and Holocene sedimentation history in Tillamook Bay, Oregon: Data and preliminary interpretations: U.S. Geological Survey Open – File Report 78–680, 64 p.

WASHINGTON

The heart of the Washington CZM program is the Shoreline Management Act of 1971 (SMA), which mandates each local government to carry out a "master program" under State guidance for shorelines under its jurisdiction. In July 1976, the State became the first in the Nation to receive Federal approval for its CZM program.

The SMA embodies a basic policy of planning for and fostering all reasonable and appropriate uses. In highly valued or sensitive areas designated as shorelines of statewide significance, the Act gives preference to shoreline uses that

- recognize and protect the statewide interest over local interest;
- preserve the natural character of the shorelines;
- result in long – term over short – term benefit;
- protect the resources and ecology of the shorelines;
- increase public access to publicly owned areas of the shorelines; and
- increase recreational opportunities for the public in the shoreline.

In addition to the SMA, several other State laws are incorporated by reference into the State CZM network. Planning and regulatory activities stemming from these network programs, such as those of the Energy Facility Site Evaluation Council, are administered separately by several State agencies and are not statutorily related to the shoreline management efforts.

Local master programs are reviewed and approved by the State through its Department of Ecology. Approved local programs are adopted as State regulations. The shoreline permit system is overseen by a six – member Shorelines Hearings Board, a State administrative appellate body created by the SMA.

In support of local shoreline planning and regulatory efforts, the Department of Ecology has developed a coastal zone atlas series for coastal counties. Information contained in each atlas in-

cludes areas of slope stability, habitats, basic geology, littorial drift, coastal flooding, and ground-water and aggregate resources.

CZM BOUNDARY

The management program established in the Shoreline Management Act applies to all "shorelines of the State," including both "shorelines" and "shorelines of statewide significance." The Act applies to all marine water areas of the State, to streams with a mean annual flow of 20 ft^3/s or more, and to lakes larger than 20 acres. It also applies to adjacent land areas extending landward 200 ft from the ordinary high-water mark and to all marshes, bogs, swamps, floodways, river deltas, and floodplains associated with water bodies subject to the Act.

It should be noted that the SMA is a statewide statute and its applicability is not limited to the coastal zone. Thus, in terms of boundaries for the CZM program, the State has defined a two-tier system. The first tier consists generally of all of the State's shorelines and their associated wetlands, including, at a minimum, all upland area 200 ft landward from the ordinary high-water mark. The second tier is composed of the non-SMA area within the 15 coastal counties which front on saltwater. While local shoreline regulatory requirements apply principally within the first tier, management authority is extended to the second tier through the State's air and water quality authorities, the State Environmental Policy Act, and other authorities.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Western Mapping Center, 345 Middlefield Road, Menlo Park, CA 94025—Phone: (415) 323–8111)

1:24,000
- Anacortes South
- Crescent Harbor
- Deception Pass
- Dungeness
- Lopes Pass
- Oak Harbor
- Richardson
- Sequim
- Smith Island

Geologic Studies

Initial contact: Regional Geologist, USGS, 345 Middlefield Road, Menlo Park, CA 94025—Phone: (415) 323–2214

Title: Geological Framework and Resource Assessment of Oregon-Washington Continental Margin
Status: Begun 1980, as continuation of similar studies begun in 1971
Type(s): Marine Investigation—Resources
Location(s): Coastal region west of the Olympic Peninsula, Wash., and southern Oregon
Investigator(s): P. D. Snavely, Jr.

Title: Land-Sea Geologic Maps
Status: Begun 1974, as sequel to earlier projects, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Coastal areas of Olympic Peninsula and central Oregon
Investigator(s): P. D. Snavely, Jr.
Product(s): Snavely, P. D., Jr., Wagner, H. C., and Lander, D. L., 1980, Geologic cross section of the coastal Oregon continental margin: Geological Society of America Map Chart Series No. MC–281, 8 p. section, colored geologic map, scale 1:250,000.
Snavely, P. D., Jr., and Wagner, H. C., 1981, Geologic cross section across the Continental Margin off Cape Flattery, Wash., and Vancouver Island, B.C.: U.S. Geological Survey Open-File Report 81–0978, 6 p., 2 oversize sheets.

Title: Estuarine Deposits of Willapa Bay
Status: Begun 1973, recessed 1980
Type(s): Special Purpose Mineral Resource Investigation
Location(s): Willapa Bay
Investigator(s): H. E. Clifton
Product(s): Hill, G. W., 1981, Facies characteristics and patterns in mid-estuary intertidal flat deposits, Willapa Bay, Wash.: U.S. Geological Survey Open-File Report 81–0162, 160 p.

Water Resources Studies

Initial contact: WRD District Chief, USGS, 12201 Pacific Avenue, Room 600, Tacoma, WA 98402—Phone: (206) 593–6510

Title: The Influence of Industrial and Municipal Wastes on Estuarine and Offshore Waters
Status: Completed FY 77
Type(s): Waste Disposal and Contamination—Effects of Waste on the Quality of Water in Estuaries; Effects of Development—Dredging; Streamflow Modeling; Quality of Water-Modeling
Location(s): Seattle, Wash.

Title: The Influence of Stream Hydraulics on Anadromous Fish Migration and Propagation
Status: Completed FY 77
Type(s): Streamflow Characteristics; Environmental Assessment—Salmon Spawning areas

Location(s): Washington statewide
Product(s): Swift, C. H., III, 1977, Preferred stream discharges for salmon spawning and rearing in Washington: U.S. Geological Survey Open-File Report 77-422, 50 p.

Title: Water Resources of the Chehalis Indian Reservation
Status: Completed FY 77
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Southwestern Washington
Product(s): Pearson, H. E., and Higgins, G. T., 1977, Water resources of the Chehalis Indian Reservation, Wash.: U.S. Geological Survey Open-File Report, 60 p.

Title: Ground-Water Resources of the North Beach Peninsula, Pacific County, Wash.
Status: Completed FY 77
Type(s): Areal Appraisal—Ground Water; Effects of Development—Ground Water Withdrawals
Location(s): Southwestern Washington
Product(s): Tracy, J. V., 1977, Ground-water resources of the North Beach Peninsula, Pacific County, Wash.: U.S. Geological Survey Open-File Report 76-647, 42 p.

Title: Water Resources of the Tulalip Indian Reservation
Status: Completed FY 79
Type(s): Areal Appraisal—Ground and Surface Water; Planning and Management—Protection of Water Resources
Product(s): Drost, B. W., 1978, Progress report on water resources of the Tulalip Indian Reservation, Wash.: U.S. Geological Survey Water-Resources Investigations 78-31, 125 p.

Title: Water Resources of the Swinomish Indian Reservation
Status: Completed FY 79
Type(s): Areal Appraisal—Ground and Surface Water; Planning and Management—Develop Water Resources, Fish Rearing Potential
Location(s): Northwestern Washington
Product(s): Drost, B. W., 1979, Water resources of the Swinomish Indian Reservation, Wash.: U.S. Geological Survey Water-Resources Investigations 79-12, 100 p.

Title: Water Resources of the Kitsap Peninsula and Adjacent Islands
Status: Completed FY 80
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation
Location(s): West-central Washington
Product(s): Hansen, A. J., and Balke, E. L., 1980, Ground-water availability on the Kitsap Peninsula, Wash.: U.S. Geological Survey Open-File Report 80-1186, 60 p.

Title: Water Resources of Areas Contiguous to the Nisqually Indian Reservation
Status: Completed FY 78
Type(s): Areal Appraisal—Ground and Surface Water; Planning and Management—Low Flow Augmentation by Ground-Water Pumpage
Location(s): Western Washington

Title: Water Resources of the Quileute Indian Reservation and the Quillayute River Basin
Status: Completed FY 79 (except report)
Type(s): Streamflow Characteristics; Quality of Water-Surface Water; Effects of Development
Location(s): Western Washington

Title: Water Resources of the Port Madison Indian Reservation, Washington
Status: Completed FY 78 (except report)
Type(s): Areal Appraisal; Planning and Management—Develop and Manage Water Resources
Location(s): Northwestern Washington

Title: Water Resources of the Port Gamble Indian Reservation, Washington
Status: Completed FY 79
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Northwestern Washington
Product(s): Lum, W. E., II, 1979, Water resources of the Port Gamble Indian Reservation, Wash.: U.S. Geological Survey Water-Resources Investigations 79-66, 40 p.

Title: Water Resources of the Makah Indian Reservation, Wash.
Status: Completed FY 80
Type(s): Areal Appraisal—Ground and Surface Water; Waste Disposal and Contamination—Sewer Lagoon Seepage
Location(s): Northwestern Washington
Product(s): Dion, N. P., Walters, K. L., and Nelson, L. M., 1980, Water resources of the Makah Indian Reservation, Wash.: U.S. Geological Survey Water-Resources Investigations 80-15, 60 p.

Title: Water Resources of the Lower Elwha Indian Reservation, Wash.
Status: Completed FY 79
Type(s): Areal Appraisal—Ground and Surface Water; Contamination—Saltwater Intrusion; Effects of Development—Stream Impoundments and Diversions
Location(s): Northwestern Washington
Product(s): Walters, K. L., Haushild, W. L., and Nelson, L. M., 1979, Water resources of the Lower Elwha Indian Reservation, Wash.: U.S. Geological Survey Water-Resources Investigations 79-82, 40 p.

Title: Water Resources of the Gig Harbor Peninsula, Pierce County, Wash.
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Contamination—Saltwater Intrusion; Quality of Water-Surface Water
Location(s): Western Washington

Title: Water Resources of the Hoh Indian Reservation, Wash.
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground and Surface Water; Quality of Water-Surface Water; Waste Disposal and Contamination—Septic Tanks
Location(s): Western Washington

Title: Water Resources of the Shoalwater Indian Reservation, Wash.
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground and Surface Water; Effects

of Development—Ground – Water Withdrawals; Contamination—Non – Point Pollutants in Streams
Location(s): Western Washington

Title: Water Resources of Developed Areas in Clallam County, Wash.
Status: Ongoing FY 81
Type(s): Effects of Development—Effect of Ground – Water Withdrawals on Streamflow; Contamination—Identify Potential Sources
Location(s): Northwestern Washington

Title: Status of Saltwater Intrusion of Coastal Areas in Washington
Status: Ongoing FY 81
Type(s): Contamination—Saltwater Intrusion
Location(s): Coastal Washington and Puget Sound

Title: Investigation of the Availability of Ground Water in the Vicinity of the Nisqually Tribal Fish Hatchery
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water
Location(s): Western Washington

Title: Investigation of the Availability of an Improved Source of Ground – Water Supply for Taholah, Quinault Indian Reservation, Wash.
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion; Effects of Development—Ground – Water Withdrawals
Location(s): Western Washington

Title: Investigation of the Availability of Ground Water in the Vicinity of the Muckleshoot Tribal Fish Hatchery, Wash.
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Planning and Management—Developing Water Supplies for Fish Hatchery
Location(s): Western Washington

Title: Quantitative Evaluation of Ground – Water Supplies of Island County, Wash.
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion; Effects of Development—Ground – Water Withdrawals
Location(s): Western Washington

Title: Quantitative Evaluation of the Water Resources of the Tulalip Indian Reservation and Surrounding Area, Snohomish County, Wash.
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Northwestern Washington

Title: Preliminary Evaluation of the Water Resources of San Juan County, Wash.
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion; Effects of Development—Ground – Water Withdrawals
Location(s): Northwestern Washington

AMERICAN SAMOA

American Samoa, the only U.S. Territory south of the Equator, consists of seven islands and about 32,000 people. The territorial government is identical to that of a State, with a three – branch system. Local governmental units include 51 villages, 14 counties, and 3 districts, though they do not have the range of powers of their counterparts in the States.

In May 1980, the Governor submitted for Federal approval a CZM program based on existing Territorial authorities and a new Executive Order (No.3–1980). Federal approval of the program was subsequently received in September 1980.

The CZM program puts into effect 16 coastal policies dealing with governmental processes, resources development, and protection. These policies are implemented through building zoning and air and water discharge permits administered by various Territorial government agencies. The Governor's Development Planning Office (DPO) is designated as the CZM agency with responsibilities that include Federal consistency determinations.

The 51 villages in American Samoa are given important roles for CZM program implementation. They are in the process of developing village coastal management plans, which incorporate the 16 territorial CZM policies. These plans will be adopted by the village zoning board to serve as the basis for zoning decisions.

CZM BOUNDARY

The CZM program is applicable to all of the land mass (except excluded Federal lands), the territorial waters, and submerged lands within the 3 – mi limit.

USGS ACTIVITIES AND INFORMATION PRODUCTS

At present, there are no ongoing USGS activities applicable to American Samoa.

GUAM

The basis of the Guam CZM program is P. L. 12–200 enacted by the Guam Legislature in January 1975. The Act required the development of a Comprehensive Development Plan and created a Central Planning Council (CPC) and its staff arm, the Bureau of Planning, to carry out the task. In early 1979, the CPC adopted several new coastal policies and rules developed through Executive

Orders of the Governor. A CZM program was then submitted by the territory for Federal approval, which was subsequently received in September 1979.

Since there is no local government in the territory, Guam's CZM program is administered directly by the territorial government. Mechanisms developed by the Bureau of Planning for CZM program implementation include a land use districting system that guides development and zoning through the designation of urban, rural, agriculture, and conservation districts by the Territorial Planning Commission.

CZM BOUNDARY

The CZM program is applicable to the entire island of Guam and its territorial waters, excluding Federal lands.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Geologic Studies

At present, there are no ongoing geologic studies in Guam. During 1948–1957, however, the USGS in cooperation with the U.S. Army Corps of Engineers conducted detailed geologic studies of Guam, the Northern Mariana Islands, and several other islands in the region. Information resulting from these studies may be obtained by contacting Chief, Office of Marine Geology, U.S. Geological Survey, 930 National Center, Reston, VA 22092—Phone: (703) 860–7241.

Water Resources Studies

Initial contact: WRD District Chief, USGS, 1833 Kalakava Avenue, 5th floor, Honolulu, HI 96815—Phone: (808) 955–0251

Title: Northern Guam Aquifer Study
Status: Ongoing FY 1981
Type(s): Aquifer Delineation
Location(s): Northern Guam

NORTHERN MARIANA ISLANDS

In January 1978, a new constitutional government was elected by the people of Northern Mariana Islands. In the same month, the Governor by Executive Order established the Office of Planning and Budget Affairs (PBAO) and instructed it to develop a CZM program for Federal approval. Subsequently, Federal approval of the program was received in September 1980.

There are no local governments in Northern Mariana Islands and, therefore, land and water uses are subject to the direct control of the Commonwealth. Through the CZM program, the Commonwealth establishes shoreline, wetland, lagoon and reef, and port/industrial areas as areas of particular concerns (APC's) in which any project not otherwise excluded is subject to control under a coastal permit process. Projects outside of APC's having effects on coastal waters are also subject to the permit process.

CZM BOUNDARY

The coastal zone is defined to include islands of Saipan, Tinian, Rota, and all the remaining land and water areas of the Commonwealth.

USGS ACTIVITIES AND INFORMATION PRODUCTS

At present, there are no ongoing USGS activities applicable to the Northern Mariana Islands. Certain geologic information, however, is available. During 1948–1957, the USGS in cooperation with the U.S. Army Corps of Engineers conducted detailed geologic studies of Guam, the Northern Mariana Islands, and several other islands in the region. Information resulting from these studies may be obtained by contacting Chief, Office of Marine Geology, U.S. Geological Survey, 930 National Center, Reston, VA 22092—Phone: (703) 860–7241.

ATLANTIC AND GULF STATES

Atlantic States in general have long established a tradition of local home rule, and their CZM decisionmaking processes usually reflect a delicate balance between State and local interests. At the State level, for example, concerns for protecting important fishery habitats are commonly embodied in laws and programs designed to control wetlands. These measures, however, are frequently not strictly enforced in deference to varied local concerns for economic development. As a rule, State CZM decisionmaking is restricted to controlling sizable or special developments involving such resource areas as wetlands. Local governments usually have wide-ranging authorities to control land and water uses within their own jurisdictions, with the State government exercising little if any overview authority over local practices.

Gulf States are, in essence, similar to the Atlantic States. They are, however, particularly concerned with statewide economic development and protection against hazards stemming from coastal storms. Their CZM decisionmaking processes,

therefore, tend to place high priority on the facilitation of environmentally tolerable economic developmental activities.

Territories in this region are economically dependent on tourism-related activities. Their CZM decisionmaking processes are operated centrally by the territorial governments with little involvement by local political subdivisions.

ALABAMA

The statutory basis for the Alabama CZM program is the Alabama Coastal Area Act of 1976, which established an autonomous Coastal Area Board (CAB) to monitor existing State regulatory programs such as wetlands control in the coastal zone. Federal approval of the program was received in September 1979.

The CAB is authorized to develop and promulgate coastal policies and to review State permits on regulated land and water uses to ensure their compliance with declared coastal policies. It is also authorized to issue permits on unregulated land and water uses. In essence, the State's primary concern in the coastal zone is to ensure that needed coastal developments will not degrade such resources as wetlands, submerged grassbeds, beaches, dunes, oyster reefs, and wildlife. In the initial 3–5 years, the CZM program places highest priority on the acquisition of additional baseline data and techniques to address developmental issues involving these resources.

The CAB maintains its own staff and office in Daphne, Ala. As lead agency for the federally approved CZM program, the CAB is solely responsible for all activities relating to the determination of Federal consistency.

CZM Boundary

The Alabama CZM program is applicable to all coastal waters and adjacent shorelands within the 10-ft contour, including transitional and intertidal areas, salt marshes, and wetlands, as well as coastal island beaches located within the limit of the United States territorial sea.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860–6336

1:250,000

Mobile

Water Resources Studies

Initial contact: WRD District Chief, USGS, P.O. Box V, University, AL 35486—Phone: (205) 752–8104.

Title: Discharge and Quality of the Mobile River Distributaries
Status: Ongoing FY 1981
Type(s): Streamflow Characteristics; Quality of Water Investigation
Location(s): Southwestern Alabama

Title: Southeastern Coastal Plain Regional Aquifer System
Status: Ongoing FY 1981
Type(s): Regional Aquifer Systems Analysis—RASA
Location(s): Alabama statewide

CONNECTICUT

The State's CZM program is based on the Connecticut Coastal Management Act of 1978 (CCMA), which establishes specific coastal policies, standards, and procedures for implementation through State and local agencies. Federal approval of the program was received in September 1980.

The State's Department of Environmental Protection (DEP) is designated by the CCMA as the lead agency for implementing the CZM program, including certification for consistency of all State, local, and Federal actions subject to the management program.

The CCMA does not substantially alter the existing governmental regulatory jurisdictions already exercised by State or local agencies. Rather, it seeks to improve the existing management framework by providing specific review standards and policies to be used by State and local regulatory programs and by requiring the DEP to oversee a coastal site plan review process covering certain activities subject to local zoning. In addition, special planning procedures will be implemented to address problems relating to shoreline erosion, shorefront access and protection, energy facilities, dredging, and the disposal of dredged materials.

CZM BOUNDARY

Connecticut has established a two-tiered management boundary. The primary nearshore tier is bounded on the seaward side by the limit of the State's jurisdiction in Long Island Sound. On the landward side, this tier is bounded by a continuous line delineated by a 1,000-foot linear setback measured from the inland boundary of State regulated tidal wetlands, or the continuous interior

contour elevation of the 100-year frequency coastal flood zone, whichever is farthest inland.

The secondary inland tier includes all areas, except those in the primary tiers, within the inland boundary of the 36 coastal municipalities.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Bedrock and Surficial Geology of Connecticut
Status: Ongoing, scheduled for completion in 1981
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Statewide
Investigator(s): J. P. Schafer

Title: Cooperative Geologic Studies of Long Island Sound
Status: Begun 1980, continuing
Type(s): Regional Geologic and Mineral Resource Investigations
Location(s): Long Island Sound
Investigator(s): R. N. Oldale

Water Resources Studies

Initial contact: WRD District Chief, USGS, 135 High Street, Room 235, Hartford, CT 06103—Phone: (203) 244–2528

Title: Significant Changes in Ground-Water Quality in Connecticut as a Result of Human Activities
Status: Completed FY 80
Type(s): Waste Disposal and Contamination; Quality of Water—Ground Water; Effects of Development; Planning and Management
Location(s): Connecticut statewide
Product(s): Handman, E. H., Grossman, I. G., Bingham, J. W., and Rolston, J. L., 1979, Major sources of ground-water contamination in Connecticut: U.S. Geological Survey Water-Resources Investigations Open-File Report 79–1069, 50 p.

Title: Water Resources of Connecticut, Part 8: Quinnipiac River Basin
Status: Completed FY 77
Type(s): Areal Appraisal—River Basin, Ground and Surface Water
Location(s): Quinnipiac River Basin, Connecticut
Product(s): Mazzaferro, D. L., Handman, E. H., and Thomas, M. P., 1979, Water resources inventory of Connecticut, part 8, Quinnipiac River Basin: Connecticut Water Resources Bulletin, no. 27, 88 p., 5 pl.

Title: Environmental and Resource Demonstration Study of the Connecticut Valley Urban Area
Status: Ongoing FY 81
Type(s): Planning and Management; Areal Appraisal; Aquifer Delineation; Effects of Development—Urbanization
Location(s): Connecticut statewide
Product(s): Frimpton, M. P., 1980, Map showing ground-water availability in the northern part of the Connecticut Valley urban area, central New England: U.S. Geological Survey Miscellaneous Investigations Map I–1074, 1 p.

Title: Hydrogeology and Sustained Yields of Stratified Drift Aquifers in South-Central Connecticut
Status: Completed FY 80
Type(s): Aquifer Delineation
Location(s): South-central Connecticut
Product(s): Haeni, F. P., 1980, Hydrogeologic data for south-central Connecticut: Connecticut Water Resources Bulletin 32, 46 p., 1 pl.

Title: Ground-Water Availability and Water Quality in Southwestern Connecticut, Fairfield County
Status: Ongoing FY 81
Type(s): Areal Appraisal; Effects of Development—Ground-Water Withdrawals
Location(s): Southwestern Connecticut

DELAWARE

The Delaware CZM program is based on four existing State coastal laws: (a) the Underwater Lands Act, which regulates uses in State bottom from mean high tide to the limits of State jurisdiction; (b) the Beach Preservation Act, which controls uses on beaches and dunes: (c) the Wetlands Act, which controls activities in tidal wetlands both saline and fresh; and (d) the Coastal Zone Act, which prohibits heavy industry and bulk product transfer facilities from locating in a land water coastal strip along the State's shorelines bordering the Delaware River, Delaware Bay, and the Atlantic Ocean. Federal approval of the program was received in September 1979.

In addition to the four basic coastal laws, several other statewide statutes such as the Erosion and Sediment Control Act were also incorporated into the CZM program. The State's Office of Management, Budget, and Planning is the lead agency for the program, though implementation responsibilities are shared by several other State agencies.

CZM BOUNDARY

Delaware has included the entire State within its coastal management program boundary, basing this decision on the proximity of nearly all lands in the State to coastal waters.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536

National Center, Reston, VA 22092—Phone: (703) 860–6336

1:250,000
Wilmington

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631.

Title: Sediments and Surficial Geology of Delmarva Peninsula
Status: Completed 1979
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Delmarva Peninsula of Delaware and Maryland
Investigator(s): J. P. Owens
Product(s): Denny, C. S., and Owens, J. P., 1979, Sand Dunes on the Delmarva Peninsula, Delaware and Maryland; U.S. Geological Survey Professional Paper 1067–C, 15 p.

Water Resources Studies

Initial contact: WRD Hydrologist – in – Charge, USGS, Federal Building, Room 1201, 300 S. New Street, Dover, DE 19901—Phone: (302) 734–2506

Title: Delaware Coastal Aquifers Study
Status: Completed FY 1980 (except report)
Type(s): Areal Appraisal; Aquifer Modeling
Location(s): Central and southern Delaware
Product(s): Hodges, A. L., Jr., 1977, Availability of ground water on the Delmarva Peninsula: U.S. Geological Survey Open – File Report 77–759, 6 p.

Title: Digital Model of the Unconfined Aquifer in West – Central and Southern Delaware
Status: Ongoing FY 1981
Type(s): Aquifer Modeling; Effects of Development—Ground Water Withdrawals
Location(s): Southwestern Delaware

FLORIDA

The State's program is based on the Florida Coastal Management Act of 1978, which directs that a CZM program be developed with the State's existing authorities codified under the Florida Statutes. Federal approval was received in September 1981.

The statutes that constitute the Florida CZM program are of three general types. Most establish State policy on substantive matters such as fisheries, water resources, and State lands. Other statutes combine substantive policy and procedural matters. An example of this kind of statute is the Industrial Siting Act. Finally, some statutes are primarily procedural, and establish processes for developing or implementing State policy. Three statutes which fall into this category include the Administrative Procedures Act, the Public Records Act, and the Regional Planning Council Act.

The State's Department of Environmental Regulation is the lead agency for the CZM program. The Department already administers many of the key State statutes incorporated into the draft CZM program.

CZM BOUNDARY

The entire State is included in the CZM boundary, with the exception that Federal consistency will only be applicable in coastal counties.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860–6336

1:250,000
Gainesville
Tarpon Springs

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Coral Reef Studies
Status: Begun 1980, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Offshore areas near Key Largo
Investigator(s): E. A. Shinn

Title: Petroleum Potentials of Subsurface Carbonate Rocks
Status: Begun 1980, continuing
Type(s): Special Mineral Resources Investigation
Location(s): South Florida Basin
Investigator(s): J. G. Palacas

Title: Mineral Resources Evaluations in Florida Wilderness and Roadless Areas
Status: Begun 1979, continuing
Type(s): Special Mineral Resources Investigation
Location(s): Liberty, Baker, Leon, and Marion Counties, with focus on Appalachicola, Ocala, and Osceola National Forests
Investigator(s): J. B. Cathcart, and C. C. Cameron
Product(s): Cameron, C. C., and Mory, P. C., 1977, Mineral resources of the Bradwell Bay Wilderness and the Soychoppy River study area, Wakulla County, with sections on phosphate by J. B. Cathcart, and sand by P. J. Geracci: U.S. Geological Survey Bulletin 1431, 37 p.

Title: Everglades Peat Deposition
Status: Continuing
Type(s): Special Mineral Resources Investigation; Environ-

mental Conditions and Geologic Hazards Investigations
Location(s): Everglades and coastal swamps (wetlands) of Florida
Investigator(s): Z. S. Altschuler

Title: Environmental Studies of the West Florida Continental Shelf
Status: Begun 1980, continuing
Type(s): Mineral Resource, Environmental Conditions and Geologic Hazards Conditions
Location(s): West Florida continental shelf
Investigator(s): C. W. Holmes

Water Resources Studies

Initial contact: WRD District Chief, USGS, 325 Knox Road, Suite F–240, Tallahassee, FL 32303—Phone: (904) 368–1118

Title: Hydrology of Proposed Mining Areas in Hardee, Southwestern Polk, Southeast Hillsborough, Eastern Manatee, and Northwestern Desoto Counties, Southwestern Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Southwestern Florida

Title: Evaluation of Urban Runoff Pollution Control Measures in Pinellas County, Florida
Status: Ongoing FY 81
Type(s): Waste Disposal and Contamination—Detention Ponds; Quality of Water – Surface Water
Location(s): West – central Florida

Title: Southeast Limestone Aquifer Systems Analysis—West – Central Florida Subarea
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): West – central Florida

Title: Southeast Limestone Aquifer Systems Analysis—East – Central Florida Subarea
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): East – central Florida

Title: Southeast Limestone Regional Aquifer Systems Analysis—South Florida Subarea
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Southern Florida

Title: Southeast Limestone Regional Aquifer Systems Analysis—Northwest Florida and Southeast Alabama subarea
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Northwestern Florida and southeastern Alabama

Title: Hydrogeology of Northern Collier County, Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water
Location(s): Southwestern Florida

Title: Investigations of Deeper Zones in the Floridan Aquifer in Jacksonville, Duval County, Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Contamination—Saltwater Intrusion
Location(s): Northeastern Florida

Title: Hydrology of the Sulfur Springs Quadrangle, Hillsborough County, Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water
Location(s): West – central Florida

Title: Long – Term Subsurface Wastewater Injection Tests, St. Petersburg, Florida
Status: Ongoing FY 81
Type(s): Waste Disposal and Contamination—Waste Injection into Aquifers; Quality of Water—Ground Water
Location(s): West – central Florida

Title: Delineation of Ground – Water Sources for Drinking Water, Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal—Statewide Freshwater Supplies, Ground and Surface Water; Planning and Management
Location(s): Florida statewide

Title: Interrelation Between the Floridan Aquifer and Selected Streams Using Seismic Surveys, West – Central Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation—Interconnection to Rivers, Streams, and Estuaries; Environmental Assessment
Location(s): Southwestern Florida

Title: Appraisal of the Shallow Aquifer of the Lower East Coast of Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Contamination—Saltwater Intrusion
Location(s): Southeastern Florida

Title: Water Resources Investigation of Flagler County, Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Effects of Development—Urbanization; Aquifer Delineation
Location(s): Eastern Florida

Title: Ground – Water Resources of Coastal Citrus, Hernando, and Levy Counties, Southwest Florida Waste Management District
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water
Location(s): Southwestern Florida

Title: Occurrence and Origins of Mineralized Ground Waters in Coastal Manasota and Piece Basins, Florida
Status: Ongoing FY 81
Type(s): Contamination—Saltwater Intrusion; Quality of Water—Ground Water
Location(s): Southwestern Florida

Title: Hydrogeology of Well Field Areas Near Tampa, Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation—Hydrologic Properties; Aquifer Modeling

Location(s): West – central Florida

Title: Hydrogeology of Shallow Aquifers, Sarasota – Port Charlotte Area, Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal; Aquifer Delineation
Location(s): Southwestern Florida

Title: Areal Appraisal of Biscayne Aquifer Water Quality, Dade County, Florida
Status: Completed FY 80 (except report)
Type(s): Quality of Water—Ground Water
Location(s): Southern Florida

Title: Loxahatchee River Estuary Environmental Assessment
Status: Ongoing FY 71
Type(s): Environmental Assessment; Quality of Water—Surface Water; Contamination—Sewage Inflow
Location(s): Southeastern Florida
Product(s): McPherson, B. F., and Saganskas, Maryann, 1980, Hydrologic and land – cover features of the Loxahatchee River Basin, Florida: U.S. Geological Survey Open – File Report 80–1109, 1 p.

Title: Landfill Leachate and Sanitary Waste Effluent Spray Study
Status: Ongoing FY 81
Type(s): Waste Disposal and Contamination—Effect of Solid and Liquid Waste on Ground Water
Location(s): West – central Florida

Title: Investigation of the Shallow Aquifer at the U.S. Naval Station, Mayport, Florida
Status: Completed FY 80
Type(s): Aquifer Delineation
Location(s): Northeastern Florida
Product(s): Franks, B. J., 1980, The surficial aquifer at the U.S. Naval Station near Mayport, Florida: U.S. Geological Survey Open – File Report 80–765, 13 p.

Title: Assessment of the Interconnection Between Tampa Bay and the Floridan Aquifer, Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Effects of Development—Dredging
Location(s): West – central Florida

Title: Assessment of the Interconnection Between the St. Johns River and the Shallow Aquifer in East Duval County, Florida
Status: Completed FY 80 (except report)
Type(s): Aquifer Delineation; Effects of Development—Dredging
Location(s): Northeastern Florida

Title: Prospectus for Storage and Recovery of Freshwater in Saline Aquifers, South Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation—Saline Water Aquifers
Location(s): Southeastern Florida

Title: Ground – Water Resources Investigations of Eastern Nassau County, Florida and Southeastern Camden County, Georgia
Status: Completed FY 80 (except report)
Type(s): Effects of Development—Industrial Ground – Water Withdrawals; Contamination—Saltwater Intrusion
Location(s): Northeast Florida – southeast Georgia

Title: Water Resources Assessment of the Manasota Basin in Southwest Florida
Status: Completed FY 78 (except report)
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Southwest Florida

Title: Hydrology of the Floridan Aquifer in the Withlacoochee River Basin, Florida
Status: Completed FY 79 (except report)
Type(s): Areal Appraisal—Ground Water
Location(s): West – central Florida

Title: Radionuclides in Ground Water in Sarasota County, Florida
Status: Ongoing FY 81
Type(s): Quality of Water—Ground Water; Contamination—Radionuclides
Location(s): Southwestern Florida

Title: Saltwater Intrusion in Cape Coral, Florida
Status: Ongoing FY 81
Type(s): Contamination—Saltwater Intrusion in Ground Water
Location(s): Southern Florida

Title: Apalachicola River Quality Assessment
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water, Streamflow Characteristics
Location(s): Northwestern Florida
Product(s): Mattraw, H. C., Jr., and Elder, J. F., 1980, Nutrient yield of the Apalachicola River flood plain, Florida: U.S. Geological Survey Water – Resources Investigations 80–51, 26 p.

Title: Geohydrology of Sinkholes, West – Central Florida
Status: Ongoing FY 81
Type(s): Effects of Development—Ground – Water Withdrawals; Environmental Assessment
Location(s): West – central Florida

Title: Biscayne Aquifer—A Sole – Source Evaluation
Status: Completed FY 78
Type(s): Aquifer Delineation; Areal Appraisal—Regional Ground Water
Location(s): Southern Florida
Product(s): Klein, H., and Hull, J. E., 1978, Biscayne Aquifer, southeast Florida: U.S. Geological Survey Water – Resources Investigations 78–107, 52 p.

Title: Assessment of the Hydrologic and Physical Characteristics of the Everglades National Park East Boundary Area, Dade County, Florida
Status: Completed FY 80 (except report)
Type(s): Effects of Development—Change in water levels and water quality on ecology; Environmental assessment
Location(s): Southern Florida

Title: Feasibility of Storing Surplus Freshwater in Saline Aquifers, Lee County, Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation—Saline Water Aquifers
Location(s): Southwestern Florida

Title: Impact of Altered Freshwater Inflow on the Tidal and Salinity Characteristics of the Alafia River and Bullfrog Creek Estuaries, Florida
Status: Completed FY 81
Type(s): Quality of Water—Estuaries
Location(s): West – central Florida
Product(s): Giovannelli, R. F., 1980, Relation between freshwater flow and salinity distributions in the Alafia River, Bullfrog Creek, and Hillsborough Bay, Florida: U.S. Geological Survey Water – Resources Investigations 80–102, 100 p.

Title: Investigation of the Hydrology of St. Johns County, Florida
Status: Completed FY 78 (except report)
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion; Aquifer Delineation
Location(s): Eastern Florida

Title: Shallow Aquifer Investigation in Jacksonville, Florida
Status: Completed FY 78
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Northeast Florida
Product(s): Causey, L. V., and Phelps, G. G., 1978, Availability of Water from the shallow aquifer in Duval County, Florida: U.S. Geological Survey Water – Resources Investigations 78–92, 36 p.

Title: Floridan Aquifer as a Source of Water for Desalting in the Florida Keys
Status: Completed FY 79
Type(s): Areal Appraisal—Saline Ground Water
Location(s): Southern Florida
Product(s): Beaven, T. R., and Meyer, F. W., 1978, Record of wells in the Floridan aquifer in Dade and Monroe Counties, Florida: U.S. Geological Survey Open – File Report 78–881, 30 p.

Title: Evaluation of Available Freshwater Resources of Big Pine Key, Florida
Status: Completed FY 80
Type(s): Areal Appraisal—Ground Water
Location(s): Southern Florida
Product(s): Hanson, C. E., 1980, Freshwater resources of Big Pine Key, Florida: U.S. Geological Survey Open – File Report 80–447, 1 p.

Title: Water Resources of the Fort Walton Beach Area, Florida
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground and Surface Water; Effects of Development—Ground – Water Withdrawals
Location(s): Northwest Florida

Title: An Evaluation of the High Permeability Zone of the Shallow Aquifer, Palm Beach County, Florida
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Waste Disposal and Contamination—Landfills; Effects of Development—Ground – Water Withdrawals
Location(s): Southeast Florida

Title: Hydrologic Effects of Proposed Ground – Water Development, West – Central Florida
Status: Completed FY 81
Type(s): Effects of Development—Effects of Phosphate Mining (Pumpage) on Ground – Water Levels and Quality of Water
Location(s): West – central Florida
Product(s): Wilson, W. E., and Gerhart, J. M., 1981, Simulated effects of ground – water development on the potentiometric surface of the Floridan aquifer, west – central Florida: U.S. Geological Survey Professional Paper (in press).
Wilson, W. E., 1981, Estimated effects of projected ground – water withdrawals on movement of the saltwater front in the Floridan aquifer, 1976–2000, west – central Florida: U.S. Geological Survey Water Supply Paper (in press).

Title: Water Supply Assessment and Evaluation of the Hillsborough River Basin, Florida
Status: Completed FY 80
Type(s): Areal Appraisal—Surface Water; Contamination—Non – Point – Source Pollution
Location(s): West – central Florida
Product(s): Goetz, C. C., Reichenbaugh, R. C., and Ogle, J. K., 1978, Water – supply potential of the lower Hillsborough River, 1976: U.S. Geological Survey Water – Resources Investigations 78–29, 40 p.

Title: Aquifer Mapping, Southwest Florida Water Management District
Status: Completed FY 78
Type(s): Aquifer Delineation
Location(s): West – central Florida
Product(s): Buono, A., and Rutledge, A. T., 1978, Configuration of the top of the Floridan aquifer, Southwest Florida Water Management District and adjacent areas: U.S. Geological Survey Water – Resources Investigations 78–34, 1 p.

Title: Water Resources of the Upper East Coast, Florida
Status: Completed FY 80
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation; Planning and Management
Location(s): Southeastern Florida
Product(s): Miller, W. L., 1979, Hydrologic and geologic data from the upper East Coast Planning area, southeast Florida: U.S. Geological Survey Open – File Report 79–1543, 99 p.

Title: Investigation of Saltwater Contamination of the Floridan Aquifer at Fernandina Beach, Florida
Status: Completed FY 77
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion; Effects of Development—Industrial Ground – Water Withdrawals
Location(s): Northeastern Florida
Product(s): Fairchild, R. W., and Bentley, C. B., 1977,

Saline – water intrusion in the Floridan aquifer in the Fernandina Beach area, Nassau County, Florida: U.S. Geological Survey Water – Resources Investigations 77–32, 27 p.

Title: Hydrologic Study of the Fakahatchee Strand, Collier County, Florida
Status: Completed FY 77
Type(s): Effects of Development—Effect of Canals on Ground Water
Location(s): South Florida
Product(s): Swayze, L. J., and McPherson, B. F., 1977, The effect of the Faka Union Canal system on water levels in the Fakahatchee Strand, Collier County, Florida: U.S. Geological Survey Water – Resources Investigations 77–61, 24 p.

Title: Water Resources Inventory of Northwest Florida
Status: Completed FY 77
Type(s): Areal Appraisal—Regional Ground and Surface Water
Location(s): Northwest Florida
Product(s): Dysart, J. E., and others, 1977, Water resources inventory of northwest Florida: U.S. Geological Survey Water – Resources Investigations Open – File Report 77–84, 114 p.

Title: Aquifer Characteristics in the Southwest Florida Water Management District Area
Status: Ongoing FY 81
Type(s): Aquifer Delineation
Location(s): Southwest Florida
Product(s): Wolansky, R. M., Barr, G. L., and Spechler, R. M., 1981, Generalized configuration of the bottom of the Floridan aquifer, Southwest Florida Water Management District: U.S. Geological Survey Water – Resources Investigations Open – File Report 79–1490.

Title: Quantitative Investigations of the Biscayne Aquifer, Southeast Florida
Status: Ongoing FY 81
Type(s): Effects of Development—Effects of Pumpage on Ground – Water Levels
Location(s): Southeastern Florida

Title: Hydrology of Central Pollution Control Zone, Area B, Sarasota County, Florida
Status: Completed FY 77 (except report)
Type(s): Areal Appraisal—Fresh and Saline Ground Water; Aquifer Delineation
Location(s): Southwest Florida

Title: Aquifer Mapping Central and Southern Florida
Status: Completed FY 80
Type(s): Aquifer Delineation; Planning and Management—Aquifer Maps
Location(s): Southern Florida

Title: Water Resources in the Waccasassa River Basin, Florida
Status: Completed FY 77
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): West – central Florida
Product(s): Taylor, G. F., 1976, Water resources in the Waccasassa River basin, Florida: U.S. Geological Survey Water – Resources Investigations 77–101, 10 p.

Title: Ochlocknee River Basin Hydrologic Investigation
Status: Completed FY 78 (except report)
Type(s): Areal Appraisal—Ground and Surface water
Location(s): Northwest Florida

Title: Potential of the Shallow Aquifer in Brevard County
Status: Completed FY 78 (except report)
Type(s): Areal Appraisal—Ground Water; Effects of Development—Ground – Water Withdrawals
Location(s): East – central Florida

Title: Preliminary Evaluation of Hydrologic Conditions in Manatee County, Florida
Status: Completed FY 77 (except report)
Type(s): Areal Appraisal—Ground and Surface Water; Effects of Development—Urbanization
Location(s): West – central Florida

Title: Hydrology, Central Volusia County
Status: Completed FY 78
Type(s): Effects of Development—Land Use (Drainage) versus Ground – Water Recharge; Environmental assessment
Location(s): East – central Florida
Product(s): Bush, P. W., 1977, Hydrologic evaluation of an area in central Volusia County, Florida, for use as a well field: U.S. Geological Survey Administrative Release, Tallahassee, Fla., 55 p.

Title: Investigation of Contaminates in Stormwater Runoff in Broward County, Florida
Status: Completed FY 78
Type(s): Waste Disposal and Contamination—Stormwater Runoff; Effects of Development—Urbanization; Quality of Water—Surface Water; Planning and Management—Stormwater Runoff
Location(s): Southeastern Florida
Product(s): Jennings, M. E., and Doyle, W. H., Jr., 1978, Deterministic modeling of urban stormwater processes, Broward County, Florida, in Proceedings, International Symposium on Urban Stormwater Management, July 1978, p. 275–281.

Title: Hydrology of Urban Areas in the Tampa Bay Region
Status: Ongoing FY 81
Type(s): Waste Disposal and Contamination—Stormwater Runoff; Effects of Development—Urbanization; Quality of Water—Surface Water
Location(s): West – central Florida
Product(s): Lopez, M. A., and Michaelis, D. M., 1978, Rainfall and urban storm runoff quality and quantity data in the Tampa Bay area, Florida: U.S. Geological Survey Open – File Report 78–125, 100 p.

Title: Hydrology of the Spring Complexes of Coastal West – Central Florida
Status: Completed FY 78
Type(s): Areal Appraisal—Springs and Surface Water (use for water supplies); Environmental Assessment
Location(s): West – central Florida

Product(s): Sinclair, W. C., 1978, Preliminary evaluation of the water-supply potential of the spring-river system in Weeki Wachee area and lower Withlacoochee River, west-central Florida: U.S. Geological Survey Water-Resources Investigations 78-74, 40 p.

Title: Water Quality Modeling of Selected Florida Estuaries
Status: Completed FY 78
Type(s): Quality of Water—Surface Water; Streamflow Characteristics; Effects of Development—Urbanization; Planning and Management—Waste Load Allocations
Product(s): Seaburn, G. E., Jennings, M. E., and Merritt, M. L., 1978, Waste-load allocation studies for selected west-central Florida estuaries—Crystal River, Homosassa River, Cross Bayou, and Anclote River: U.S. Geological Survey Water-Resources Investigations 78-54, 55 p.

Title: Water Resources Evaluation of the Sandy Flatlands, Palm Beach County
Status: Completed FY 77
Type(s): Areal Appraisal—Ground Water; Effects of Development—Urbanization; Quality of Water—Canals, Ground Water
Location(s): Southeast Florida
Product(s): Scott, W. B., 1977, Hydraulic conductivity and water quality of the shallow aquifer, Palm Beach County, Florida: U.S. Geological Survey Water-Resources Investigations 76-119, 22 p.

Title: Subsurface Storage of Stormwater and Waste Treatment Plant Effluent, St. Petersburg, Florida
Status: Completed FY 81
Type(s): Waste Disposal and Contamination—Well Injection, Stormwater Runoff and Liquid Waste; Quality of Water—Ground Water
Location(s): West-central Florida
Product(s): Hickey, J. J., 1980, Hydrogeology and results of injection tests at waste-injection test sites in Pinellas County, Florida: U.S. Geological Survey Water-Supply Paper 2183.

Title: Effects of Solid Waste Landfills on Ground-Water Quality, Dade County, Florida
Status: Completed FY 78
Type(s): Waste Disposal and Contamination—Solid Waste; Quality of Water—Ground Water
Location(s): Southeastern Florida
Product(s): Mattraw, H. C., Hull, J. E., and Klein, H., 1978, Ground-water quality near the Northwest 58th Street solid-waste facility, Dade County, Florida: U.S. Geological Survey Water-Resources Investigations 78-45, 79 p.

Title: Water Resources, Martin County
Status: Completed FY 77
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Encroachment; Effects of Development—Urbanization
Location(s): Southeastern Florida
Product(s): Miller, R. A., 1977, Water resources of the shallow aquifer, Martin County, Florida: U.S. Geological Survey Water-Resources Investigations 77-68, 50 p.

Title: Hydrologic Evaluation of Potential Well Field Areas, West-Central Florida
Status: Ongoing FY 81
Type(s): Aquifer Modeling; Effects of Development—Ground-Water Withdrawals
Location(s): West-central Florida
Product(s): Ryder, P. D., Johnson, D. M., and Gerhart, J. M., 1980, Model evaluation of the hydrogeology of the Morris Bridge well-field and vicinity in west-central Florida: U.S. Geological Survey Water-Resources Investigations 80-29, 92 p.

Title: Englewood Water District, Monitoring Program
Status: Completed FY 79 (except report)
Type(s): Areal Appraisal; Contamination—Saltwater Intrusion; Effects of Development—Urbanization
Location(s): Southwest Florida

Title: Estuarine Hydrology, Tampa Bay Model
Status: Ongoing FY 81
Type(s): Streamflow Model—Bay; Quality of Water—Surface Water; Effects of Development—Dredging
Location(s): Central Gulf Coast, Florida
Product(s): Goodwin, C. R., 1979, Preliminary simulated flow and circulation patterns on Hillsborough Bay, Florida: U.S. Geological Survey Administrative Report, 12 p.

Title: Springs of Florida
Status: Completed FY 77
Type(s): Areal Appraisal—Springs and Submarine Discharge; Environmental Assessment
Location(s): Florida statewide
Product(s): Rosenau, J. C., Faulkner, G. L., Hendry, C. W., Jr., and Hull, R. W., 1977, Florida's springs: Florida Department of Natural Resources, Bureau of Geology Bulletin 31, 600 p.

Title: Geohydrologic Study of a Landfill and Septic Tank Effluent Operation in a Coastal Limestone Environment, St. Petersburg, Pinellas County, Florida
Status: Completed FY 78
Type(s): Waste Disposal and Contamination—Municipal Waste; Quality of Water—Ground Water
Location(s): West-central Florida
Product(s): Fernandez, Mario, Jr., 1978, Water quality data from a sludge disposal test site, St. Petersburg, Florida: U.S. Geological Survey Water-Resources Investigations 78-821, 1 p.

Title: Water Resources of Riviera Beach, Florida
Status: Completed FY 77
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion
Location(s): Southeastern Florida
Product(s): Land, L. F., 1977, Ground-water resources of the Riviera Beach area, Palm Beach County, Florida: U.S. Geological Survey Water-Resources Investigations 77-47, 44 p.

Title: Water Resources at the Hallandale Area, Florida
Status: Completed FY 79
Type(s): Areal Assessment—Ground Water; Contamination—Saltwater Intrusion

Location(s): Southeastern Florida

Title: Water Resources of Palm Beach County, Florida
Status: Completed FY 80
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion; Aquifer Delineation
Location(s): Southeast Florida
Product(s): Fischer, J. W., Jr., 1980, Evaluation of a cavity-riddled zone of the shallow aquifer near Riviera Beach, Palm Beach County, Florida: U.S. Geological Survey Water-Resources Investigations 80-60, 45 p.

Title: Hydrology of the Sand-and-Gravel Aquifer; Pensacola, Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Effects of Development—Ground-Water Withdrawals; Aquifer Delineation
Location(s): Northwestern Florida
Product(s): Trapp, Henry, Jr., 1979, Water in the Pensacola Florida area: U.S. Geological Survey Water-Resources Investigations Open-File Report 78-89, 13 p.

Title: Water Resources of the Hollywood, Florida area
Status: Completed FY 79
Type(s): Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion; Aquifer Delineation
Location(s): Southeastern Florida

Title: Subsurface Waste Storage, Florida
Status: Ongoing FY 81
Type(s): Waste Disposal and Contamination—Industrial Waste; Aquifer Mapping; Quality of Water—Ground Water; Planning and Management—Hydrologic Atlas Maps
Location(s): Florida statewide
Product(s): Vecchioli, John, McKenzie, D. J., Pascale, C. A., and Wilson, W. E., 1979, Active Waste-injection systems in Florida, 1976: U.S. Geological Survey Open-File Report 79-1296, 33 p.
Miller, J. A., 1979, Potential subsurface zones for liquid-waste storage in Florida: Florida Bureau of Geology Map Series 94, 1 p.

Title: Environmental Studies, Statewide
Status: Ended FY 80
Type(s): Quality of Water—Surface Water; Planning and Management—Hydrologic Atlas Maps; Environmental Assessment
Location(s): Florida statewide
Product(s): Dysart, J. E., and Goolsby, D. A., 1977, Dissolved solids loads and concentrations in Florida surface waters: Florida Department of Environmental Regulations, Map Series no. 77, 1 p.

Title: Hydrology of Western Collier County, Florida
Status: Completed FY 79
Type(s): Areal assessment—Ground and Surface Water; Effects of Development—Canals
Location(s): Southwest Florida

Title: An Evaluation of the Water Resources in Duval and Nassau Counties, Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal; Effects of Development—Urbanization; Waste Disposal and Contamination—Saltwater Intrusion; Planning and Management—Hydrologic Atlas Maps; Aquifer Modeling
Location(s): Northeast Florida
Product(s): Leve, G. W., 1980, Seasonal and annual variations in the potentiometric levels in the Floridan aquifer in Duval County, Florida: U.S. Geological Survey Water-Resources Investigations 80-164, 1 p.

Title: Investigations of the Use of Deep Wells for Waste Disposal Near Pensacola, Florida
Status: Ongoing FY 81
Type(s): Waste Disposal and Contamination—Industrial Waste; Quality of Water Investigations—Ground Water
Location(s): Northwest Florida
Product(s): Pascale, C. A., and Martin, J. B., 1978, Hydrologic monitoring of waste injection wells near Pensacola, Florida, March 1970-March 1977: U.S. Geological Survey Water-Resources Investigations 78-27, 61 p.

Title: Effects of Man-Made Contaminants on Water Resources of Broward County, Florida
Status: Completed FY 79
Type(s): Waste Disposal and Contamination; Effects of Development—Urbanization, Landfills; Quality of Water—Canals
Location(s): Southeastern Florida
Product(s): Sonntag, W. H., 1980, Water-quality data for canals in eastern Broward County, Florida, 1975-78: U.S. Geological Survey Open-File Report 80-405, 43 p.

Title: Ground Water Studies in Fort Lauderdale, Florida
Status: Completed FY 79
Type(s): Areal Appraisal; Effects of Development—Withdrawals, Canals
Location(s): Southeast Florida

Title: Water Resources of Everglades National Park, Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Effects of Development—Urbanization
Location(s): Southern Florida

Title: Water Resources of Broward County, Florida
Status: Completed FY 79
Type(s): Areal Appraisal—Ground and Surface Water; Effects of Development—Urbanization
Location(s): Southeastern Florida
Product(s): Beaven, T. R., 1979, Hydrologic conditions in Broward County, Florida, 1976: U.S. Geological Survey Open-File Report 79-1258, 93 p.

Title: Ground-Water Conditions in the Cocoa Well Field Area
Status: Ongoing FY 81
Type(s): Effects of Development—Ground-Water Withdrawals; Contamination—Saltwater Intrusion
Location(s): Central Florida
Product(s): Tibbals, C. H., and Frazee, J. M., Jr., 1976, Ground-water hydrology of the Cocoa well-field area, Orange County, Florida: U.S. Geological Survey Open-File Report 75-676, 67 p.

Title: Water Atlas
Status: Ongoing FY 81
Type(s): Planning and Management—State Water Resources Atlas Maps
Location(s): Florida statewide
Product(s): Stewart, J. W., 1980, Areas of natural recharge to the Floridan aquifer in Florida: Florida Bureau of Geology Map Series 98, 1 p.

Title: Water Resources, Lee County, Florida
Status: Ongoing FY 81
Type(s): Areal Appraisal; Waste Disposal and Contamination—Saltwater Intrusion, Effects of Development—Urbanization
Location(s): Southwestern Florida
Product(s): Boggess, D. H., Missimer, T. M., and O'Donnell, T. H., 1977, Saline-water intrusion related to well construction in Lee County, Florida: U.S. Geological Survey Water Resources Investigations 77-33, 29 p.

GEORGIA

In a June 21, 1979, letter to the Secretary of Commerce, Governor George Busbee formally withdrew from "efforts to obtain" Federal approval of its coastal management program.

The State, however, has other active laws and programs for regulating air and water quality, marshlands, beaches, sand dunes, riverbeds, ocean bottoms, as well as withdrawal of ground water from coastal aquifers.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860-6336

1:250,000
Brunswick
Savannah

1:100,000
Beufort

1:24,000
Altamaha Sound
Burnswick East
Burnswick West
Burroughs
Cabretta
Cumberland Island North
Cumberland Island South
Darien
Doboy Sound
Dover Bluff
Fernandina Beach
Fort Pulaski
Harrietts Bluff
Isle of Hope
Jekyll Island
Kingsland
Limerick SE
Oak Level
Raccoon Key
St. Catherine
St. Marys
Sapelo Sound
Seabrook
Sea Island
Shellman Bluff
Tybee Island North
Tybee Island South
Wassaw Sound
Woodbine

Water Resources Studies

Initial contact: WRD District Chief, USGS, 6481 Peachtree Industrial Boulevard, Doraville, GA 30360—Phone: (404) 221-4858

Title: Colonels Island Test Well
Status: Completed FY 78
Type(s): Aquifer Delineation; Contamination—Saltwater Intrusion; Effects of Development—Industrial Withdrawals
Location(s): Southeastern Georgia

Title: Ground Water Models
Status: Ongoing FY 81
Type(s): Aquifer Modeling; Planning and Management; Effects of Development—Ground Water Withdrawals
Location(s): Southeastern Georgia—Brunswick, Savannah

Title: Southeast Limestone Regional Aquifer Systems Analysis, Coastal Georgia, South Carolina, and Northeast Florida
Status: Ongoing FY 81
Type(s): Regional Aquifer System Analysis
Location(s): Southeastern South Carolina, eastern Georgia, northeastern Florida

LOUISIANA

The Louisiana CZM program is based on the Louisiana State and local Coastal Resources Management Act of 1978 (referred to as Act 361), which established a new State-level coastal use permit system and voluntary development and implementation of local management programs. Federal approval of the program was received in September 1980.

The State's Department of Natural Resources (DNR) is the designated lead agency for the CZM program and is thus responsible for Federal consistency activities. An independent Louisiana Coastal Commission (LCC), however, was created by Act 361 within the DNR to oversee a broad range of activities, including the development of coastal use guidelines, appeals of State and local permit decisions, and approval of local coastal management programs. Several other State agencies also share CZM program responsibilities, notably the Department of Wildlife and Fisheries and the Department of Transportation and Development.

Examples of coastal zone uses covered by the new coastal use permit system include

- dredging or filling and discharges of dredged or fill material;
- levee siting, construction, operation and maintenance;
- hurricane or flood protection facilities;
- energy development activities including siting, construction, and operation of generating, processing and transmission facilities, pipeline facilities, and exploration for and production of oil, natural gas, and geothermal energy;
- mining activities, including surface, subsurface, and underground mining, geothermal energy, sand or gravel mining and shell dredging;
- shoreline modification projects;
- activities which affect barrier islands, salt domes, cheniers, and beaches; and
- drainage projects.

CZM BOUNDARY

The Louisiana CZM boundary includes the territorial sea and an inland area described in great detail and complexity in Act 361. In essence, the inland boundary contains all or part of 17 coastal parishes, consisting of areas ranging from 16 to 32 miles inland from the Gulf coast.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Mid-Continent Mapping Center, USGS, 1400 Independence Road, Rolla, MO 65401—Phone: (314) 341–0851

1:250,000

Mobile
New Orleans
Port Arthur

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Stratigraphy and Sedimentation of Geopressured Zones
Status: Begun 1979, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Onshore and offshore areas from northern Louisiana to the outer edge of the continental shelf
Investigator(s): R. Q. Foote

Water Resources Studies

Initial contact: WRD District Chief, USGS, P.O. Box 66492, Baton Rouge, LA 70896—Phone: (505) 387–0181

Title: Status of Hydrologic Conditions—New Orleans Area, Louisiana
Status: Ongoing FY 81
Type(s): Planning and Management—Water Resources; Effects of Development—Urbanization; Environmental Assessment
Location(s): Southern Louisiana

Title: Chemical, Physical, and Biological Characteristics of the Lower Mississippi River and Adjacent Wetlands, Louisiana
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water, Estuary; Contamination; Streamflow Characteristics
Location(s): Southern Louisiana
Product(s): Wells, F. C., 1980, Hydrology and water quality of the lower Mississippi River: Louisiana Department of Transportation and Development, Office of Public Works, Water Resources Technical Report 21, 83 p.

Title: Quality of Water in the Atchafalaya River Basin, Louisiana
Status: Completed FY 77
Type(s): Quality of Water—Surface Water; Environmental Assessment; Streamflow Characteristics
Location(s): South-central Louisiana
Product(s): Wells, F. C., and Demas, C. R., 1977, Hydrology and water quality of the Atchafalaya River Basin: Louisiana Department of Transportation and Development, Office of Public Works, Water Resources Technical Report 14, 53 p.

Title: Ground-Water Resources of Washington Parish, Louisiana
Status: Completed FY 79
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Southeastern Louisiana
Product(s): Case, H. L., III, 1979, Ground-water resources

of Washington Parish, Louisiana: Louisiana Department of Transportation and Development, Office of Public Works, Water Resources Technical Report 18, 33 p.

Title: Hydrology of the Pearl River Basin in Louisiana
Status: Ongoing FY 81
Type(s): Environmental Assessment; Effects of Development—Road Construction
Location(s): Southeastern Louisiana and southcentral Mississippi

Title: Ground-Water Resources of the Gramery Area, Louisiana
Status: Completed FY 80
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation; Contamination—Saltwater Intrusion
Location(s): Southern Louisiana
Product(s): Dial, D. C., 1980, Ground-water resources of the Gramery area, Louisiana: Louisiana Department of Transportation and Development, Office of Public Works, Water Resources Technical Report 24, 39 p.

Title: Water Resources of the Tangipahoa-Tchefuncta River Basins, Louisiana
Status: Completed FY 77
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Streamflow Characteristics
Location(s): Southeastern Louisiana
Product(s): Nyman, D. J., and Fayard, L. D., 1978, Ground-water resources of Tangipahoa and St. Tammany Parishes, southeastern Louisiana: Louisiana Department of Transportation and Development, Office of Public Works, Water Resources Technical Report 15, 198 p.

Title: Status of Hydrologic Conditions—Southwestern, Louisiana
Status: Ongoing FY 81
Type(s): Effects of Development—Ground and Surface Water Withdrawals
Location(s): Southwestern Louisiana

Title: Status of Hydrologic Conditions—Baton Rouge Area, Louisiana
Status: Ongoing FY 81
Type(s): Planning and Management; Effects of Development—Ground-Water Withdrawals; Contamination—Saltwater Intrusion; Environmental Assessment
Location(s): Southeastern Louisiana
Product(s): Whiteman, C. D., Jr., 1979, Saltwater encroachment in the "600-foot" and "1,500-foot" sands in the Baton Rouge area, Louisiana, 1966–78, including a discussion of saltwater in other sands: Louisiana Department of Transportation and Development, Office of Public Works, Water Resources Technical Report 19, 49 p.
Whiteman, C. D., Jr., 1980, Measuring local subsidence with extenso-meters in the Baton Rouge area, Louisiana, 1975–79: Louisiana Department of Transportation and Development, Office of Public Works, Water Resources Technical Report 20, 18 p.

Title: Geopressured-Geothermal Resources of the United States
Status: Ongoing FY 81
Type(s): Regional Investigation of Deep Aquifers
Location(s): Gulf Coast—Texas, Louisiana
Product(s): Kharaka, Y. K., Callendar, E., and Wallace, R. H., Jr., 1977, Geochemistry of geopressured geothermal waters from the Frio Clay in the Gulf Coast region of Texas: Geology, v. 5, April, p. 241–244.

MAINE

Maine's Coastal Program is based on 11 existing State laws administered by various State agencies as well as local governments. Federal approval of the program was received in 1978. The 11 laws and their purposes are as follows:

- The Protection and Improvement of Waters Act – protects the quality of State waters through classifying them and requiring licenses for proposed discharges.
- The Alteration of Coastal Wetlands Act controls uses so that environmental quality is maintained.
- The Shoreland Zoning Act requires municipalities to enact shoreland zoning for areas within 250 feet of water.
- The Land Use Regulation Law promotes principles of sound land use planning in unorganized areas.
- The Subdivision Law requires municipalities to review subdivisions according to minimum State criteria.
- The Site Location Act controls large projects through permit procedure.
- The Protection and Improvement of Air Law protects and enhances air quality by establishing standards and licensing proposed emissions.
- The Solid Waste Management Law promotes a coordinated statewide program regulating solid waste disposal.
- The Stream Alteration Act controls the alteration of flowing waters so that environmental quality is maintained.
- The Oil Discharge Prevention and Pollution Control Law prevents, regulates, and expedites cleanup of oilspills, regulates the transfer and conveyance of oil, and sets up funds for effective cleanup of spills.
- Marine Resource Management Laws provide for the conservation of marine resources through regulations.

Lead agency for the CZM program is the State Planning Office. Other State agencies participating in the program include the Department of Conservation, the Department of Environmental

Protection, and the Department of Marine Resources.

Along with strong State involvement, Maine's program places considerable emphasis on assistance to local governments in strengthening their land-use decisionmaking capabilities. A large part of the Federal funds available to the State are redistributed to coastal local governments for such projects as town comprehensive plans, planning for economic waterfront, harbor development, developing town ordinances, and gathering detailed information on coastal resources for improved management. In addition, the State has also made available through the CZM program a series of over 200 natural resource inventory maps depicting topography, slopes, soil conditions, fish and wildlife habitats, vegetation, marine resources, recreation facilities, and characteristics of watersheds and bodies of surface water. Furthermore, specialized coastal geology maps are also provided, depicting bedrock, ground-water conditions, surficial geology, near-shore marine environments, and other coastal geological features.

CZM BOUNDARY

Maine's CZM boundary extends from the territorial sea landward to the incorporated limits of all coastal towns and unorganized territories.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Massive Sulfide Deposits
Status: Begun 1978, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Areas in the vicinity of Penobscot Bay
Investigator(s): J. F. Slack

Water Resources Studies

Initial contact: WRD Subdistrict Chief, USGS, 26 Canneston Drive, Augusta, ME 04330—Phone: (207) 263–4797.

Title: Availability of Ground Water in the Upper Saco, Presumpsot, and Royal River Drainage Basins in Maine
Status: Completed FY 80
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water; Environmental Assessment—Geology
Location(s): Southwestern Maine
Product(s): Prescott, G. C., Jr., 1979, Ground-water resources and surficial geology in the Royal, upper Presumpsot, and upper Saco River basins in Maine: U.S. Geological Survey Water-Resources Investigations ME 76021, 2 p.

Title: Maine Sand and Gravel Aquifers
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Contamination—Ground Water; Planning and Management—Hydrologic Atlas
Location(s): Maine statewide

Title: Water Resources of Acadia National Park and Vicinity, Hancock County, Maine
Status: Completed FY 80
Type(s): Areal Appraisal—Ground Water; Contamination—Solid Waste
Location(s): Northeastern Maine
Product(s): Hansen, B. P., 1980, Ground water availability in Acadia National Park and vicinity, Hancock and Knox Counties, Maine: U.S. Geological Survey Open-File Report 80–1050, 14 p.

Title: Hydrology of Peat Bogs in Maine
Status: Ongoing FY 81
Type(s): Environmental Assessment—Peat Bogs; Effects of Development—Excavation; Quality of Water—Ground Water
Location(s): Eastern Maine

MARYLAND

The Maryland CZM program is based on existing State laws, notably the Wetlands Act, the State Boat Act, the Atlantic Coast Beach Erosion Control District Act, the Power Plant Siting Program, and the Coastal Facilities Review Act. The emphasis of the program is on coordinated implementation of these existing statutes to achieve stated coastal goals and policies. Federal approval of the program was received in September 1978.

By Executive Order of the Governor, the Tidewater Administration of the State Department of Natural Resources is designated as the lead agency for the CZM program. The agency operates a project-evaluation and program-review process through which State and local decisions stemming from those statutes incorporated into the CZM program are assessed as to their consistency with declared State coastal policies. Other State agencies with regulatory responsibilities in the coastal zone are tied in with this review process through formal Memorandums of Understanding with the lead CZM agency. For example, the Water Resources Administration, which administers the Wetlands Act, must include considerations of coastal policies in addition to its own regulations and standards in decisionmaking on the issuance of water use permits. The CZM

agency, if necessary, may make findings and recommendations on a permit application, which could affect the decisions of the issuing agency.

CZM BOUNDARY

Maryland's coastal zone area extends from its 3 – mi jurisdiction in the Atlantic Ocean to the inland boundaries of the counties bordering the Atlantic Ocean, Chesapeake Bay, and Potomac River up to the District of Columbia.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860–6336.

1:250,000

Wilmington

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (203) 860–6631

Title: Geologic History of Western Chesapeake Bay
Status: Begun 1980, as replacement of earlier project on geologic hazards relating to siting of nuclear reactors, continuing
Type(s): Regional Geologic and Mineral Resources/Environmental Conditions and Geologic Hazards Investigation
Location(s): West side of Chesapeake Bay, including Norfolk area in Virginia
Investigator(s): W. L. Newell

Title: Sedimentology and Geochemistry of Coastal Plain Estuaries
Status: Begun 1979, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Potomac River Estuary adjacent to Maryland and Virginia
Investigator(s): E. A. Martin

Title: Sediments and Surficial Geology of Delmarva Peninsula
Status: Completed 1979
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Delmarva Peninsula of Delaware and Maryland
Investigator(s): J. P. Owens

Woter Resources Studies

Initial contact: WRD District Chief, USGS, 8600 LaSalle Road, Townson. MD 21204—Phone: (301) 828–1535.

Title: Baltimore – Washington Area—Urban Hydrology Study
Status: Completed FY 77
Type(s): Effects of Development Urbanization; Planning and Management—Hydrologic Atlas; Environmental Assessment
Location(s): Eastern Maryland and District of Columbia

Title: Ground – Water Resources in Relation to Land Use Concepts in an Urbanizing Area, Harford County, Maryland
Status: Completed FY 80
Type(s): Environmental Assessment—Land Use; Planning and Management—Hydrologic Atlas; Areal Appraisal—Ground Water
Location(s): Northeastern Maryland
Product(s): Nutter, L. J., 1977, Groundwater resources of Harford County, Maryland: Maryland Geological Survey Bulletin 32, 44 p.

Title: Environmental Geohydrologic Studies, Maryland
Status: Completed FY 80 (except report)
Type(s): Environmental Assessment Land Use (Septic Tanks); Planning and Management—Hydrologic Atlas; Areal Appraisal—Ground Water
Location(s): Central and western Maryland
Product(s): (Series of quadrangle maps showing hydrology and geology published as U.S. Geological Survey Open – File Reports) Weigle, J. M., and others, 1980, Littleston quadrangle; hydrogeology: U.S. Geological Survey Open – File Report 80–1015, 5 maps, 44 p.

Title: Ground – Water Supplies From the Maryland Coastal Plain
Status: Ongoing FY 81
Type(s): Aquifer Modeling; Effects of Development—Ground – Water Withdrawals
Location(s): Southern Maryland

Title: Hydrologic Study of the Aquia and Piney Point – Nanjemoy Aquifers in Southern Maryland
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Aquifer Modeling; Effects of Development—Ground – Water Withdrawals
Location(s): Southern Maryland

Title: Hydrology of the Water – Table Aquifer, Delmarva Peninsula, Maryland
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Quality of Water—Ground Water
Location(s): Eastern Maryland (Eastern shore)

Title: Analysis by Digital Models of the Coastal Plain Aquifers Underlying Maryland and Delaware
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Maryland and Delaware Coastal Plain

Title: Hydrologic Impacts of Power Plants on Aquifers of Southern Maryland
Status: Ongoing FY 81
Type(s): Effects of Development—Ground–Water Withdrawals
Location: Southern Maryland
Product: Mack, F. K., Wheeler, J. C., and Curtin, S. E., 1980, Map showing the potentiometric surface of the Magothy

acquifer in southern Maryland, 1979: U.S. Geological Survey Open – File Report 80–959, 1 p.

Title: Aquifer Studies in Maryland—Phase III
Status: Completed FY 79 (except report)
Type(s): Aquifer Delineation; Aquifer Modeling; Effects of Development—Ground – Water Withdrawals
Location(s): Eastern Maryland
Product(s): Williams, J. F., III, 1979, Simulated changes in the Piney Point aquifer in Maryland: Maryland Geological Survey Report of Investigations 31, 50 p.

Title: Ground – Water Availability and Quality, Baltimore Industrial Area, Maryland
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Effects of Development—Excavations
Location(s): Central Maryland

Title: Effects of Water Quality Changes on Estuarine Biota
Status: Ongoing FY 81
Type(s): Regional Estuary Research
Location(s): Maryland
Product(s): Cory, R. L., 1978, Open – water metabolism in the Rhode River Estuary, Maryland, 1971–1975: Proceedings, Coastal Zone 78, American Society of Civil Engineers, San Francisco, California, v. 2, pp. 567–580.
Dresler, P. V., and Cory, R. L., 1980, The Arian Iam Corbicula fluminea (Muller) in the tidal Potomac River, Maryland: Estuaries, v. 3, no. 3, 4 p.

Title: Potomac Estuary Studies
Status: Ongoing FY 81
Type(s): Regional Estuary Research
Location(s): Maryland and Virginia

Title: Sedimentation and Eutrophication in the Potomac Estuary
Status: Ongoing FY 81
Type(s): Regional Estuary Research
Location(s): Potomac River, Maryland–Virginia

Title: Hydrology of Estuarine Intertidal Environments of Northwestern Oregon and the Potomac River Estuary
Status: Completed FY 80
Type(s): Regional Estuary Research
Location(s): Northwestern Oregon (Tillamook Embayment), Maryland and Virginia (Potomac River estuary)
Product(s): Glenn, J. L., 1978, Sediment sources and Holocene sedimentation history in Tillamook Bay, Oregon: Data and preliminary interpretations: U.S. Geological Survey Open – File Report 78–680, 64 p.

MASSACHUSETTS

The Massachusetts CZM program is based on several existing State laws with emphasis on wetlands and water pollution control. Federal approval of the program was received in September 1978.

The Executive Office of Environmental Affairs (EOEA), one of the Governor's cabinet offices, is the designated lead agency for the CZM program. Implementation of the regulatory policies occurs through existing programs within the various departments of EOEA. Each of these programs has promulgated regulations to carry out CZM policies. In addition, the Energy Facility Siting Council, which is not within EOEA, also has regulations implementing the CZM program.

Specifically, the programs described below are used for implementation of the CZM policies:

- Coastal Wetlands Restriction Program—The Department of Environmental Management (DEM) maps and places restriction orders on the deeds of affected landowners which permit and prohibit specified uses of all or portions of beaches, dunes, salt marshes, shellfish beds, and salt ponds that are determined to be significant to the public interest.
- Wetlands Protection Program—This program gives local conservation commissions or the Department of Environmental Quality Engineering (DEQE) the authority to review and condition projects in wetlands (including upland areas within 100 ft beyond either the 100 – year floodplain or the landward edge of the wetland, whichever distance is greater). Regulatory standards are provided by the DEQE.
- Waterways Program—The program gives DEQE the authority to regulate filling, construction, dredging, and removal of sand and vegetation in tidelands, harbors, and certain rivers below the high – water mark for the purposes of maintaining navigation and the public trust doctrine.
- Ocean Sanctuaries—This program authorizes the DEM to regulate discharges or the placement of structures on or in the seabed in designated ocean sanctuaries in the State's Territorial sea.
- Division of Water Pollution Control, DEQE—The division issues point source discharge permits (in conjunction with EPA under the NPDES) and licenses the disposal of chemical, explosive, reactive, and toxic substances.
- Energy Facilities Siting Council—The Council controls the siting of electric generation, gas and oil facilities and ancillary structures. It has power to override local permits on these facilities.

The Massachusetts coastal zone is heavily developed and the control of land use in shoreland and inland areas is principally by local zoning. The State is attempting to influence the pattern of urban developments through State growth policies and coordinated highway projects and State permits for water and sewerage treatment works. The EOEA, in addition, can also assist in the coordination of local planning and zoning activities in the coastal zone. These local activities, however, are not funded by the CZM program.

CZM BOUNDARY

The Massachusetts Coastal Zone includes the 3-mi territorial sea extending from the Massachusetts-New Hampshire border south to the Massachusetts-Rhode Island border, and landward to 100 ft inland of specified major roads, rail lines, or other visible rights of way. The coastal zone includes all of Cape Cod, Martha's Vineyard, and Nantucket.

In isolated instances, where the road boundary might exclude coastal wetlands, these wetlands are included in the coastal zone although the written description follows the road. Tidal rivers and adjacent uplands are included inland, at a minimum, to the extent of vegetation affected by saline water. Anadromous fish runs are included to the freshwater breeding area, if such area is within a coastal town.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Engineering Geologic Maps of the Urban Core of Metropolitan Boston
Status: Begun 1979, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Boston
Investigator(s): C. A. Kaye

Title: Bedrock Geology of Metropolitan Boston
Status: Begun 1978, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Boston area, with current focus on mapping three quadrangles
Investigator(s): C. A. Kaye

Title: Fault Zone Definition in Northeast Massachusetts
Status: Begun 1977, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Cape Ann area
Investigator(s): A. F. Stride

Title: Offshore Geology of Massachusetts
Status: Begun 1975, continuing
Type(s): Marine Investigation—Resources and Environmental
Location(s): Offshore areas adjacent to eastern Massachusetts
Investigator(s): R. N. Oldale

Water Resources Studies

Initial contact: WRD District Chief, USGS, 150 Causeway Street, Suite 1001, Boston, MA 02114—Phone: (617) 223–2822

Title: Hydrologic Effects of Wastewater Disposal, Otis Air Force Base, Cape Cod, Massachusetts
Status: Completed FY 80 (except report)
Type(s): Waste Disposal and Contamination—Sewage in Ground Water
Location(s): Southeastern Massachusetts

Title: Water Resources of the Blackstone River Basins, Massachusetts
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Streamflow Characteristics
Location(s): Central Massachusetts

Title: Estimating Maximum Ground-Water Levels from Long-Term Observation-Well Data
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground Water
Location(s): Massachusetts statewide
Product(s): Frimpter, M. H., 1980, Probable high ground-water levels on Cape Cod, Massachusetts: U.S. Geological Survey Water-Resources Investigations 80–1008, 31 p.

Title: Application of Cape Cod Digital Ground-Water Model and Hydrologic and Water-Quality Data to Water Management Planning
Status: Ongoing FY 81
Type(s): Aquifer Model; Planning and Management—Developing Ground-Water Resources
Location(s): Eastern Massachusetts

Title: Cape Cod Sole Source Aquifer
Status: Completed FY 80
Type(s): Aquifer Delineation
Location(s): Eastern Massachusetts (Cape Cod)
Product(s): Ryan, B. J., 1980, Cape Cod aquifer, Cape Cod, Massachusetts: U.S. Geological Survey Water-Resources Investigations 80–571, 37 p.

Title: Ground-Water Resources, Mattapoisett River Valley, Massachusetts
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Planning and Management—Alternatives for Water-Resources Development

Location(s): Southeastern Massachusetts

Title: Water Resources of the Coastal Drainage Basins of Southeastern Massachusetts: Part 1, Hingham to Kingston; Part 2, Plymouth to Wareham
Status: Completed FY 77
Type(s): Streamflow Characteristics; Quality of Water—Surface Water; Planning and Management—Water Projects
Location(s): Southeastern Massachusetts

Title: Hydrology and Water Resources of the Nashua River Basin, Massachusetts
Status: Completed FY 79
Type(s): Areal Appraisal; Streamflow Characteristics; Planning and Management—Water Projects
Location(s): North – central Massachusetts
Product(s): Brackley, R. A., and Hansen, B. P., 1978, Water resources of the Nashua and Souhegan River basins, Massachusetts: U.S. Geological Survey Hydrologic Investigations Atlas HA–276, 2 p.

Title: Water Resoures of the Coastal Basins in Northeastern Massachusetts
Status: Completed FY 79
Type(s): Areal Appraisal—Ground and Surface Water; Planning and Management—Hydrologic Atlases
Location(s): Northeastern Massachusetts
Product(s): Gay, F. B., and Delaney, D. F., 1980, Hydrology and water resources of the lower Merrimack River basin, Massachusetts, from Concord River, Lowell, to Plum Island, Newburyport: U.S. Geological Survey Hydrologic Investigations Atlas HA–616, 4 p.

Title: Water Resources of the Coastal Basins of Southeastern Massachusetts, Weweantic River, Warcham to Upper Narragansett Bay
Status: Completed FY 79
Type(s): Areal Appraisal; Streamflow Characteristics; Planning and Management—Hydrologic Atlases
Location(s): Southeastern Massachusetts
Product(s): Williams, J. R., and Tasker, G. D., 1977, Water resources of the coastal drainage basins of southeastern Massachusetts, northwest shore of Buzzards Bay: U.S. Geological Survey Hydrologic Investigations Atlas HA–560, 37 p.

Title: Ground – Water Resources of Cape Cod
Status: Completed FY 79 (except report)
Type(s): Aquifer Modeling; Aquifer Delineation; Quality of Water—Ground Water; Planning and Management—Land Use
Location(s): Southeastern Massachusetts
Product(s): Guswa, J. H., and LeBlanc, D. R., 1980, Digital models of ground – water flow in the Cape Cod aquifer system, Massachusetts: U.S. Geological Survey Water – Resources Investigations 80–67, 73 p.

Title: Water Resources of the Sudbury, Assabet, and Concord River Basins, Northeastern Massachusetts
Status: Ongoing FY 81
Type(s): Areal Appraisal; Planning and Management—Water Development
Location(s): Northeastern Massachusetts

Title: Ground – Water Resources of Nantucket Island, Massachusetts
Status: Completed FY 79
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation; Contamination—Saltwater Intrusion
Location(s): Eastern Massachusetts (Nantucket Island)
Product(s): Walker, E. H., 1979, Water resources of Nantucket Island, Massachusetts: U.S. Geological Survey Hydrologic Investigations Atlas HA–615, 2 p.

Title: Ground – Water Resources of Martha's Vineyard Island, Massachusetts
Status: Completed FY 79
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation; Contamination—Saltwater Intrusion
Location(s): Eastern Massachusetts (Martha's Vineyard Island)
Product(s): Delaney, D. F., Groundwater hydrology of Martha's Vineyard, Massachusetts: U.S. Geological Survey Open – File Report 79–917.

Title: Ground – Water Contamination From Surface Impoundments
Status: Completed FY 80
Type(s): Waste Disposal and Contamination—Liquid Waste Impoundments; Aquifer Delineation; Areal Appraisal—Ground Water
Location(s): Massachusetts statewide
Product(s): Delaney, D. F., and Maevsky, A., 1980, Distribution of aquifers, liquid – waste impoundments, and municipal water – supply sources, Massachusetts: U.S. Geological Survey Open – File Report 80–431, 1 p.

MISSISSIPPI

The Mississippi CZM program is based on the Mississippi Coastal Wetlands Protection Law and the Mississippi Marine Resources Council Enabling Legislation, with primary program emphasis on coastal wetlands management. Federal program approval was received in September 1980.

The Bureau of Marine Resources (BMR) Department of Wildlife Conservation administers the major portions of the program. Collectively, four "coastal program agencies" (BMR, the Bureau of Pollution Control and Land and Water Resources of the Department of Natural Resources, and the Department of Archives and History) are responsible for monitoring decisions that affect the coastal area and for ensuring that such decisions are made in accordance with the Coastal Program.

The State is concerned with rational industrial developments in the coastal area. Thus, the first of the State's 10 CZM program goal statements is related to the "efficient utilization" of waterfront industrial sites in order to provide for "reasonable industrial expansion" in the coastal area. While the CZM program incorporates existing State

wetlands regulatory activities, it also includes unique "affirmative management activities" designed to facilitate, among other things, industrial and protective developments.

CZM BOUNDARY

The Mississippi coastal zone extends from the territorial sea landward to include all areas within the three coastal counties.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Mid-Continent Mapping Center, USGS, 1400 Independence Road, Rolla, MO 65401—Phone: (314) 341-0851

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Mobile

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860-6631.

Title: Unstable Sediments of the Mississippi Delta
Status: Begun 1974, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Mississippi Delta area
Investigator(s): L. E. Garrison
Product(s): Teleki, P. G., Garrison, L. E., and Hampton, M. A., 1979, Environmental hazards; considerations for outer continental shelf development: Offshore Technology Conference Proceedings, no. 11, v. 4, p. 2579-2589.

Water Resources Studies

Initial contact: WRD District Chief, USGS, 430 Bounds Street, Jackson, MS 39206—Phone: (601) 969-4600

Title: Waste Assimilation Capacity of Mississippi Streams
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water; Streamflow Characteristics; Waste Disposal and Contamination—Streams
Location(s): Mississippi statewide
Product(s): Faye, R. E., 1980, Water-quality reconnaissance of Pascagoula and Escatawpa Rivers, Jackson Counties, Mississippi, May 1974 to July 1978: U.S. Geological Survey Open-File Report 80-727, 105 p.

Title: Hydrologic Mapping of Aquifers in Mississippi
Status: Completed FY 79
Type: Aquifer Delineation; Planning and Management—Development of Ground-Water Supplies
Location(s): Mississippi statewide
Product(s): Gandl, L. A., 1979, The Oligocene aquifer system in Mississippi: U.S. Geological Survey Water-Resources Investigations 79-28, 2 sheets.

Title: Water for Industrial Development in George, Hancock, Pearl River, and Stone Counties, Mississippi
Status: Completed FY 77
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Streamflow Characteristics; Planning and Management—Development of Industrial Water Supplies
Location(s): Southern Mississippi
Product(s): Brahana, J. V., and Dalsin, G. J., 1977, Water for industrial development in George, Hancock, Pearl River, and Stone Counties, Mississippi: Mississippi Research and Development Center Bulletin, 75 p.

Title: Southeastern Coastal Plain Regional Aquifer System Analysis
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Western Alabama, eastern Mississippi, northwest Florida

Title: Identification and Characterization of Aquifers Designated as Underground Sources of Drinking Water
Status: Completed FY 80 (except report)
Type(s): Aquifer Delineation; Waste Disposal and Contamination; Planning and Management—Permitting Waste Injection Wells
Location(s): Mississippi statewide

NEW HAMPSHIRE

New Hampshire has developed a CZM program based on existing State and local regulatory authorities incorporated into a coordinated "coastal activity review process" to be implemented by municipalities in the coastal zone. However, a proposed Coastal coordination and Local Assistance Act, which would make the review process effective while also putting in place needed policies and guidelines, has yet to be passed by the State Assembly. Therefore, the CZM program has not received Federal approval.

The State is concerned with such issues as coastal access, coordinated harbor management and protection of wetlands and marine resources. Existing programs of such State agencies as the Department of Resources and Economic Development, the Water Supply and Pollution Control Commission and the Wetlands Board will be utilized to carry out the CZM program. The focus of management activities, however, will be coastal towns and cities.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Water Resources Studies

Initial contact: WRD Chief Supervisory Hydrologist, USGS, 55 Pleasant Street, Concord, NH 03301—Phone: (603) 834-4739

Title: Ground-Water Reconnaissance of New Hampshire River Basins

Status: Completed FY 79
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation; Planning and Management—Land Use and Development of Water Resources
Location(s): New Hampshire statewide
Product(s): Cotton, J. E., 1977, Ground-water availability in the lower Connecticut River basin, southwestern New Hampshire: U.S. Geological Survey Water-Resources Investigations 77-73, 1 map.

Title: Ground-Water Resources of the Lamprey River Basin, New Hampshire
Status: Completed FY 80 (except report)
Type(s): Aquifer Delineation; Effects of Development—Induced Infiltration
Location(s): Southeastern New Hampshire

Title: Hydrologic Effects of Waste Disposal, Pease Air Force Base
Status: Completed FY 80
Type(s): Waste Disposal and Contamination—Trichloroethylene in Ground Water
Location(s): Southeastern New Hampshire
Product(s): Bradley, Edward, 1980, Trichloroethylene in ground-water supply of Pease Air Force Base, Portsmouth, New Hampshire: U.S. Geological Survey Water-Resources Investigations Open-File Report 80-557, 51 p.

Title: Ground-Water Resources of the Cocheo River Basin, Southeastern New Hampshire
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water; Effects of Development—Surface Water Infiltration
Location(s): Southeastern New Hampshire

NEW JERSEY

The New Jersey CZM program is based on several existing State statutes, notably the Coastal Area Facility Review Act (CAFRA), the Wetlands Act and the Waterfront Development Act. Federal approval of the program was achieved in two segments. The first segment was approved in September 1978, covering areas south of Sandy Hook to the tip of Cape May and north along the Delaware Bay to a point near the Delaware Memorial Bridge. The second segment was approved in September 1980, covering the remainder of the coastal zone (see description in this section under "CZM Boundary").

The State's Department of Environmental Protection (DEP) is the designated lead agency for the CZM program. In addition to the three regulatory laws administered by the DEP, other existing State authorities incorporated into the CZM program include those stemming from the shoreline protection program and tidelands management program, also administered by DEP, and regulatory activities of the State's Department of Energy and the independent Hackensack Meadowlands Development Commission.

The coastal zone of New Jersey is among the most heavily developed in the Nation. Therefore, principal emphasis of the State's CZM program is on control of large-scale developments. As early as 1914, the State Legislature showed its first interest in regulating land areas along tidal waters by passing the Waterfront Development Law, requiring State approval of developments bordering navigable water or streams. In 1969, the Hackensack Meadowlands Reclamation and Development Act was passed, creating a Commission with authority to regulate developments in a specifically defined Meadowlands District. In 1970, the Wetlands Act was passed to regulate developments in all coastal wetlands. Finally, in 1973, the Legislature passed CAFRA, authorizing the DEP to regulate major developments occurring in the coastal area included in the first segment of the CZM program.

CZM BOUNDARY

New Jersey's coastal zone extends from the New York border south to Cape May Point and then north to Trenton. It encompasses the waters and waterfronts of the Hudson River and related water bodies south to the Raritan Bay, the Atlantic Ocean, and some inland areas from Sandy Hook to Cape May, the Delaware Bay, and some inland areas; and the waterfront of the Delaware River and related tributaries.

The inland boundary for the portion of the coast from Raritan Bay south to Cape May Point and then north along the Delaware Bay (consisting of parts of Middlesex, Monmouth, Ocean, Burlington, Atlantic, Cape May, Cumberland, and Salem Counties) is defined as "The landward boundary of the Coastal Area as defined in CAFRA or the upper boundary of coastal wetlands located landward of the CAFRA boundary along tidal water courses flowing through the CAFRA area, whichever is more landward, including State-owned tidelands." This area varies in width from several thousand ft to up to 24 mi at one point.

In the more developed portions of the State (including portions of Salem, Gloucester, Camden, Burlington, Mercer, Middlesex, Somerset, Union, Hudson, Essex, Passaic, and Bergen Counties), the coastal zone boundary is defined as "The land-

ward boundary of the State's jurisdiction under the Waterfront Development Act or Wetlands Act, or the landward boundary of State-owned tidelands, whichever extends farthest inland." This area extends at least 100 ft inland from mean high water and is generally no more than 500 ft inland.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860–6045

1:250,000

Wilmington

Water Resources Studies

Initial contact: WRD District Chief, USGS, P.O. Box 1238, Trenton, NJ 12201—Phone: (609) 989–2162

Title: Wastewater Solids Utilization on Land Demonstration Project
Status: Completed FY 78
Type(s): Waste Disposal and Contamination—Effect of Land Spreading of Sewage Sludge on Ground Water; Quality of Water
Location(s): East-central New Jersey
Product(s): Kam, William, 1978, Effect of controlled land application of sludge on ground-water quality, Ocean County, New Jersey: U.S. Geological Survey Open-File Report 78–492, 109 p.

Title: Geophysical Logging in New Jersey
Status: Completed FY 80 (except report)
Type(s): Aquifer Delineation; Areal Appraisal Ground Water; Planning and Management—Ground-Water Development; Aquifer Modeling
Location(s): New Jersey statewide
Product(s): Nichols, W. D., 1977, Geohydrology of the Englishtown formation in the northern coastal plain of New Jersey: U.S. Geological Survey Water-Resources Investigations 76–123, 62 p.
Farlekas, G. M., 1979, Geohydrologic and digital simulation model of the Farrington aquifer in the northern coastal plain of New Jersey: U.S. Geological Survey Water-Resources Investigations 79–106, 55 p.

Title: Land Subsidence Caused by Ground-Water Withdrawals in the Coastal Plain of New Jersey
Status: Ongoing FY 81
Type(s): Environmental Assessment—Land Subsidence; Effects of Development—Ground-Water Withdrawals
Location(s): Eastern New Jersey

Title: Quality of Ground and Surface Water in the Area of the Potomac-Raritan-Magothy Aquifer Outcrop South of Trenton, New Jersey
Status: Ongoing FY 81
Type(s): Quality of Water—Ground and Surface Water; Contamination—General
Location(s): Southwestern New Jersey

Title: Simulation of Multilayer Coastal Plain Aquifer System of New Jersey
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Southern New Jersey

Title: Hydrogeologic Conditions in the Coastal Plain of New Jersey
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal-Ground Water; Planning and Management—Development of Ground-Water Supplies
Location(s): Southern New Jersey

Title: Geohydrology of the Potomac-Raritan-Magothy Aquifer System, Trenton to Perth Amboy, New Jersey
Status: Completed FY 78 (except report)
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Northeastern New Jersey

Title: Geohydrologic Analysis of the Englishtown Formation
Status: Completed FY 77
Type(s): Areal Appraisal—Ground Water; Aquifer Modeling; Planning and Management—Development of Ground-Water Supplies
Location: Central New Jersey
Product(s): Nichols, W. D., 1977, Digital computer simulation model of the Englishtown aquifer in the northern coastal plain of New Jersey: U.S. Geological Survey Water-Resources Investigations Open-File Report 77–73, 152 p.
Nichols, W. D., 1977, Geohydrology of the Englishtown formation in the northern coastal plain of New Jersey: U.S. Geological Survey Water-Resources Investigations 76–123, 62 p.

NEW YORK

New York has coastal areas bordering the waters of both the Great Lakes and the Atlantic Ocean. The State has developed a CZM program based on existing State and local authorities, with the focus of management responsibilities housed in a proposed Coastal Management Board. The creation of the Board would be by means of proposed legislation which has yet to be passed by the State Legislature. Therefore, the program has not received Federal approval.

As outlined in a preliminary CZM program document, the Coastal Management Board would rely on existing State authorities, principally those of the Department of Environmental Protection pertaining to wetlands control and of the Department of State in land use planning and siting of utility transmission facilities to implement various coastal policies to be promulgated through leg-

islation. Local governments would be encouraged to share CZM responsibilities by developing and implementing State-approved local CZM programs on a voluntary basis.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Engineering Geology of New York City
Status: Begun 1979, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): New York City and vicinity
Investigator(s): C. A. Baskerville

Water Resources Studies

Initial contact: WRD District Chief, USGS, P.O. Box 1350, Albany, NY 12201—Phone: (518) 472–3107

Title: Evaluation of the Quality of Water on Long Island, New York
Status: Ongoing FY 81
Type(s): Quality of Water—Ground Water; Waste Disposal and Contamination; Effects of Development—Urbanization
Location(s): Southeastern New York (Long Island)
Product(s): Katz, B. G., and Mallard, G. E., 1980, Chemical and microbiological monitoring of a sole-source aquifer intended for artificial recharge: U.S. Geological Survey Open-File Report 80–567, 18 p.

Title: Survey of Hydrogeology and Water Quality of That Part of Southeast Nassau County to Be Served by Wantagh Sewage Treatment Plant
Status: Completed FY 77 (except report)
Type(s): Quality of Water—Ground Water; Waste Disposal and Contamination Sewage
Location(s): Southeastern New York (Long Island)
Product(s): Kimmel, G. E., Ku, H. F. H., Harbaugh, A. W., Sulam, D. J., and Getzen, R. T., 1977, Analog model prediction of the hydrologic effects of sanitary sewerage in southeast Nassau County and southwest Suffolk County, New York: Long Island Water Resources Bulletin 6, 25 p.

Title: Water Resources of the South Fork of Long Island, New York
Status: Completed FY 77
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Contamination—Saltwater Intrusion
Location(s): Southeastern New York (Long Island)
Product(s): Nemickas, B., Koszalka, E. J., and Vaupel, D. E., 1977, Hydrogeologic data from investigations of water resources of the South Fork, Suffolk County, New York: Long Island Water Resources Bulletin 7.

Title: Applications of Long Island Analog Model and of Hydrologic and Hydrochemical Ground Water and Streamflow Data in Water Management Modeling
Status: Completed FY 77
Type(s): Waste Disposal and Contamination; Quality of Water—Ground and Surface Water; Aquifer Model; Planning and Management—Wastewater
Location(s): Southeastern New York (Long Island)
Product(s): Harbaugh, A. W., and Reilly, T. E., 1977, Analog model analysis of the effect of wastewater management on the groundwater reservoir in Nassau and Suffolk Counties, Long Island, New York, Report III; reduction and redistribution of groundwater pumpage: U.S. Geological Survey Open-File Report 77–148, 24 p.

Title: Hydrologic and Water Quality Effects of Recharging Reclaimed Water on the Operation of Recharge Basins and on the Ground-Water Reservoir, Nassau County, New York
Status: Ongoing FY 81
Type(s): Waste Disposal and Contamination—Ground Water; Effects of Development—Recharge Basins and Injection Wells
Location(s): Southeastern New York (Long Island)
Product(s): Aronson, D. A., 1980, Use of highly treated wastewater to recharge the groundwater reservoir in Nassau County, Long Island, New York: American Society of Civil Engineers, Proceedings of Environmental Engineering Division Specialty Conference 1980, p. 214–220.

Title: Occurrence and Transport of PCB Residues Within the Upper and Estuarine Hudson River Basin
Status: Ongoing FY 81
Type(s): Contamination—Surface Water; Quality of Water; Effects of Development—Dredging
Location(s): East-central New York
Product(s): Turk, J. T., 1980, Applications of Hudson River basin PCB transport studies, in Baker, R. A., ed. Contaminates and Sediments, v. 1: Ann Arbor Science Publishers, Inc., pp. 171–183.

Title: Geohydrology of North Brookhaven Town, Suffolk County, Long Island, New York
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground Water; Effects of Development—Urbanization
Location(s): Southeastern New York (Long Island)

Title: Impact of Future Sewering and the Effects of Proposed Mitigating Actions on the Freshwater Resources of Long Island, New York
Status: Ongoing FY 81
Type(s): Environmental Assessment—Ground and Surface Water Discharge into Oceans; Effects of Development—Ocean Outfalls
Location(s): Southeastern New York (Long Island)
Product(s): Sulam, D. J., 1980, Delineation of ground-water contributing areas of streams of southwestern Suffolk County, New York: U.S. Geological Survey Open-File Report 80–346, 4 p.

Title: Hydrogeology of Suffolk County, New York
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water

Location(s): Southeastern New York (Long Island)
Product(s): Jensen, H. M., and Soren, Julian, 1981, Hydrogeology of Suffolk County, Long Island, New York: U.S. Geological Survey Hydrologic Investigations Atlas HA-501.

Title: Hydrogeology of Nassau County, New York
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water
Location(s): Southeastern New York (Long Island)
Product(s): Kilburn, Chabot, 1979, Hydrogeology of the town of North Hempstead, Nassau County, Long Island, New York: Long Island Water Resources Bulletin 12, 87 p.

Title: Urban Hydrology of Long Island, New York
Status: Ongoing FY 81
Type(s): Effects of Development—Urbanization; Contamination—Stormwater Runoff; Quality of Water—Surface Water
Location(s): Southeastern New York (Long Island)

Title: Irondequoit Creek Urban Runoff Study
Status: Ongoing FY 81
Type(s): Effects of Development—Urbanization; Environmental Assessment—Surface Runoff from Urban Areas; Contamination—Non-Point Source
Location(s): North-central New York

Title: Regional Aquifer Study of Long Island
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Southeastern New York (Long Island)

Title: The Technological Basis for a Comprehensive Ground-Water Management Plan on Long Island, New York
Status: Ongoing FY 71
Type(s): Planning and Management—Aid New York State Department of Environmental Conservation to establish statewide Ground-Water Management Plan
Location(s): Southeastern New York (Long Island)
Product(s): Technical background information on ground-water resources

Title: Ground-Water Resources, Montauk Area
Status: Ongoing FY 81
Type(s): Contamination—Saltwater Intrusion; Effects of Development—Ground-Water Withdrawals; Planning and Management—Alternative methods of developing ground water
Location(s): Southeastern New York (Long Island)

Title: Ground-Water Resources of Long Island, New York
Status: Ongoing FY 81
Type(s): Areal Appraisal—General; Quality of Water—Ground Water; Waste Disposal and Contamination; Planning and Management—Alternatives for managing groundwater supplies
Location(s): Southeastern New York (Long Island)

NORTH CAROLINA

The North Carolina CZM program is based on the North Carolina Coastal Area Management Act of 1974 (CAMA), which establishes a State and (or) local permitting system controlling developments in designated "areas of environmental concern" (AEC's). Federal approval of the program was received in September 1978.

Lead agency for the CZM program is the Coastal Resources Commission created by CAMA, with staff provided by the State's Department of Natural Resources and Community Development. The Commission is authorized to issue permits on "major" and "minor" developments involving designated AEC's, but it may delegate minor development-permit responsibilities to a local government unit with a State-approved local land use plan. The Commission, to date, has identified four broad categories of AEC's which in turn include the 13 subcategories listed below.

- estuarine system, including coastal wetlands, estuarine waters, public trust areas, and estuarine shorelines
- ocean hazard areas, including ocean beaches, frontal dunes, inlet lands, and ocean-erodible areas
- public water supplies, including small surface water supply watersheds, and public water supply well fields
- fragile coastal resources areas, including coastal complex natural areas, coastal geologic formations, and coastal areas that sustain remnant species.

CZM BOUNDARY

North Carolina's coastal zone encompasses a relatively large coastal area consisting of 20 coastal counties. Within this area, a two-tiered approach was chosen for management purposes. The first tier consists of critical resource areas, designated as areas of environmental concern (AEC's), in which most significant land and water uses are regulated by permit. The second tier consists of the area within the coastal counties but outside the areas of environmental concern. In this second tier, the program calls for management of certain uses by coordinating existing State authorities; additionally, the State will be guided by policies contained in State-approved land use plans that have been prepared by the local governments under CAMA guidelines. These guidelines consist of two sections. The first contains criteria for development within the AEC's; the second contains general guidelines for development of land use plans throughout the entire coastal area.

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860–6336

1:250,000
Beaufort
Currituck Sound
Georgetown

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Coastal Plain Sediments
Status: Begun 1979, continuing
Type(s): Regional Geologic and Mineral Resources to Environmental Conditions and Geologic Hazards Investigation
Location(s): Cape Fear area
Investigator(s): J. P. Owens

Water Resources Studies

Initial contact: WRD District Chief, USGS, P.O. Box 2857, Raleigh, NC 27602—Phone: (919) 672–4510

Title: Water Resources Potential of Northeast North Carolina Above Cape Lookout
Status: Completed FY 77
Type(s): Areal Appraisal—Ground and Surface Water; Streamflow Characteristics; Contamination—Saltwater Intrusion; Planning and Management—Control of Saltwater Intrusion
Location(s): Northeastern North Carolina
Product(s): Wilder, H. B., Robinson, T. M., and Lindskov, K. L., 1977, Water resources of northeast North Carolina: U.S. Geological Survey Water–Resources Investigations 77–81, 125 p.

Title: Flow Modeling of the Chowan River Estuary
Status: Completed FY 77
Type(s): Streamflow Characteristics; Streamflow Modeling
Location(s): Northeastern North Carolina
Product(s): Daniel, C. C., 1977, Digital flow model of the Chowan River Estuary, North Carolina: U.S. Geological Survey Water–Resources Investigations 77–63, 90 p.

Title: Hydrology of Estuaries and Sounds of North Carolina, With Emphasis on Sea–Water Encroachment
Status: Completed FY 79
Type(s): Streamflow Characteristics—Estuaries; Quality of Water Surface Water; Environmental Assessment
Location(s): Eastern North Carolina
Product(s): Giese, G. L., Wilder, H. B., and Parker, G. G., Jr., 1979, Hydrology of major estuaries and sounds of North Carolina: U.S. Geological Survey Water–Resources Investigations 79–46, 180 p.

Title: Evaluation of Stream–Channel Improvements on Hydrologic Conditions in the Creeping Swamp Subwatershed, North Carolina
Status: Completed FY 77
Type(s): Effects of Development—Stream Channelization; Streamflow Characteristics; Quality of Water
Location(s): East–central North Carolina
Product(s): Winner, M. D., Jr., and Simmons, C. E., 1977, Hydrology of the Creeping Swamp watershed, North Carolina, with reference to potential effects of stream channelization: U.S. Geological Survey Water–Resources Investigations 77–26, 54 p.

Title: Effects of Stream Channelization on the Hydrology of the Chicod Creek Watershed, North Carolina
Status: Ongoing FY 81
Type(s): Effects of Development—Stream Channelization; Streamflow Characteristics; Quality of Water
Location(s): Northeastern North Carolina
Product(s): Simmons, C. E., and Aldridge, M. C., 1980, Hydrology of the Chicod Creek basin, North Carolina, prior to channel improvements: U.S. Geological Survey Open–File Report 80–680, 27 p.

Title: Effect of Land Clearing and Drainage for Agricultural Development on Hydrology of Albemarle–Pamlico Peninsula, North Carolina
Status: Completed FY 80
Type(s): Effects of Development—Land Clearing and Drainage Activities; Streamflow Characteristics; Quality of Water
Location(s): Northeastern North Carolina
Product(s): Daniel, C. C., III, 1978, Pond use, land cover and drainage on the Albemarle–Pamlico Peninsula, eastern North Carolina: U.S. Geological Survey Water–Resources Investigations Map 78–134, 2 sheets.

Title: Ground–Water Resources in the Cape Lookout National Seashore, North Carolina
Status: Completed FY 78
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Eastern North Carolina
Product(s): Winner, M. D., Jr., 1978, Ground–water resources of the Cape Lookout National Seashore, North Carolina: U.S. Geological Survey Water–Resources Investigations 78–52, 49 p.

Title: Effects of Urbanization on Floods in the Coastal Plain of North Carolina
Status: Ongoing FY 81
Type(s): Effects of Development—Urbanization; Streamflow Characteristics; Planning and Management—Land Use
Location(s): Eastern North Carolina

Title: North Carolina Coastal Plain Aquifer Study
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Eastern North Carolina

RHODE ISLAND

The Rhode Island CZM program is based on the Rhode Island Coastal Resources Management Act of 1971, which establishes an independent 17-member Coastal Resources Management Council (CRMC) to regulate activities in areas between the mean high water mark and the outward limits of the State's Territorial sea. Federal approval of the program was received in September 1978 and the Governor's Office is the designated program implementation agency.

The CRMC's permitting authorities cover coastal wetlands, coastal ponds and shoreline systems, and all directly associated areas "contiguous to and necessary to preserve the integrity of such areas and features." In addition, the CRMC also has jurisdiction on five specific types of activities regardless of their locations, including

- power generating and desalination plants;
- chemical or petroleum processing, transfer or storage;
- mineral extraction;
- shoreline protection facilities; and
- sewage treatment and disposal and solid waste disposal facilities.

The CRMC utilizes a permit review process to involve local, State, and Federal agencies in its management decisions. The Council is the last step in State permit procedures. Persons proposing such activities as alterations along the shorelines will first obtain other applicable local and State permits and will then be informed as to whether a Council permit is required. Comments from interested parties, including Federal agencies, are solicited and incorporated into permit considerations.

Since 1975, with Federal funds made available through the CZM program, the CRMC has greatly accelerated its development of management regulations, notably those addressing sand dunes; beaches and barrier islands; cliffs/bluffs; flood hazard areas; marine mineral mining; dredging in tidal water; ocean dumping; and petroleum and LNG processing, transfer, and storage. As a part of its management information base, a series of coastal information maps has also been made available (orthophotoquads corrected to conform with USGS topographic maps at the scale of 1:12,000). Features shown on these maps include local zoning, recreation facilities, historic sites, wetlands, public water and sewage lines, and flood hazard zones.

CZM BOUNDARY

The Rhode Island coastal zone is defined to include the territorial seas and those lands within approximately 1 mi of tidal waters (the inner boundary of the census tract bisected by a line drawn 1 mi inland from tidal waters). As so defined the coastal region contains several coastal cities and towns in their entirety and encompasses nearly all the coastal watershed. For permit review purposes, the boundary includes all coastal towns.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Water Resources Studies

Initial contact: WRD Subdistrict Chief, USGS, Federal Building, Room 224, Providence, RI 02903—Phone: (401) 528-4389

Title: Ground-Water Supply, Development, and Management, Pawcatuck River Basin, Rhode Island
Status: Ongoing FY 81
Type(s): Aquifer—Stream Models; Planning and Management—Alternative methods of development of ground-water supplies; Effects of Development—Ground-Water Withdrawals
Location(s): Southwestern Rhode Island

Title: Appraisal of Water Quality of Rhode Island Streams
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water; Effects of Development—Urbanization
Location(s): Rhode Island statewide

SOUTH CAROLINA

The South Carolina CZM program is based on the South Carolina Coastal Management Act of 1977 (SCCMA), which establishes a South Carolina Coastal Council (SCCC) to regulate activities occurring in four types of "critical areas," including tidelands, coastal waters, beaches and primary ocean-front sand dunes. In addition, the SCCC also "certifies" State and Federal permits applicable to activities within the eight coastal counties. Federal approval of the program was received in September 1979.

The Coastal Council's permit review and certification process outside of the critical areas involves activities of six other State agencies, notably those addressing

- permits for activities below the ordinary high-water mark, that are within the coastal zone but out of the critical areas;
- State permits to construct wastewater treatment systems or septic tanks handling

either more than 1,500 gal/d or other – than – domestic waste;
- water supply permits;
- National Pollutant Discharge Elimination System (NPDES) permits (delegated by EPA);
- Section 401 of the Federal Water Pollution Control Act Certification;
- mining operation permits;
- certificates for major utility facilities;
- oil and gas facilities permits;
- ground – water capacity use area permits; and
- air quality permits.

CZM BOUNDARY

The South Carolina coastal zone is defined to include all coastal waters and submerged lands seaward to the State's jurisdictional limits and all lands and waters in the counties of the State which contain any one or more of the critical areas. These counties are Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper, and Georgetown.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860–6336

1:250,000
Georgetown
James Island
Savannah

1:100,000
Beaufort

1:24,000
Fort Pulaski
Tybee Island North

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Geology, Earthquakes, and Geologic Hazards of Charleston Area, South Carolina
Status: Begun 1974, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Charleston and vicinity
Investigator(s): G. S. Gohn, J. D. Phillips, J. C. Behrendt, H. D. Ackermann, and C. J. Langer
Product(s): Lyttle, P. T., Gohn, G. S., Higgins, B. B., and Wright, D. S., 1979, Vertical crustal movements in the Charleston – Savannah area· Tectonophysics, v. 52, p. 183–189.

Water Resources Studies

Initial contact: WRD District Chief, USGS, 1835 Assembly Street, Suite 658, Columbia, SC 29201—Phone: (803) 765–5966

Title: Reconnaissance Investigation of South Carolina Estuaries
Status: Ongoing FY 81
Type(s): Streamflow Characteristics; Quality of Water—Surface Water; Environmental Assessment—Estuaries
Location(s): Eastern South Carolina
Product(s): Johnson, F. A., 1978, A tracer study of the flushing time of the Sampit River estuary, Georgetown, South Carolina: South Carolina Water Resources Commission Report no. 10, 40 p.

Title: Grand Strand Capacity Use Study
Status: Completed FY 77
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water
Location(s): Northeastern North Carolina
Product(s): Zack, A., 1977, The occurrence, availability, and chemical quality of ground water, Grand Strand area and surrounding parts of Harry and Georgetown Counties, South Carolina: South Carolina Water Resources Commission Report no. 8, 100 p.

Title: Low Country Capacity Use Study
Status: Completed FY 78
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water; Contamination—Saline Water
Location(s): Southeastern South Carolina
Product(s): Hayes, L. R., 1978, The ground – water resources of Beaufort, Colleton, Hampton, and Jasper Counties, South Carolina: South Carolina Water Resources Commission Report no. 9, 181 p.

Title: Occurrence of Fluoride in Ground Water From the Coastal Plain in South Carolina
Status: Completed FY 81
Type(s): Quality of Water—Ground Water; Contamination—High Fluoride Concentrations; Environmental Assessment
Location(s): Coastal South Carolina
Product(s): Johnson, P. W., and Rhett, J. M., 1981, Fluoride concentrations in water from four principal Coastal Plain aquifer systems, South Carolina: U.S. Geological Survey Open – File Report 81–140.

Title· Comprehensive Study of Some Geohydrologic Problems of Harry and Georgetown Counties, South Carolina
Status: Completed FY 80
Type(s): Contamination—Saltwater Intrusion, High Fluoride Concentrations; Quality of Water—Ground Water; Areal Appraisal
Location(s): Northeastern South Carolina

Product(s): Zack, A. L., 1980, Geochemistry of fluoride in the Black Creek aquifer system of Harry and Georgetown Counties, South Carolina; and its physiological implications: U.S. Geological Survey Water – Supply Paper 2067.

Title: An Assessment of Ground – Water Resources of Charleston, Berkeley, and Dorchester Counties, South Carolina—An Overview
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Effects of Development—Ground – Water Withdrawals; Contamination—High Fluoride Concentrations
Location(s): Central Coastal South Carolina

Title: Geologic, Hydrologic, and Hydraulic Evaluation of the Water Resources of Harry and Georgetown Counties, South Carolina
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Planning and Management—Develop Ground Water Supplies
Location(s): Northeastern South Carolina

Title: Southeast Coastal Plain Regional Aquifer System Study
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Southeastern South Carolina

Title: An Independent Examination of the Effectiveness of the Cooper River Rediversion Project
Status: Ongoing FY 81
Type(s): Effects of Development—Rediversion of River; Environmental Assessment—Sedimentation, Charleston Harbor
Location(s): Southern South Carolina

TEXAS

Texas has developed several alternative preliminary CZM programs based on existing State authorities. To date, however, none has been submitted formally for Federal approval.

The State's CZM program development activities were carried out by the General Land Office until 1979. More recent efforts were under the coordination of the Texas Energy and Natural Resources Advisory Council created by the Legislature.

Major issues addressed through the CZM program development phase include natural hazards (hurricanes, subsidence, and erosion), estuarine and bay management (wetlands, dredge activities and freshwater inflows) and developmental activities (industrial siting, OCS onshore impacts). Principal existing State laws considered for program implementation include the Texas Coastal Public Lands Management Act of 1973, the Texas Water Code, the Coastal Wetlands Acquisition Act, the Coastal Coordination Act, and the Dunes Protection act.

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Rocky Mountain Mapping Center, USGS, MS 504, Box 25046, Denver Federal Center, Lakewood, CO 80225—Phone: (303) 234–2326

1:250,000
Bay City
Beeville
Houston
Port Arthur

Geologic Studies

Initial contact: Regional Geologist, USGS, MS911, Federal Center, Lakewood, CO 80223—Phone: (303) 234–3624

Title: South Texas Lineaments and Subsidence Study
Status: Begun 1975, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Metropolitan Houston area
Investigator(s): R. R. Verbeck
Product(s): Verbeck, R. R., 1979, Surface faults in the Gulf Coastal Plain between Victoria and Beaumont, Texas: Tectonophysics, v. 52, p. 373–375

Title: Sedimentation and Stratigraphy of a Fluvial – Estuarine – Barrier Island Complex
Status: Begun 1975, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Mustang Island – Corpus Christi Bay area
Investigator(s): G. L. Shideler

Title: Quaternary Geologic History and Sea Floor Stability
Status: Begun 1979, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Outer shelf and upper slope of northwest Gulf of Mexico
Investigator(s): H. L. Berryhill, Jr.

Water Resources Studies

Initial contact: WRD District Chief, USGS, 300 E. 8th Street, Austin, TX 78701—Phone: (512) 397–5766

Title: Urban Hydrology Study—Houston, Texas
Status: Ongoing FY 81
Type(s): Effects of Development—Urbanization; Streamflow Characteristics—Floods; Quality of Water; Streamflow Modeling
Location(s): Southeastern Texas
Product(s): Liscum, Fred, and Massey, B. C., 1980, Tech-

niques for estimating the magnitude and frequency of floods in the Houston, Texas, metropolitan area: U.S. Geological Survey Water-Resources Investigations 80-17, 42 p.

Title: Saltwater Encroachment, Houston Area, Texas
Status: Completed FY 78
Type: Contamination—Saltwater Intrusion into Ground Water; Effects of Development—Dredging
Location(s): Southeast Texas
Product(s): Jorgensen, D. G., 1976, Saltwater encroachment in aquifers near the Houston ship channel, Texas: U.S. Geological Survey Open-File Report 76-781, 58 p.

Title: Model Study—Chicot and Evangeline Aquifers, Texas Gulf Coast
Status: Completed FY 80 (except report)
Type(s): Aquifer Modeling; Effects of Development—Ground Water Withdrawals
Location(s): Texas Gulf Coast
Product(s): Meyer, W. L., and Carr, J. R., 1979, A digital model for simulation of ground-water hydrology in the Houston area, Texas: Texas Department of Water Resources Report LP-103, 104 p.

Title: Model Study of the Jasper and Catahoula Aquifers in the Gulf Coast Region of Texas
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Aquifer Modeling; Effects of Development—Ground-Water Withdrawals
Location(s): Texas Gulf Coast
Product(s): Baker, E. T., Jr., 1977, Stratigraphic and hydrologic framework of part of the Coastal Plain of Texas: U.S. Geological Survey Open-File Report 77-712, 50 p.

Title: Artificial Recharge for Subsidence Abatement in the NASA-Johnson Space Center Area
Status: Completed FY 77
Type(s): Effects of Development—Land Subsidence as a result of Ground Water Withdrawals; Environmental Assessment
Location(s): East-central Texas
Product(s): Garza, S., 1977, Artificial recharge for subsidence abatement at the NASA-Johnson Space Center, Texas: U.S. Geological Survey Open-File Report 77-217, 77 p.

Title: Subsidence Studies Along the Texas Gulf Coast
Status: Ongoing FY 81
Type(s): Effects of Development—Land Subsidence as a result of Ground-Water Withdrawals; Environmental Assessment—Faulting and Land Subsidence
Location(s): Texas Gulf Coast
Product(s): Gabrych, R. K., 1980, Approximate land-surface subsidence in the Houston-Galveston region, Texas, 1906-78, 1943-78: U.S. Geological Survey Open-File Report 80-337, 4 p.

Title: Hydrogeology of the Wilcox Group (Eocene) Texas--A Regional Appraisal With Reference to Storage of Fluid Wastes in the Subsurface
Status: Completed FY 79
Type(s): Regional Hydrologic Investigation—Water-Quality
Location(s): Southern Texas
Product(s): Wesielman, J. B., 1977, Geopressure in the Carrizo-Wilcox aquifer system of Texas, in Proceedings of the Third Geopressured-Geothermal Energy Conference: University of Southwestern Louisiana, Lafayette, November 16-18, 1977, v. 1, p. GL 425-438, 14 p.
Wallace, R. H., Jr., 1979, Gulf Coast geopressured-geothermal resources as related to hydrogeologic characteristics of the subsurface system for disposal of spent brines, in Workshop on Subsurface Disposal of Geopressured Fluids, Gulf Coast, Proceedings, Louisiana State University, Baton Rouge, March 6-7, 1979, p. 21-42.

Title: Geopressured-Geothermal Resources of the United States
Status: Ongoing FY 81
Type(s): Regional Aquifers Investigations
Location(s): Gulf Coast—Texas, Louisiana
Product(s): Kharaka, Y. K., Callender, E., and Wallace, R. H., Jr., 1977, Geochemistry of geopressured geothermal waters from the Frio Clay in the Gulf Coast region of Texas: Geology, v. 5, April, p. 241-244.
Wallace, R. H., Jr., 1979, An assessment of gas dissolved in sandbed reservoirs in southern Louisiana and adjacent continental shelf; submitted as a part of the Report to Supply—Technical Advisory Task Force—Nonconventional National Gas Resources by sub-Task Force 1: Gas Dissolved in Water; Gas Policy Advisory Council, Federal Energy Regulatory Commission, U.S. Department of Energy, DOE/FERC-0029, p. 5-50, 46 p.
Wallace, R. H., Jr., Kraemer, T. F., Taylor, R. E., and Wesselman, J. B., 1979, Assessment of geopressured-geothermal resources in the Northern Gulf Coast of Mexico Basin, in Assessment of Geothermal Resources of the United States—1978: U.S. Geological Survey Circular 790, p. 132-155.
Wallace, R. H., Jr., Taylor, R. E., and Wesselman, J. B., 1977, Use of hydrogeologic mapping techniques in identifying potential geopressured-geothermal reservoirs in the Lower Rio Grande Embayment, Texas, in Proceedings, Third Geopressured-Geothermal Energy Conference, November 16- 18, 1977, University of Southwestern Louisiana, Lafayette, La., v. 1, p. GL 1-88, 88 p.

VIRGINIA

Virginia has one of the most comprehensive State and local programs in the Nation for regulating the use of wetlands. The State has engaged in the development of a CZM program focusing on wetlands controls and other existing State regulatory measures relating to air/water quality and marine resources. To date, however, no CZM program has been formally submitted for Federal approval.

The State's CZM program development activities are carried out by the Office of the Secretary of Commerce and Resources, the Virginia Marine Resources Commission, and the Virginia Institute of Marine Science.

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860–6336

1:250,000
Currituck Sound

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Sedimentology and Geochemistry of Coastal Plain Estuaries
Status: Begun 1979, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Potomac River Estuary adjacent to Maryland and Virginia
Investigator(s): E. A. Martin

Title: Geologic History of WesternChesapeake Bay
Status: Begun 1980, as replacement of earlier project on geologic hazards relating to siting of nuclear reactors, continuing
Type(s): Regional Geologic and Mineral Resources/Environmental Conditions and Geologic Hazards Investigation
Location(s): West side of Chesapeake Bay, including Norfolk area in Virginia
Investigator(s): W. L. Newell

Title: Sediments and Surficial Geology of Delmarva Peninsula
Status: Completed 1979
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Delmarva Peninsula of Delaware and Maryland
Investigator(s): J. P. Owens
Product(s): Denny, C. S., and Owens, J. P., 1979, Sand Dunes on the Delmarva Peninsula, Delaware and Maryland, U.S. Geological Survey Professional Paper 1067–C, 15 p.

Water Resources Studies

Initial contact: WRD District Chief, USGS, 200 W. Grace Street, Room 304, Richmond, VA 23220—Phone: (804) 782–2427

Title: Occurrence and Quality of Ground Water in the Coastal Plain of Virginia
Status: Completed FY 80
Type(s): Aquifer Delineation; Contamination—Saltwater Intrusion; Effects of Development—Ground-Water Withdrawals
Location(s): Eastern Virginia
Product(s): Hopkins, H. T., Bowen, R. F., Abe, J. M., and Harsh, J. F., 1980, Potentiometric surface map for the Cretaceous aquifer, Virginia Coastal Plain, 1978: U.S. Geological Survey Water-Resources Investigations Open-File Report 80–965, 1 p.

Title: Hydrology of the Coastal Plain Sediments Underlying James City County, Virginia
Status: Completed FY 80
Type(s): Aquifer Delineation, Areal Appraisal—Ground Water; Contamination—Saltwater Intrusion
Location(s): East-central Virginia
Product(s): Harsh, J. F., 1980, Ground water hydrology of James City County, Virginia: U.S. Geological Survey Water-Resources Investigations Open-File Report 80–961, 81 p.

Title: Hydrology of the Great Dismal Swamp
Status: Completed FY 80
Type(s): Areal Appraisal—Ground and Surface Water; Environmental Assessment
Location(s): Southeastern Virginia, northeastern North Carolina

Title: Distribution of Saltwater in the Coastal Plain
Status: Completed FY 80 (except report)
Type(s): Contamination—Saltwater Intrusion; Quality of Water—Vertical and Horizontal Distribution of Saltwater in Ground-Water Aquifers
Location(s): Southeastern Virginia

Title: Analysis of the Aquifer System in the Coastal Plain of Virginia
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Coastal Plain, Virginia and northeastern North Carolina

Title: Hydrology of Estuarine Intertidal Environments of Northwestern Oregon and the Potomac River Estuary
Status: Completed FY 80
Type(s): Regional Estuary Investigation
Location(s): Northwestern Oregon (Tillamook Embayment), Maryland and Virginia Potomac River Estuary)
Product(s): Glenn, J. L., 1978, Sediment sources and Holocene sedimentation history in Tillamook Bay, Oregon: Data and preliminary interpretations: U.S. Geological Survey, Open-File Report 78–680, 64 p.

PUERTO RICO

The Puerto Rico CZM program is, in essence, an integral element of its commonwealthwide process of planning, development, and conservation. Federal approval of the program was received in September 1978.

The primary objective of the Commonwealth's CZM program is to guide developments on public and private properties. Puerto Rico already has a process for guiding development in the coastal zone, conducted principally by four agencies: The Puerto Rico Planning Board, the Regulations and Permits Administration, the Environmental Qual-

ity Board, and the Department of Natural Resources.

The established guidance process is based on the comprehensive powers of the Planning Board to reconcile conflicts among existing laws on developments and the authorities of the Department of Natural Resources (DNR) in controlling the use of coastal and other natural resources. In this process, the DNR serves as advocate and proponent of a natural resource perspective and the Board makes the final decisions that reconcile those proposals with other needs. The DNR is designated as the lead agency for coastal management in Puerto Rico, and the Planning Board retains responsibility for overall policymaking and for principal development controls.

A major effort of the CZM program involves refinement of regulations and criteria relating to runoff and sedimentation control, diking, filling, dredging and deposit of dredged materials. In addition, policies dealing with mangrove wetlands, beach access and coastal developments have been set forth.

CZM BOUNDARY

Generally, the coastal zone extends inland 1,000 m from the shoreline of the main island of Puerto Rico—and in some places somewhat farther inland where necessary to include an important coastal natural system. In addition, all offshore islands are included in the coastal zone. Although the marine jurisdiction of Puerto Rico extends outward 3 marine leagues, the coastal zone includes only those waters within 3 nautical miles.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Geologic Map and Tectonic Setting of Puerto Rico
Status: Begun 1980, continuing
Type(s): Regional Geologic and Mineral Resources Investigation
Location(s): Islandwide
Investigator(s): R. D. Krushensky

Title: Sediments, Subsurface Structure and Geologic Hazards of Offshore Puerto Rico
Status: Begun 1972, continuing
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Offshore areas of Puerto Rico
Investigator(s): J. V. Trumbull
Product(s): Beach, D. K., and Trumbull, J. V., 1981, Marine geologic map of the Puerto Rico insular shelf, Isla Caja de Muertos area: U.S. Geological Survey Miscellaneous Investigation Series I–1265.

Title: Puerto Rico Seismic Program
Status: Begun 1974, completion pending
Type(s): Environmental Conditions and Geologic Hazards Investigation
Location(s): Islandwide
Investigator(s): C. J. Langer

Water Resources Studies

Initial contact: WRD District Chief, USGS, Building 652, P.O. Box 34168, Ft. Buchanan, PR 02903—Phone: (401) 528–4389

Title: Water Resources of the North Coast Limestone, Puerto Rico
Status: Completed FY 78
Type(s): Aquifer Delineation; Areal Appraisal—Ground Water
Location(s): North Coast, Puerto Rico
Product(s): Giusti, E. V., 1978, Hydrogeology of the karst of Puerto Rico: U.S. Geological Survey Professional Paper 1012, 68 p.

Title: Water Resources of Maunabo Valley, Puerto Rico
Status: Completed FY 77
Type(s): Areal Appraisal—Ground Water
Location(s): Southeastern Puerto Rico
Product(s): Adolphson, D. G., Seijo, M. A., and Robison, T. M., 1977, Water resources of the Maunabo Valley, Puerto Rico: U.S. Geological Survey Water-Resources Investigations 115–76, 38 p.

Title: Water-Quality Reconnaissance Study at Solid-Waste Disposal Sites in Puerto Rico
Status: Completed FY 79
Type(s): Waste Disposal and Contamination—Effect of Solid-Waste on Ground Water
Location(s): Puerto Rico, Islandwide
Product(s): Gomez-Gomez, F., 1979, Reconnaissance of six solid-waste disposal sites in Puerto Rico and effects on water quality: U.S. Geological Survey Open-File Report 79–1338, 75 p.

Title: Summary Appraisal of the Nation's Ground-Water Resources Caribbean Region
Status: Completed FY 79
Type(s): Areal Appraisal—Regional Ground Water; Planning and Management—Development of Ground-Water Resources
Location(s): Puerto Rico and U.S. Virgin Islands

Title: Effects of Ground-Water Usage in Critical Areas
Status: Ongoing FY 81
Type(s): Effects of Development—Ground-Water Withdrawals; Planning and Management—Development of Ground-Water Resources
Location(s): Southwest, north-central, and southeast Puerto Rico

Title: Geohydrologic Descriptions of Selected Sanitary Landfills in Puerto Rico
Status: Completed FY 78 (except report)
Type(s): Waste Disposal and Contamination—Effect of Solid-Waste Disposal on Ground Water
Location(s): Puerto Rico islandwide

Title: Water Resources of Sabana Seca to Vega Baja Area, Puerto Rico
Status: Completed FY 79 (except report)
Type(s): Areal Appraisal—Ground and Surface Water; Contamination—Saltwater Intrusion; Planning and Management—Growing of Rice
Location(s): North-central coast, Puerto Rico

Title: Water Resources of the Canovanas—Rio Grande Area, Puerto Rico
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground Water; Contamination—Seawater Intrusion
Location(s): Northeast coast, Puerto Rico

Title: Water Resources of the Rio Gunajibo Basin, Puerto Rico
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground and Surface Water; Contamination—Seawater Intrusion; Aquifer Delineation; Streamflow Characteristics
Location(s): Southwest coast, Puerto Rico

Title: Restoration of Fresh Ground Water in the Cano Tiburones Area of Puerto Rico
Status: Ongoing FY 81
Type(s): Contamination—Seawater Intrusion into Ground and Surface Water; Planning and Management—Growing of Rice
Location(s): North-central Coast, Puerto Rico

Title: Water Resources of the Manati Area, Puerto Rico
Status: Completed FY 80 (except report)
Type(s): Contamination—Seawater Intrusion; Areal Appraisal—Ground and Surface Water
Location(s): North-central coast, Puerto Rico

Title: Water Resources of the Cibuco Area, Puerto Rico
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Contamination—Seawater Intrusion
Location(s): North-central coast, Puerto Rico

Title: Water Resources of the Anasco Basin
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Environmental Assessment—Drainage for Agriculture
Location(s): West coast, Puerto Rico

Title: Available Water in the Lower Rio Loco Valley, Guanica, Puerto Rico
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Southwestern coast, Puerto Rico

Title: Availability of Water for Irrigation in the Lower Rio Grande de Arecibo Alluvial Valley
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Streamflow Characteristics
Location(s): Western north coast, Puerto Rico

VIRGIN ISLANDS

The Virgin Islands CZM program is based primarily on the Open Shoreline Act administered by the Department of Conservation and Cultural Affairs (DCCA). Federal approval of the program was received in September 1978.

The economy of the Virgin Islands is heavily dependent on tourism, which, in turn, generates a high demand for shoreline developments. In recent years, industries such as oil refining and watch assembly have also added to the demand for coastal locations. Thus, beginning in 1973, the Virgin Islands legislature passed a number of laws designed specifically to control the use of shorelines and related coastal resources.

The lead agency for the CZM program is the former Bureau of Shoreline and Land Management within the DCCA, now redesignated as the Division of Coastal Zone Management. The division operates a coastal zone permit system under the supervision of a territorywide Coastal Zone Management Commission which controls the dredging and mining of sand, gravel, and coral from the beaches and shorelines. In addition to the Open Shoreline Act, the provisions of several other statutes are also consolidated into the permit system, including

- the Trustlands, Occupancy and Alteration Act, which controls occupation and alteration of submerged lands by filling, dredging, mining, construction, or other means;
- the Earth Change Law, which controls soil erosion stemming from land alteration;
- the Zoning Law; and
- the Subdivision Law.

CZM BOUNDARY

The Virgin Islands' coastal zone is defined to include the 3-mi offshore areas and a two-tier landward element. The first tier is composed of a relatively narrow strip along the coast subject to the coastal zone permit system. All offshore islands and cays are included in the first tier, except those areas under the "sole discretion" of the Federal Government: Water and Buck Island, St. Thomas; Trunk Cay, St. John; and Buck Island,

St. Croix. The second tier includes all watersheds and adjacent areas of the three main islands.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Geologic Studies

Initial contact: Regional Geologist, USGS, 953 National Center, Reston, VA 22092—Phone: (703) 860–6631

Title: Sand Resources of Northern Virgin Islands Shelf
Status: Begun 1977, completed
Type(s): Special Mineral Resources Investigation
Location(s): Offshore areas of Virgin Islands
Investigator(s): C. W. Holmes
Product(s): Holmes, C. W., 1978, Virgin Islands sand resource study: U.S. Geological Survey Open – File Report 78–919, 55 p.

Water Resources Studies

Initial contact: WRD District Chief, USGS, Building 652, P.O. Box 34168, Ft. Buchanan, PR 02903—Phone: (401) 528–4389

Title: Water – Resource Appraisal of St. Croix, Virgin Islands
Status: Completed FY 79 (except report)
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): St. Croix, V.I.

Title: Water Resource Appraisal of St. Thomas, U.S. Virgin Islands
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation; Streamflow Characteristics
Location(s): St. Thomas, V.I.

THE GREAT LAKES

States in this region are concerned with such issues as the effects of shoreland developments on the water quality of the Great Lakes and, conversely, the problems of shoreline erosion and storm hazards stemming from the Lakes. The tradition of local home rule also runs strong in this region, though State resource management agencies are often given authorities to exercise overviews on planning and control of specially designated shoreland areas (environmentally sensitive and (or) hazard – prone areas) by local governments.

Typically, CZM decisionmaking processes in these States are based on existing State and (or) local shoreland control programs, with an intergovernmental coordination mechanism operating at the State level to provide policy guidance.

ILLINOIS

In 1978, the State developed a preliminary CZM program based on existing State and municipal authorities. Implementation of the program was to be made official through a proposed legislation. The Legislature, however, failed to pass the needed legislation. Consequently, no program has been submitted for Federal approval.

Illinois' coastal zone is defined in the preliminary program as a narrow strip of shoreland along Lake Michigan consisting primarily of properties immediately adjacent to the Lake, coastal flood plains, and erosion – prone areas. Management of this narrow strip will be primarily through existing local zoning, with the State providing assistance in conflict resolution between adjoining municipalities.

The State controls construction on low – lying properties immediately adjacent to Lake Michigan through its Rivers, Lakes, and Streams Act. Permits are required from the State Department of Transportation, Division of Water Resources, to authorize any project which will directly affect the waters of the lake.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Water Resources Studies

Initial contact: WRD District Chief, USGS, 102 E. Main Street, Urbana, IL 61801—Phone: (217) 398–5353

Title: Hydrogeologic Assessment of the Northern Midwest Regional Aquifer in Illinois
Status: Ongoing FY 1981
Purpose: Regional Aquifer System Analysis
Location(s): Northern Illinois
Investigator(s): District Office, Champaign, Ill.

INDIANA

Indiana has about 45 mi of shoreline on Lake Michigan consisting of densely populated and industralized areas as well as dunes, wetlands, beaches, prairies, and forests.

In early 1980, the State developed an approach to coastal zone management, calling for the creation of a legislative study committee in the State's Legislative Council to recommend to the Legislature the most appropriate means to implement a CZM program. The Indiana General Assembly, however, did not act on this proposal. Consequently, no program has been submitted for Federal approval.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Water Resources Studies

Initial contact: WRD District Chief, USGS, 1819 N.

Meridian Street, Indianapolis, IN 46202—Phone: (317) 269–7101

Title: Investigation of the Hydrology and Water Quality of Cowels Bog Wetland Complex and Surrounding Area
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Aquifer Delineation
Location(s): Northwestern Indiana

Title: Investigation of Potential Ground-Water Quality Changes Caused by Northern Indiana Public Service Company
Status: Ongoing FY 81
Type(s): Effects of Development—Dewatering; Quality of Water—Ground Water (Modeling)
Location(s): Northwestern Indiana

Title: Regional Ground-Water Appraisal, Great Lakes Basin
Status: Completed FY 77
Type(s): Areal Appraisal—Regional Ground Water; Planning and Management
Location(s): Great Lakes Basin, Northern Indiana
Product(s): Weist, W. G., Jr., 1977, Summary appraisal of the nation's ground-water resources, Great Lakes Region: U.S. Geological Survey Professional Paper 812, 30 p.

Title: Evaluation of Water-Level and Water-Quality Problems, Indiana Dunes National Lakeshore
Status: Completed FY 79
Type(s): Effects of Development—Dewatering; Contamination—Fly-Ash; Quality of Water—Ground Water
Location(s): Northwestern Indiana
Product(s): Meyer, William, and Tucci, Patrick, 1979, Effects of seepage from fly-ash settling ponds and construction dewatering on ground-water levels in the Cowles Unit, Indiana Dunes National Lakeshore, Indiana: U.S. Geological Survey Water-Resources Investigations 78–138, 95 p.

Title: Ground-Water Resources of the Indiana Dunes National Lakeshore
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation; Effects of Development—Urbanization, Dewatering
Location(s): Northwestern Indiana
Product(s): Gillies, D. C., and Lapham, W. W., 1980, Reassessment of the effects of construction dewatering on groundwater levels in the Cowles Unit, Indiana Dunes National Lakeshore, Indiana: U.S. Geological Survey Open-File Report 80–1105, 56 p.

Title: The Northern Midwest Regional Aquifer Systems Analysis: Hydrogeology and Water Quality of the Cambrian-Ordovician Aquifer in Indiana
Status: Ongoing FY 81
Type(s): Regional Aquifer System Analysis
Location(s): Northwestern Indiana

Title: Biological and Chemical Characteristics of Surface Waters of the Indiana Dunes National Lakeshore
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water; Contamination—Fly-Ash
Location(s): Northwestern Indiana

MICHIGAN

The Michigan CZM program is based primarily on the Michigan Shorelands Protection and Management Act of 1970 (Act 245), which enables the State to regulate developments in designated shoreland high-risk erosion areas. Federal approval of the program was received in September 1978.

The State's Department of Natural Resources, which administers Act 245, is the designated CZM Agency. Through the CZM program, a number of other existing State regulatory programs, notably those applicable to wetlands, floodplains, and soil erosion and sedimentation controls, are incorporated into a coastal management system. Implementation of the CZM program is through existing State permits and licenses and there is no special coastal permit process created.

Local governments in Michigan's coastal zone are involved in the CZM program through Act 245, which requires implementation through local zoning ordinances approved in accordance with State guidelines and standards. Under provisions of Act 245, State permits will be applicable to only those "high-risk erosion-prone" shorelands not covered by a local zoning ordinance.

CZM BOUNDARY

Michigan's coastal zone includes waters of the Great Lakes under its jurisdiction. The inland boundary is defined to include areas extending a minimum of 1,000 ft from the ordinary high-water mark, plus bulges around areas having resources or uses which have a physical, chemical, biological, or other demonstrable impact upon the Great Lakes. Thus, while the inland coastal zone is essentially a 1,000 ft strip of shoreland, it contains such bulges as coastal lakes; river-mouths and bays; floodplains; wetlands; Great Lakes sand dunes; public park, recreation and natural areas, and some urban areas.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Water Resources Studies

Initial contact: WRD District Chief, USGS, 6520 Mercantile Way, Suite 5, Lansing, MI 48910—Phone: (517) 372–1910

Title: Ground-Water Resources of the Western Upper Peninsula, Michigan
Status: Completed FY 78 (except report)
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Northwestern Michigan

Title: Ground Water of Coal Deposits, May County, Michigan
Status: Completed FY 79 (except report)
Type(s): Aquifer Delineation; Environmental Assessment—Ground Water in Coal Beds
Location(s): East – central Michigan

Title: Ground – Water Modeling of Muskegon County Wastewater Treatment Facility
Status: Completed FY 79
Type(s): Aquifer Modeling, Waste Disposal and Contamination—Liquid Waste
Location(s): West – central Michigan

Title: Geology and Hydrology for Environmental Planning in Michigan
Status: Completed FY 79 (except report)
Type(s): Environmental Assessment—Geology and Water Resources; Planning and Management—Land Use
Location(s): Michigan statewide

Title: Water Resources of the Marquette Iron Range Area, Michigan
Status: Completed FY 79
Type(s): Areal Appraisal—General
Location(s): Central upper peninsula, Michigan
Product(s): Grannemann, N. G., 1979, Water resources of the Marquette iron range area, Marquette County, Michigan: U.S. Geological Survey Open – File Report 79–1339, 77 p.

Title: Hydrologic Analysis of the Sands Plain Area, Marquette County, Michigan
Status: Ongoing FY 81
Type(s): Effects of Development—Mining Excavations; Aquifer Delineation; Quality of Water—Ground Water
Location(s): Central upper peninsula, Michigan

Title: Water Resources of Sleeping Bear Dunes National Lakeshore, Michigan
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Northwestern lower peninsula, Michigan

Title: Water Resources of Pictured Rocks National Lakeshore, Michigan
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Northern upper peninsula, Michigan

Title: Ground – Water Study of Wurtsmith Air Force Base, Michigan
Status: Ongoing FY 81
Type(s): Contamination—Trichloroethylene in Ground Water; Quality of Water—Ground Water; Aquifer Modeling
Location(s): Northeastern lower peninsula, Michigan
Product(s): Stark, J. R., Cummings, T. R., and Twenter, F. R., 1981, Ground – water contamination at Wurtsmith Air Force Base, Michigan: U.S. Geological Survey Administrative Report, 84 p.

Title: Water Resources of Van Buren County, Michigan
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water; Effects of Development—Irrigation
Location(s): Southwestern Michigan

MINNESOTA

The State engaged in a CZM program – development process in 1975 through its Office of State Planning. In time, the two northernmost coastal counties opposed the program due to efforts in Congress to expand the nearby Boundary Waters Canoe Area and the management authority of the U.S. Forest Service. Because of this opposition, the State terminated its activities for CZM program development in September 1980.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Water Resources Studies

Initial contact: WRD District Chief, USGS, 1033 Post Office Building, St. Paul, MN 55101—Phone: (612) 725–7841

Title: Hydrology of Watersheds in the Lake Superior Basin, Minnesota
Status: Completed FY 77
Type(s): Areal Appraisal—Ground and Surface Water; Planning and Management—Development of Water Resources
Location(s): Northeastern Minnesota
Product(s): Lindholm, G. F., Ericson, D. W., Broussard, W. L., and Hult, M. F., 1977, Water resources of the St. Louis River watershed, northeastern Minnesota: U.S. Geological Survey Open – File Report 77–608, 3 sheets.

Title: A Hydrogeologic Reconnaissance of Sand – Plain Aquifers in Minnesota
Status: Completed FY 80 (except report)
Type(s): Aquifer Delineation
Location(s): Minnesota statewide

Title: Environmental Impact Assessment of Copper – Nickel Mining Development in Northeastern Minnesota
Status: Completed FY 80
Type(s): Environmental Assessment—Water Resources; Effects of Development—Mining; Areal Appraisal—Ground and Surface Water
Location(s): Northeastern Minnesota
Product(s): Siegel, D. I., and Ericson, D. W., 1980, Hydrology and water quality of the copper – nickel study region, northeastern Minnesota: U.S. Geological Survey Water – Resources Investigations Open – File Report 80–739, 87 p.

Title: Summary Appraisals of the Nation's Ground – Water Resources—Souris – Red – Rainy Rivers Region
Status: Completed FY 77
Type(s): Areal Appraisal—Regional Ground Water; Planning and Management—Development of Water Resources
Location(s): Western Minnesota, eastern North Dakota, and eastern South Dakota
Product(s): Reeder, H. O., 1977, Summary appraisals of the Nation's ground – water resources—Souris – Red – Rainy region: U.S. Geological Survey Professional Paper 813–K, 112 p.

Title: Water Quality Investigations in Voyageurs National Park, Minnesota
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water, Lakes; Effects of Development; Environmental Assessment
Location(s): Northern Minnesota
Product(s): Payne, G. A., 1979, Water-quality reconnaissance of lakes in Voyageurs National Park, Minnesota: U.S. Geological Survey Open-File Report 79-556, 40 p.

Title: Underground Injection Control Program, Minnesota
Status: Ongoing FY 81
Type(s): Aquifer Delineation; Waste Disposal and Contamination; Planning and Management—Waste Injection in Aquifers
Location(s): Minnesota statewide

OHIO

The State has developed a preliminary CZM program calling for the passage of a legislation which will give the State authority over wetlands, provide for setbacks of structures in erosion-prone areas, and require municipalities to participate in the National Flood Plain Insurance Program. The needed legislation, however, has failed to pass. Consequently, no program has been submitted for Federal approval.

USGS ACTIVITIES AND INFORMATION PRODUCTS

Water Resources Studies

Initial contact: WRD District Chief, USGS, 975 W. Third Avenue, Columbus, OH 43212—Phone: (614) 469-5553

Title: Investigation of Geology and Ground-Water Hydrology Associated with the Salina Formation in a Selected Area in Northeast Ohio
Status: Completed FY 1979.
Purpose: Aquifer Delineation; Environmental Assessment—Location of Salt Deposits
Location(s): Northeastern Ohio
Product(s): Norris, S. E., 1978, Hydrologic environment of the Silurian salt deposits in parts of Michigan, Ohio, and New York: U.S. Geological Survey Open-File Report 78-684, 27 p.
Norris, S. E., 1978, The Silurian salt deposits in eastern Lake, northwestern Astabula, and northeastern Geauga Counties, Ohio: U.S. Geological Survey Open-File Report 79-269, 15 p.

PENNSYLVANIA

Pennsylvania has coastal areas bordering on the Great Lakes and the part of the Delaware River that is under tidal influence. Its CZM program is based on several existing State laws, including the Dam Safety and Encroachment Act (controls obstructions and encroachments in wetlands and in the beds of Lake Erie and the Delaware River), the Floodplain Management Act, the Bluff Recession and Setback Act, and various air and water quality-control programs. Federal approval of the program was received in September 1980.

There are provisions for local administration of two program authorities based on State standards. These are the Floodplain Management Act, administered by the Department of Community Affairs and the Department of Environmental Resources, and the Bluff Recession and Setback Act, administered by the Department of Environmental Resources.

CZM BOUNDARY

The Lake Erie portion of the Pennsylvania coastal zone extends landward from the international boundary with Canada in Lake Erie to areas 400 ft to 3 mi from the shoreline, encompassing erosion-hazard areas, wetlands, and floodplains. The Delaware River portion extends landward from the interstate boundary with New Jersey in the river to areas within 1/8 to over 3.5 mi from the banks of the Delaware, including all segments of tributaries under tidal influence (from Morrisville near Trenton southward to the interstate boundary line with Delaware).

USGS ACTIVITIES AND INFORMATION PRODUCTS

Topo-Bathy Maps

Initial contact: National Cartographic Information Center, Eastern Mapping Center, USGS, 536 National Center, Reston, VA 22092—Phone: (703) 860-6336

1:250,000
Wilmington

Water Resources Studies

Initial contact: WRD District Chief, P. O. Box 1107, Harrisburg, PA 17108—Phone: (717) 782-3468

Title: The Effects of Urbanization Upon the Water Resources of Philadelphia, Pennsylvania
Status: Completed FY 79 (except report)
Type(s): Effects of Development—Urbanization; Environmental Assessment—Floods; Streamflow Characteristics
Location(s): Philadelphia, Pa.

Title: Hydrology and Geology of Erie County
Status: Completed FY 80 (except report)
Type(s): Areal Assessment—Ground Water; Aquifer Delineation; Contamination—Saline Water
Location(s): Northwestern Pennsylvania

Title: Ground – Water Quality in Pennsylvania
Status: Completed FY 80 (except report)
Type(s): Quality of Water—Ground Water
Location(s): Pennsylvania statewide

Title: River Quality Assessment of the Schuylkill River Basin
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water; Contamination—Heavy Metals and Organic Compounds; Streamflow Characteristics
Location(s): Southeastern Pennsylvania
Product(s): Pederson, G. L., Yorke, T. H., and Stamer, J. K., 1980, Work plan for the Schuylkill River basin, Pennsylvania; Assessment of river quality as related to the distribution and transport of trace metals and organic substances: U.S. Geological Survey Open – File Report 80–566, 25 p.

Title: Ground – Water Quality and Flow in the Coastal Plain Aquifer, Philadelphia Area, Pennsylvania
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Quality of Water—Ground Water; Effects of Development—Ground – Water Withdrawals
Location(s): Philadelphia, Pennsylvania

Title: Water – Quality Loads of the Susquehanna River
Status: Ongoing FY 81
Type(s): Quality of Water—Surface Water; Contamination
Location(s): South – central Pennsylvania

Title: Appraisal of the Ground – Water Resources of the Philadelphia Area, Pennsylvania
Status: Ongoing FY 81
Type(s): Planning and Management—Ground – Water Development
Location(s): Philadelphia, Pennsylvania

WISCONSIN

The Wisconsin Coastal Management Program is based on numerous State laws which provide for the management of water resources, shoreline zoning, economic development, powerplant siting and others. A Governor's Executive Order (No. 41, dated March 25, 1980) provides for the coordination of these laws, establishes a Wisconsin Coastal Management Council to "set out State coastal policies," and directs State agencies to act consistently with such policies. Federal approval of the program was received in May 1978.

CZM BOUNDARY

The Wisconsin coastal zone is defined to include all water areas in the Great Lakes under its jurisdiction and a landward element consisting of the 15 counties with frontage on Lake Superior, Lake Michigan, or Green Bay.

Initial contact: WRD District Chief, USGS, 1815 University Avenue, Room 200, Madison, WI 53706—Phone: (608) 262–2488

Title: Study of Ground – Water Pollution in the Niagara Dolomite of Door County, Wisconsin
Status: Completed FY 78
Type(s): Waste Disposal and Contamination—Pollution of Ground Water; Areal Appraisal—Alternate Sources of Ground Water
Location(s): Northeastern Wisconsin
Product(s): Sherrill, M. G., 1978, Geology and ground water in Door County, Wisconsin, with emphasis on contamination potential in the Silurian dolomite: U.S. Geological Survey WaterSupply Paper 2047, 38 p.

Title: Hydrology of Cedar Lake; Surface Water – Ground Water Relationships
Status: Completed FY 80
Type(s): Environmental Assessment—Lake Recharge by Ground – Water Pumpage; Effects of Development—Ground – Water Withdrawals
Location(s): East – central Wisconsin
Product(s): McLeod, R. S., 1980, The effects of using ground water to maintain water levels of Cedar Lake, Wisconsin: U.S. Geological Survey Water – Resources Investigations 80–23, 35 p.

Title: Red Clay Sedimentation
Status: Completed FY 79
Type(s): Environmental Assessment—Erosion and Sediment Loads in Streams; Quality of Water—Surface Water
Location(s): Northwestern Wisconsin
Product(s): Rose, W. J., 1979, Bedload in northwestern Wisconsin's Nemadji River: U.S. Geological Survey Administrative Report, 12 p.

Title: Ground – Water Resources and Geology of Washington and Ozaukee Counties, Wisconsin
Status: Completed FY 80
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Southwestern Wisconsin
Product(s): Young, H. L., and Batten, W. G., 1980, Ground – water resources and geology of Washington and Ozaukee Counties, Wisconsin: Wisconsin Geology and Natural History Survey Information Circular 38, 37 p.

Title: Hydrology of Wetlands in Wisconsin
Status: Completed FY 78 (except report)
Type(s): Environmental Assessment—Classification of Wetlands, Relation to Surface and Ground – Water Quality and Quantity
Location(s): Wisconsin statewide
Product(s): Novitzki, R. P., 1978, Wisconsin wetlands; plants, hydrology, and soils: Wisconsin Geology and Natural History Survey Bulletin, 25 p.

Title: Ground – Water Contamination Potential in the Dolomite Aquifer of Eastern Wisconsin
Status: Completed FY 79

Type(s): Contamination—Ground Water; Aquifer Delineation; Quality of Water—Ground Water
Location(s): Eastern Wisconsin
Product(s): Sherrill, M. G., 1979, Contamination potential in the Silurian dolomite aquifer, eastern Wisconsin: U.S. Geological Survey Water-Resources Investigations 78-108, 2 p.

Title: Ground-Water Resources and Geology of Dodge County, Wisconsin
Status: Completed FY 79 (except report)
Type(s): Areal Appraisal—Ground Water; Aquifer Delineation
Location(s): Southeastern Wisconsin

Title: Sediment Disposition in the White River Reservoir, Northwestern Wisconsin
Status: Completed FY 81
Type(s): Contamination—Sediment; Environmental Assessment—Erosion and Sediment Deposition
Location(s): Northwestern Wisconsin
Product(s): Batten, W. G., and Hindall, S. M., 1980, Sediment deposition in the White River reservoir, northwestern Wisconsin: U.S. Geological Survey Water-Supply Paper 2069, 30 p.

Title: Hydrogeology and Ground-Water Quality in Northeastern Waukesha County, an Area of Near-Surface Dolomite Bedrock
Status: Completed FY 80 (except report)
Type(s): Areal Appraisal—Ground Water; Contamination—Ground Water Supplies (determine source and type)
Location(s): Southeastern Wisconsin

Title: Water-Table, Depth-to-Water, and Contamination-Potential Maps of Washington Ozaukee, Waukesha, Milwaukee, Walworth, Racine, and Kenosha Counties, Wisconsin
Status: Completed FY 79
Type(s): Planning and Management—Hydrologic Atlas Maps for Protection and Management of Ground-Water Resources
Location(s): Southeastern Wisconsin
Product(s): Sherrill, M. G., Schiller, J. J., and Erickson, J. R., 1979, Watertable map of Kenosha County, Wisconsin: U.S. Geological Survey Water-Resources Investigations 79-31, 1 pl.
Sherrill, M. G., Schiller, J. J., and Erickson, J. R., 1979, Water- table map of Milwaukee County, Wisconsin: U. S. Geological Survey Water- Resources Investigations 79-40 1 pl.
Sherrill, M. G., Schiller, J. J., and Erickson, J. R., 1979, Water- table map of Racine County, Wisconsin: U.S. Geological Survey Water-Resources Investigations 79-41, 1 pl.
Sherrill, M. G., Schiller, J. J., and Erickson, J. R., 1979, Water- table map of Walworth County, Wisconsin: U.S. Geological Survey Water- Resources Investigations 79-42, 1 pl.
Gonthier, J. B., 1979, Water-table map of Waukesha County, Wisconsin: U.S. Geological Survey Water-Resources Investigations 79-43, 1 pl.

Title: Ground-Water Quality Appraisal of Wisconsin's Aquifers
Status: Ongoing FY 81
Type(s): Quality of Water—Ground Water; Environmental Assessment—Natural and Man-Made Water-Quality Problems
Location(s): Wisconsin statewide

Title: Hydrology of the Northern Midwest Regional Aquifer System in Wisconsin
Status: Ongoing FY 81
Type(s): Regional Aquifer Systems Analysis
Location(s): Southern Wisconsin

Title: Simulation of a Proposed Management Plan for Winnebago Pool Water Elevations to Determine the Effects on Streamflow in the Fox River
Status: Completed FY 81
Type(s): Streamflow Characteristics; Planning and Management—Managing Lake Levels and Streamflow; Effects of Development
Location(s): East-Central Wisconsin
Product(s): Kreig, W. R., 1981, Hydrologic effects of proposed changes in management practices, Winnebago Pool, Wisconsin Pool, Wisconsin: U.S. Geological Survey Water-Resources Investigations 80-107, 19 p.

Title: Water Resources Appraisal of Apostle Islands National Lakeshore
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground and Surface Water
Location(s): Northern Wisconsin

Title: Hydrogeology of an Area of Declining Ground- Water Levels in the Lower Fox River Valley, Wisconsin
Status: Ongoing FY 81
Type(s): Areal Appraisal—Ground Water; Effects of Development—Ground Water Withdrawals; Aquifer Modeling
Location(s): Northeastern Wisconsin

APPENDIX

Florida–Volusia County, Daytona Beach. May 1938.

APPENDIX 1

U.S. GEOLOGICAL SURVEY DIVISIONS FOR EARTH-SCIENCES ACTIVITIES

The USGS' earth science activities are performed by three program divisions: Geologic, National Mapping, and Water Resources.

The Geologic Division through a continuing national program of geologic research and investigations produces (a) new and improved methods, techniques, and instruments for mineral and energy resource assessments on land and on the submerged continental margins; (b) geologic, geophysical, and geochemical maps and analyses that show the distribution, age, composition, structure, and physical properties of the rocks and mineral deposits at and beneath the surface of the Earth, including the OCS; (c) information on the chemistry and physics of the earth, the climate, and the geologic processes by which it was formed and is continually being modified; (d) information on geologic hazards, such as volcanoes, landslides, and land subsidence, which affect human safety, urban development, and the engineering design of sensitive structures such as nuclear reactors and offshore oil and gas platforms as well as public facilities in urban areas; and (e) analyses for use by other Federal and State agencies in the management of Federal lands, including Federal coal leasing, wilderness studies, multiple-use planning, and national policy determinations relating to energy development and mineral resource availability.

The National Mapping Division produces basic information on the configuration of the land surface through various general-purpose, special map, and special photoimage products. It also operates the National Cartographic Information Center, which serves as a clearinghouse for cartographic, photoimage, and digital data available from both Federal and State agencies. To meet the special needs of coastal zone planning and management, this Division, in cooperation with the National Ocean Survey (NOS) of the National Oceanic and Atmospheric Administration (NOAA), is preparing a series of topo-bathy maps of coastal areas showing, in addition to regular topographic features on land, sea-bottom contours derived from bathymetric data. The National Mapping Division has also cooperated with NOS in producing a "Coastal Mapping Handbook" to help coastal planners match their needs with map products from Federal sources.

The Water Resources Division undertakes investigations and collects data on the quantity, quality, movement, and use of the surface and ground water. It also engages in special analyses of such topics as the frequency and heights of floods in order to assist Federal and State planning and management efforts in floodplains. The Water Resources Division investigates problems in the coastal zone, such as saltwater encroachment into ground-water supplies, sinking of land because of excessive ground-water withdrawals, and the role of freshwater in maintaining the ecological health of estuaries. The majority of these studies are done through cooperatively funded efforts with other Federal agencies and State and local governments.

APPENDIX II

SOURCES OF FURTHER INFORMATION FOR COASTAL STATES

(NOTE: Materials in this section are based on excerpts from U.S. Geological Survey Circular 777, "A Guide to obtaining Information from the USGS," 1981.)

A. Public Inquiries Office (PIO's)
B. USGS Distribution Branch and Open – File Services Section
C. Regional Centers and State Affiliates of the National Cartographic Information Center

PUBLIC INQUIRIES OFFICES

Public Inquiries Offices (PIO's) provide general information about the programs of the USGS and its reports and maps. PIO's answer inquiries made in person, by mail, or by telephone; recommend publications relating to specific subjects and areas; and refer requests for specific technical information to the appropriate people. PIO's sell limited quantities of published maps and books over the counter and distribute circulars, nontechnical publications, most catalogs, and indexes free of charge. All PIO's, except those in Reston, Washington, and Menlo Park maintain small reference libraries. Most are depositories for open – file reports. The Anchorage, Los Angeles, and Spokane offices maintain Landsat reference files and viewers for satellite images. PIO's with services available to coastal States are listed below:

ANCHORAGE, ALASKA

Maps of and book reports on Alaska:

Public Inquiries Office
U.S. Geological Survey
108 Skyline Building
508 West Second Avenue
Anchorage, Alaska 99501
(907) 277–0577
FTS (907) 277–0577

DALLAS, TEX.

Maps of and book reports on Louisiana and Texas:

Public Inquiries Office
U.S. Geological Survey
1–C–45 Federal Building
1100 Commerce Street
Dallas, Tex. 75242
(214) 767–0198
FTS 729-0198

DENVER, COLO.

Maps of and book reports on Alaska:

Public Inquiries Office
U.S. Geological Survey
169 Federal Building
1961 Stout Street
Denver, Colo.
(303) 837–4169
FTS 327–4169

LOS ANGELES, CALIF.

Maps of and book reports on Alaska, California, Hawaii, Oregon, and Washington:

Public Inquiries Office
U.S. Geological Survey
7638 Federal Building
300 North Los Angeles Street
Los Angeles, CA 90012
(213) 688–2850
FTS 798 – 2850

MENLO PARK, CALIF.

Maps of and book reports on Alaska, California, Hawaii, Oregon, and Washington:

Public Inquiries Office
Building 3, Mail Stop 33
345 Middlefield Road
Menlo Park, CA 94025
(415) 323–8111, ext. 2818
FTS 467–2817

RESTON, VA.

Maps of and book reports on all States:

Public Inquiries Office
U.S. Geological Survey
503 National Center
Room I–C–402
12201 Sunrise Valley Drive
Reston, VA 22092
(703) 860–6167
FTS 928–6167

SAN FRANCISCO, CALIF.

Maps of and book reports on Alaska, California, Hawaii, Oregon, and Washington:

Public Inquiries Office
U.S. Geological Survey
504 Court House
555 Battery Street
San Francisco, CA 94111

(415) 556–5627
FTS 556–5627

SPOKANE, WASH.

Maps of and book reports on Alaska, Oregon, and Washington:

Public Inquiries Office
U.S. Geological Survey
678 U.S. Court House
West 920 Riverside Avenue
Spokane, Wash. 99201
(509) 456–2524
FTS 439–2524

WASHINGTON, D.C.

Maps of and book reports on all States:

Public Inquiries Office
U.S. Geological Survey
1028 General Services Administration Building
19th and F Streets, N.W.
Washington, D.C. 20244
(202) 343–8073
FTS 343–8073

DISTRIBUTION OFFICES

DISTRIBUTION BRANCHES

The three regional centers of the USGS Distribution Branch are the primary sources for maps published by the USGS, and the Texts Products Section of the Eastern Distribution Branch is the primary source for all USGS books. To order maps, write to the appropriate center as explained below; for books, write to the Texts Products Section.

EASTERN DISTRIBUTION BRANCH

The Eastern Distribution Branch distributes maps of areas east of the Mississippi River including Minnesota, Puerto Rico, and the Virgin Islands. The Texts Products Section of this office also sells all USGS books and distributes free materials.

Eastern Distribution Branch
U.S. Geological Survey
1200 South Eads Street
Arlington, Va. 22202

(703) 557–2781
FTS 557–2781

Text Products Section
Eastern Distribution Branch
U.S. Geological Survey
604 South Pickett Street
Alexandria, Va. 22304

(703) 756–6141
FTS 756–6141

WESTERN DISTRIBUTION BRANCH

The Western Distribution Branch sells maps of areas west of the Mississippi River including Alaska, Hawaii, Louisiana, Guam, and American Samoa. This office also distributes Geodetic Control Diagrams for the entire United States and selected River Survey Maps.

Western Distribution Branch
U.S. Geological Survey
Box 25286, Denver Federal Center
Lakewood, Colo. 80225

(303) 234–3832
FTS 234–3832

ALASKA DISTRIBUTION SECTION

The Alaska Distribution Section in Fairbanks sells maps of Alaska.

Alaska Distribution Section
U.S. Geological Survey
New Federal Building—Box 12
101 Twelfth Avenue
Fairbanks, Alaska 99701

(907) 456 – 7535
FTS (907) 456 – 7535

USGS OPEN–FILE SERVICES SECTION

The Open – File Services Section is a mail – order facility where both microfiche and paper copies of most open – file reports are available at cost. The price of each open – file report is given when the report is announced in "New Publications of the Geological Survey." Reports requiring special reproduction techniques may be available, however, only from certain depositories; in these cases, the source is indicated in the announcement. Prepayment is required and should be made payable to the U.S. Geological Survey. Reference copies of open – file reports continue to be available for inspection at U.S. Geological Survey libraries and at specified PIO's.

Open – File Services Section
Western Distribution Branch
U.S. Geological Survey
Box 25425
Denver Federal Center
Lakewood, Colo. 80225

REGIONAL CENTERS AND STATE AFFILIATES OF THE NATIONAL CARTOGRAPHIC INFORMATION CENTER

NATIONAL CARTOGRAPHIC INFORMATION CENTER HEADQUARTERS

National Cartographic Information Center
U.S. Geological Survey
507 National Center
Reston, Va. 22092

(703) 860–6045
FTS 928–6045

REGIONAL CENTERS

National Cartographic Information Center
Eastern Mapping Center
U.S. Geological Survey
536 National Center
Reston, Va. 22092

(703) 860 – 6336
FTS 928 – 6336

National Cartographic Information Center
Mid – Continent Mapping Center
U.S. Geological Survey
1400 Independence Road
Rolla, Mo. 65401

(314) 341–0851
FTS 277–0851

National Cartographic Information Center
Rocky Mountain Mapping Center
U.S. Geological Survey
MS 504, Box 25046
Denver Federal Center
Lakewood, Colo. 80225

(303) 234 – 2326
FTS 234 – 2326

National Cartographic Information Center
Western Mapping Center
U.S. Geological Survey
345 Middlefield Road
Menlo Park, Calif. 94025

(415) 323–8111, Ext. 2427
FTS 467–2427

National Cartographic Information Center
U.S. Geological Survey
218 E Street
Anchorage, Alaska 99501

(907) 271–4149
FTS (907) 271–4148

National Cartographic Information Center
U.S. Geological Survey
Building 3101
National Space Technology Laboratories
NSTL Station, Miss. 39529

(601) 688–3544
FTS 494–3544

COASTAL STATES AFFILIATES

Geological Survey of Alabama
P.O. Drawer O
University, Ala. 35486

California Automated Resources Inventory
Department of Conservation
Suite 225
717 K Street
Sacramento, Calif. 95814

Office of Research and Evaluation
Georgia Department of Community Affairs
19 Martin Luther King, Jr., Drive
Atlanta, Ga. 30334

Department of Planning and Economic Development
Kamamalu Building
250 South King Street
Honolulu, Hawaii 96813

Office of Public Works
Department of Transportation and Development
P.O. Box 44155
Baton Rouge, La. 70804

Division of Land Resource Programs
Michigan Department of Natural Resources
Box 30028
Steven T. Mason Building
Lansing, Mich. 48909

Land Management Information Center
Minnesota State Planning Agency
LL45 Metro Square Bldg.
7th and Robert
Saint Paul, Minn. 55101

Regional Planning Branch
Mississippi Research and Development Center
P.O. Drawer 2470
Jackson, Miss. 39205

Department of Environmental Protection
New Jersey Geological Survey
P.O. Box 1390
Trenton, N.J. 08625

Chief, Geological Survey Section
Division of Land Resources, DNRCD
Box 27687
Raleigh, N.C. 27611

Administrator for Public Services
State Library Building
Salem, Oreg. 97310

Bureau of Topographic and Geological Survey
Department of Environmental Resources
P.O. Box 2357
Harrisburg, Pa. 17120

South Carolina Land Resources Conservation Commission
Suite 222
2221 Devine Street
Columbia, S.C. 29205

Texas Natural Resource Information Systems
P.O. Box 13087
Austin, Tex. 78711

Division of Mineral Resources
Department of Conservation and Economic Development
National Resources Building
Box 3667
Charlottesville, Va. 22903

Document Section
Washington State Library
Olympia, Wash. 98504

State Cartographer's Office
144 Science Hall
550 North Park Street
Madison, Wis. 53706