FEDERAL MAPPING AND CHARTING ACTIVITIES

Responsibility for mapping and charting the land areas of the United States, its airspace, and its waters and adjacent seas is divided among the executive departments, bureaus, and offices of the Federal Government listed below.

DEPARTMENT OF AGRICULTURE.—The Forest Service performs topographic mapping for engineering, resource, and conservation management of national forests. Activities include large-scale mapping for road reconnaissance and design, damsites, watersheds, and recreational-area development.

The Soil Conservation Service prepares maps showing the results of soil surveys to facilitate land-use planning.

DEPARTMENT OF COMMERCE.—The Bureau of the Census publishes a special Census Metropolitan Map Series showing local boundaries, tracts, blocks, wards, and congressional districts.

The Coast and Geodetic Survey maintains the national geodetic control network and produces nautical charts of coastal waters and certain interior waters of the United States, in support of sea navigation; aeronautical charts of the United States for civil and military use and for international air routes used by civil aviation, and State postal maps for the U.S. Post Office Department.

DEPARTMENT OF DEFENSE.—The Aeronautical Chart and Information Center produces aeronautical charts for all areas outside the United States to meet military aviation requirements.

The Army Topographic Command prepares topographic maps chiefly of foreign areas to meet Department of Defense requirements.

The Lake Survey publishes nautical charts of the Great Lakes.

The Mississippi River Commission prepares topographic maps and hydrographic charts for the lower Mississippi River and its navigable tributaries.

The Naval Oceanographic Office publishes and maintains charts of oceans and the navigable water of the world showing hydrographic, topographic, and navigational data and prepares aeronautical charts required for naval aviation.

DEPARTMENT OF THE INTERIOR.—The Geological Survey prepares, maintains, and distributes general-purpose maps of the National Topographic Map Series of the United States and areas under its sovereignty. This mapping program has continued for 90 years and has gained recognition for the Geological Survey as the Nation's principal civilian mapping agency. The Survey maintains the Map Information Office for the collection and dissemination of information about maps, aerial photographs, and geodetic-control surveys that are available from Federal mapping agencies and other sources.

The Bureau of Land Management performs cadastral surveys of the public domain that include national parks and forests, Indian reservations, grazing districts, and national reservations.

The Bureau of Mines prepares maps in support of activities related to conservation, development, and utilization of minerals and fuels.

The Bureau of Reclamation prepares maps needed for comprehensive planning and development of water resources.

The National Park Service prepares maps showing natural and historic resources.

DEPARTMENT OF STATE.—The Office of the Geographer prepares maps showing national sovereignties and related geographic and current political data.

DEPARTMENT OF TRANSPORTATION.—The Bureau of Public Roads publishes the Transportation Map Series of the United States and maps showing the Federal Aid system of highways.

TENNESSEE VALLEY AUTHORITY performs the topographic, cadastral, and hydrographic mapping required for economic development, river navigation, and flood control within the Tennessee Valley region.

The principal types of maps, charts, and related data which are available from Federal agencies and the addresses of these agencies are listed below. Single-sheet thematic maps of the United States are not listed.

DATA AVAILABLE	AGENCY
Aerial photography:	Agricultural Stabilization and Conservation Service Coast and Geodetic Survey Geological Survey Soil Conservation Service Tennessee Valley Authority
Historical	National Archives and Records Service
Aeronautical charts and related publications	Coast and Geodetic Survey
Bathymetric maps	Coast and Geodetic Survey
Boundary information (international):	
Maps of United States–Canada boundary	International Boundary Commission, United States and Canada
Maps of United States–Mexico boundary	International Boundary and Water Commission, United States and Mexico
Records of geodetic control surveys along international boundaries	International Boundary Commission, United States and Canada Coast and Geodetic Survey Geological Survey
Geodetic control data	Coast and Geodetic Survey U.S. Army Topographic Command Geological Survey Tennessee Valley Authority
Geologic maps	Geological Survey
Historical maps:	
Reproductions of maps on file	Library of Congress
Reproductions of military and other maps on file	National Archives and Records Service
Photostats of topographic quadrangles	Geological Survey
Hydrologic investigations atlases	Geological Survey
National Park topographic maps	Geological Survey
Nautical charts:	
U.S. coastal and territorial waters	Coast and Geodetic Survey
Charts and related publications, areas outside the United States	Naval Oceanographic Office
Great Lakes and connecting waterways	Corps of Engineers, U.S. Army (Lake Survey)
Orthophoto maps	Geological Survey

DATA AVAILABLE	AGENCY
Planimetric maps:	
Various scales	Geological Survey
Coastal areas of the United States	Coast and Geodetic Survey
National forest (small scale)	Forest Service
Relief maps, shaded	Geological Survey
River navigation charts:	
Mississippi (lower)	Corps of Engineers, U.S. Army, Vicksburg
Mississippi (upper)	Corps of Engineers, U.S. Army, Chicago
Missouri	Corps of Engineers, U.S. Army, Omaha
Ohio	Corps of Engineers, U.S. Army, Cincinnati
Tennessee	Tennessee Valley Authority
River, reservoir, and damsite surveys (Western States)	Geological Survey
Shoreline surveys (coastal areas of the United States)	Coast and Geodetic Survey
Soil survey maps	Superintendent of Documents
Space photography	National Aeronautics and Space Administration Geological Survey
State maps:	
Base	Geological Survey
Federal lands administered by the Bureau of Land Management	Bureau of Land Management
Geologic	Geological Survey
Postal	Superintendent of Documents
Shaded-relief	Geological Survey
Topographic	Geological Survey
Tennessee Valley region maps (various subjects)	Tennessee Valley Authority
Topographic maps:	
National Topographic Map Series of the United States	Geological Survey
Lower Mississippi River Valley	Corps of Engineers, U.S. Army, Vicksburg
National forests (small scale)	Forest Service
Tennessee River Basin	Geological Survey Tennessee Valley Authority
Township plats:	
Reproductions of original plats on file except for the States listed below	Bureau of Land Management
Reproductions of plats for Illinois, Indiana, Iowa, Kansas, Missouri, and Ohio	National Archives and Records Service

AGENCY DIRECTORY

Agricultural Stabilization and Conservation Service
Department of Agriculture
Washington, D.C. 20250

Bureau of Land Management
Department of the Interior
Washington, D.C. 20240

Coast and Geodetic Survey
Environmental Science Services Administration
Department of Commerce
Washington Science Center
Rockville, Md. 20852

Corps of Engineers, U.S. Army
219 South Dearborn Street
Chicago, Ill. 60605

Corps of Engineers, U.S. Army
P.O. Box 1159
Cincinnati, Ohio 45201

Corps of Engineers, U.S. Army
Lake Survey
P.O. Box 1027
Detroit, Mich. 48226

Corps of Engineers, U.S. Army
215 North 17th Street
Omaha, Nebr. 68102

Corps of Engineers, U.S. Army
P.O. Box 80
Vicksburg, Miss. 39180

Forest Service
Department of Agriculture
Washington, D.C. 20250

Geological Survey
Department of the Interior
Washington, D.C. 20242

International Boundary Commission, United States and Canada
441 G Street, N.W.
Washington, D.C. 20548

International Boundary and Water Commission, United States and Mexico
United States Section
818 Southwest Center
El Paso, Tex. 79901

Library of Congress
Geography and Map Division
Alexandria, Va. 22304

National Aeronautics and Space Administration
4th St. and Independence Ave., S.W.
Washington, D.C. 20407

National Archives and Records Service
General Services Administration
Washington, D.C. 20407

Naval Oceanographic Office
Department of the Navy
Washington, D.C. 20390

Soil Conservation Service
Department of Agriculture
Washington, D.C. 20251

Superintendent of Documents
Government Printing Office
Washington, D.C. 20401

Tennessee Valley Authority
New Sprankle Building
Knoxville, Tenn. 37902

U.S. Army Topographic Command
Washington, D.C. 20315

NAUTICAL CHARTING

Maritime commerce and the naval operations of the United States require nautical charts of practically all the navigable waters of the earth; production and up-to-date maintenance of nautical charts consequently has been an important function of the Federal Government since early in the 19th century. Nautical charts are produced by the U.S. Naval Oceanographic Office; the Coast and Geodetic Survey, U.S. Department of Commerce; and the Lake Survey, U.S. Department of the Army. The Oceanographic Office produces nautical charts of foreign areas, publishes the Notice to Mariners, and serves the special charting needs of the Navy. The Coast and Geodetic Survey publishes nautical charts of coastal waters and certain interior waters of the United States. The Lake Survey publishes nautical charts of the Great Lakes. The Mississippi River Commission of the Department of the Army publishes navigation folios of the lower Mississippi River.

A nautical chart is a special map designed and produced for the mariner. This navigational aid is required for all types of shipping, whether on the surface or underwater.

The nautical chart must be based on a map projection of the lines of latitude and longitude in a manner most suitable for navigation, usually the Mercator projection. All the physical features shown on the chart must be in correct position (latitude and longitude) so that the area covered by the chart is correctly related to all other places on the earth and so that each feature on the chart is exactly related in distance and direction to all other features on the chart.

The most important information shown on the nautical charts relates to the submerged features that are not visible from the surface but are vital to the mariner. Among these features are the shape of the bottom of the sea, usually expressed by depth curves or contours; the depths of water in channels and over submerged features dangerous to navigation such as submerged rocks, shoals, and sunken wrecks; and channel lines showing the positions of dredged or natural channels through shallow waters. The chart must also show all aids to navigation including lights, day beacons, buoys, electronic aids and lines of position, landmarks, prominent land forms, and details of the adjacent shore.

A nautical chart must be kept up to date if it is to be a safe instrument for navigation. Consequently, charts must be frequently revised and reissued, and a Notice to Mariners is published to provide the mariner with immediate information about significant changes pending new editions of the charts. The Notice to Mariners, prepared jointly by the Naval Oceanographic Office, U.S. Coast Guard, and Coast and Geodetic Survey and published weekly by the Naval Oceanographic Office, provides worldwide coverage. An example of the importance of chart maintenance is the fact that 60 percent of the 800 charts published by the Coast and Geodetic Survey must be revised and reissued every year and about 75 percent of its nautical charting effort is devoted to chart maintenance.

A very large volume of surveying, particularly hydrographic surveying, must be accomplished to provide the information needed to construct nautical charts and maintain them up to date. The Coast and Geodetic Survey, for example, devotes approximately 70 percent of its total charting effort to the field operations required to gather the data for construction and maintenance of nautical charts. Field surveying for nautical charting includes—in addition to hydrography—geodetic surveys, tide observations, tidal current surveys, geomagnetic measurements, positioning of aids to navigation, and mapping of the coastline and offshore features.

Charts for marine navigation are designed at varying scales. Complete chart coverage of a coast, for example, usually consists of several different series of charts, each series made for a particular purpose and for specific coverage and at a certain scale. The smallest scale charts are used in approaching a coast from the open sea while making a landfall. Larger scale series are for navigation in more constricted areas, where accurate positioning is more critical. The largest scale charts comprise the harbor charts, where it is necessary to show the greatest amount of detail.

Nautical charts produced by the Coast and Geodetic Survey are divided into three major categories, designed to meet the needs of maritime and recreational navigation: conventional charts, small-craft charts, and special purpose charts. Conventional charts are for use aboard ships that have room for display and plotting. They range from the large-scale harbor chart for precise navigation in harbors and narrow waterways to the small-scale sailing charts for offshore navigation between distant ports.

Small-craft charts provide the millions of recreational boaters with a compact format for use in the cockpits of small craft. The format is designed to promote boating safety through more efficient chart usage. The small-craft charts, in sharp contrast with the conventional charts, are accordion folded. They direct skippers to docking facilities and supplies and services; include information on tides, currents, symbols, and abbreviations; and have safety notes printed on either the chart or its protective cover.

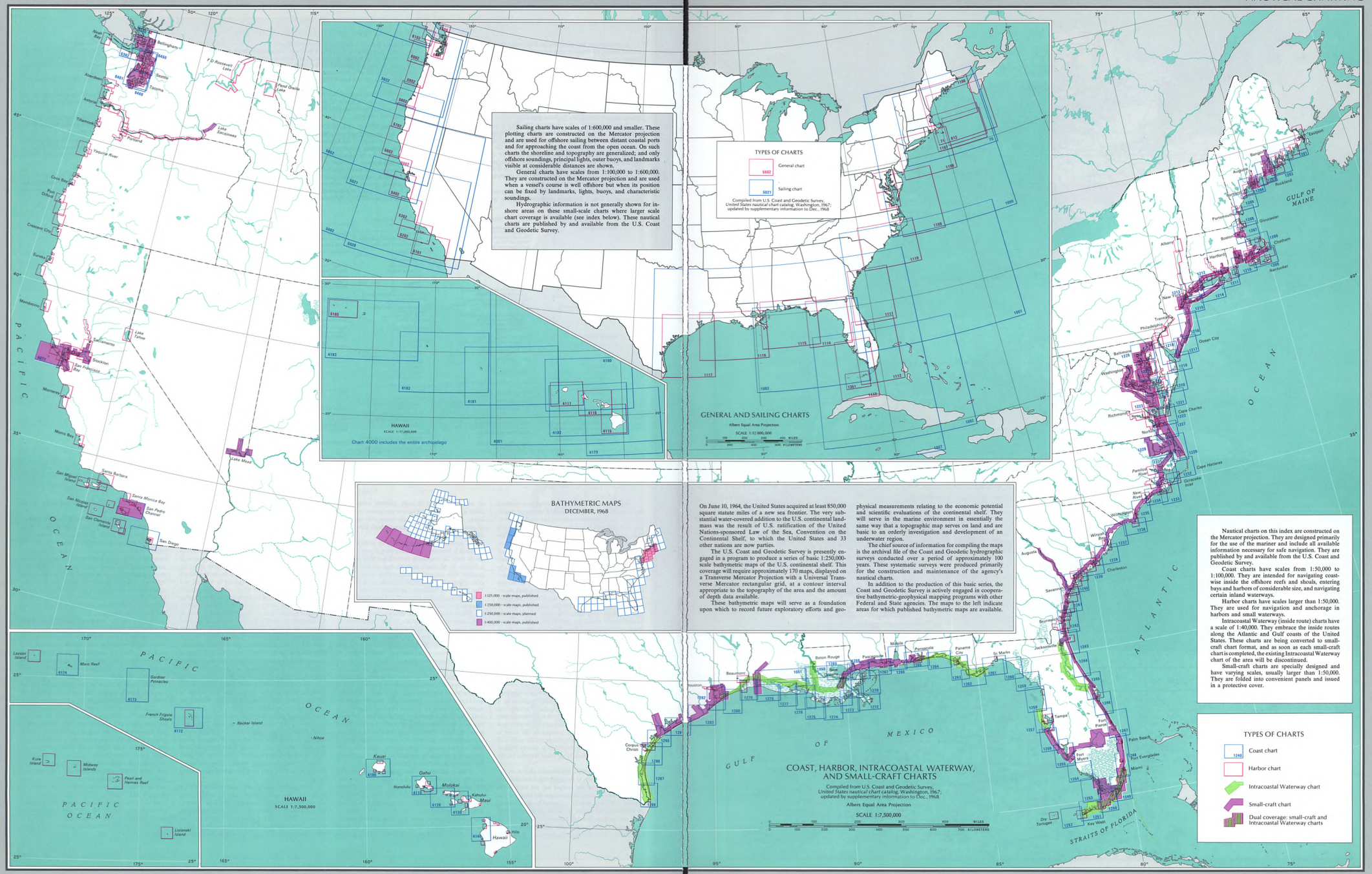
Nautical charts must be supplemented by other publications to provide information that cannot be shown on the chart. These publications include the weekly Notice to Mariners; Tide Tables published annually and giving the predicted time and heights of high and low tides for each day for 1 year following publication; tidal current tables and charts showing the direction and strength of currents along principal routes; and Sailing Directions or Coast Pilot books providing detailed information for navigation in harbors, inland waters, along the intracoastal waterways, and for close-in navigation along the coast.

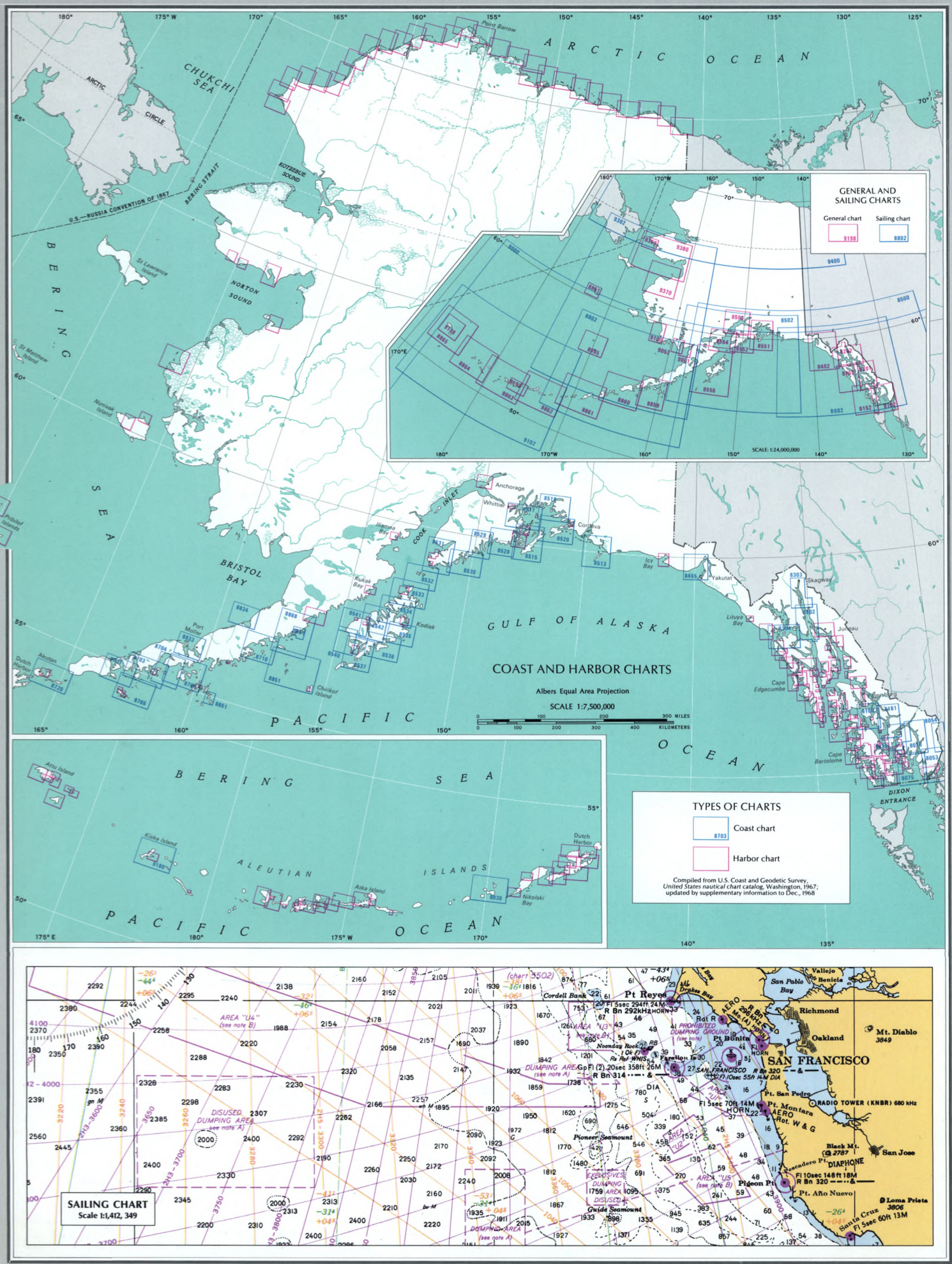
Information concerning publications of the Coast and Geodetic Survey may be obtained by writing the Director, Coast and Geodetic Survey, Environmental Science Services Administration, Rockville, Md. 20852. Charts and related publications may be purchased from the same address or from authorized sales agents. Locations of authorized nautical chart sales agents are listed in the Nautical Chart Catalog.

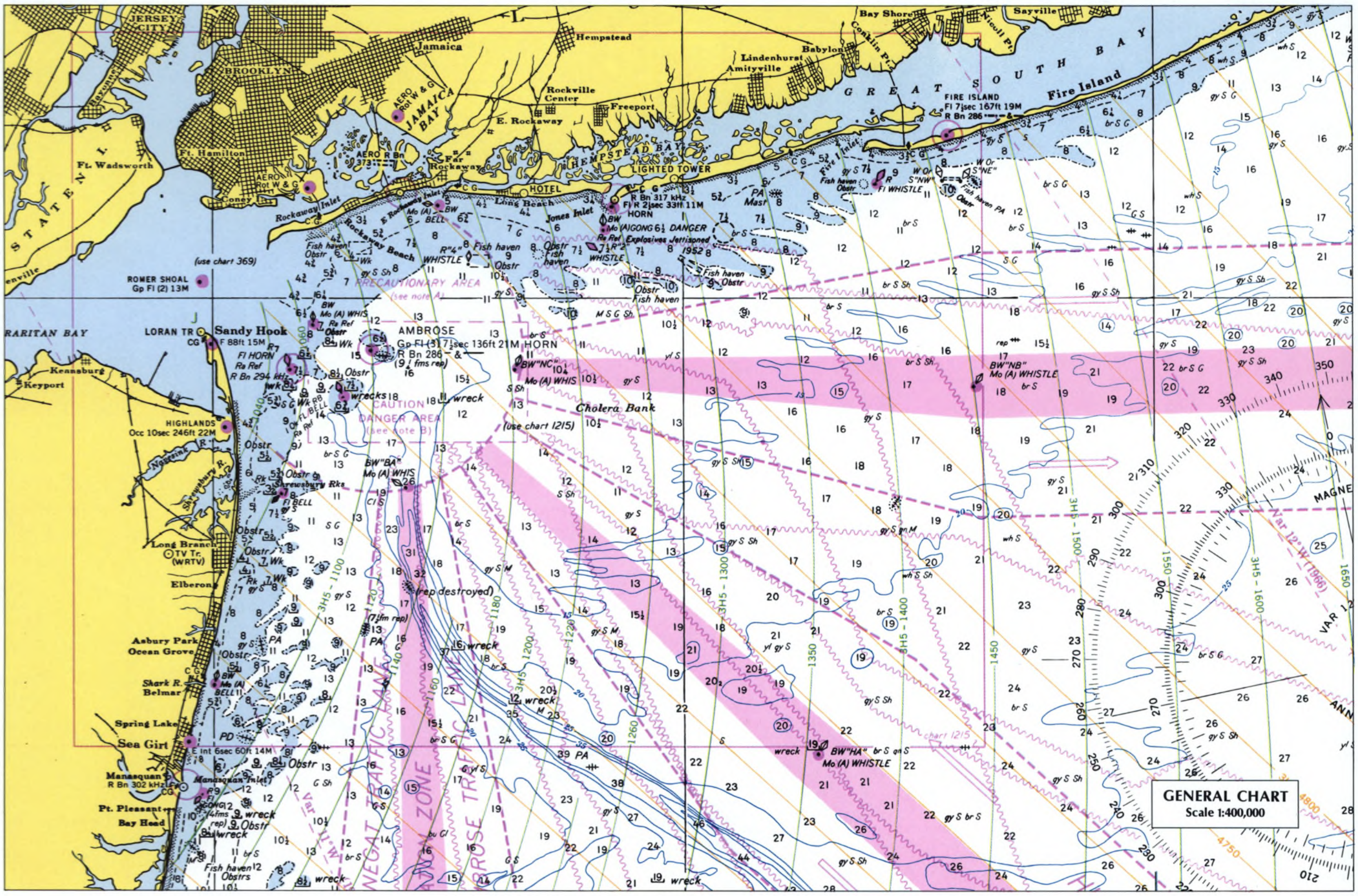
In contrast with the Coast and Geodetic Survey, which produces charts primarily of domestic navigable waters, the Naval Oceanographic Office publishes and maintains over 6,000 different charts of the oceans and foreign waters of the world. These charts range from large-scale harbor charts showing individual piers and anchorages to small-scale general charts showing detailed bottom topography of the oceans. Although a small number of these charts are produced exclusively for U.S. Navy use, the great majority are available to mariners and the general public through over 150 sales agencies in the United States and throughout the world.

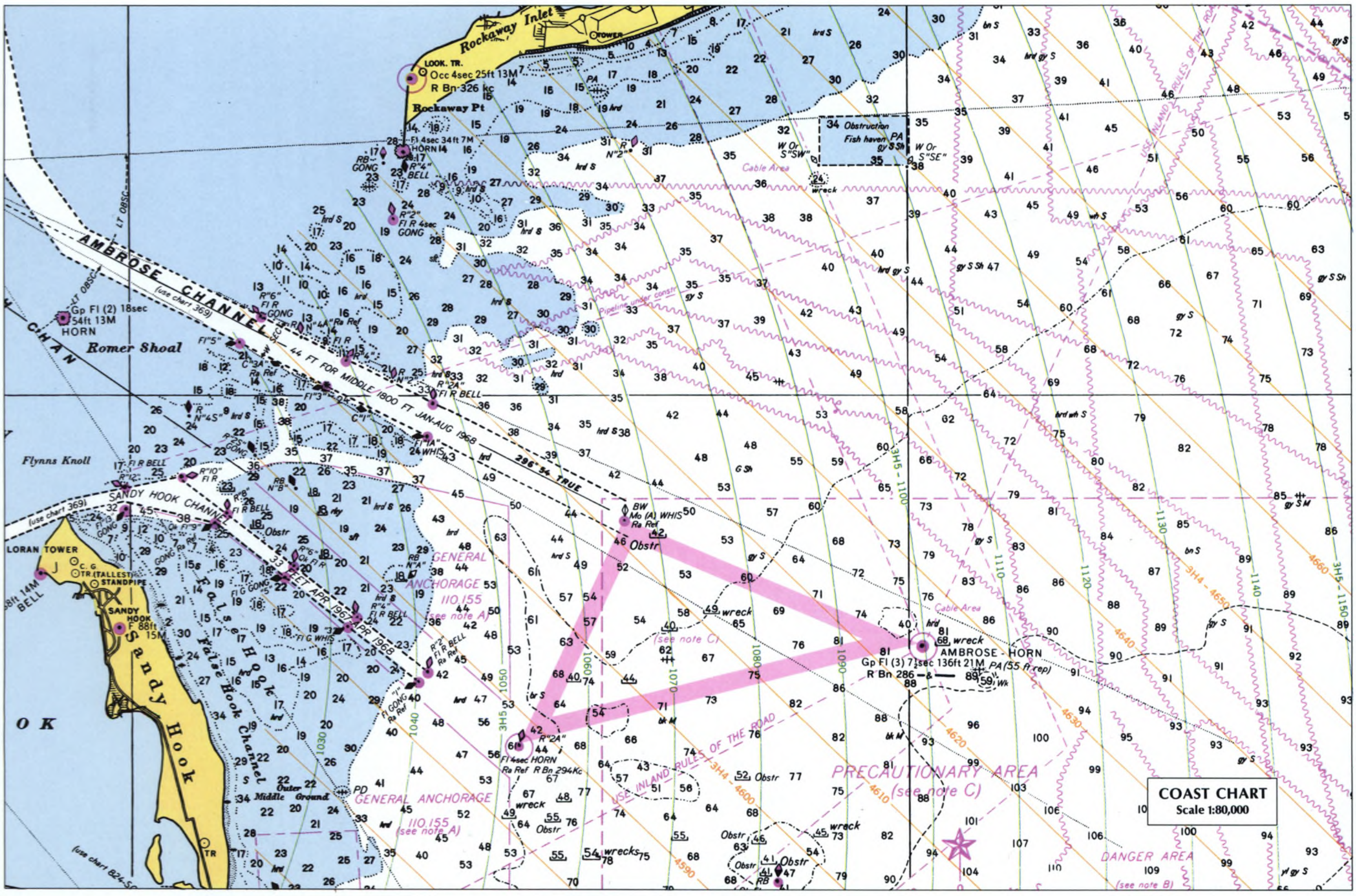
Charts of the Oceanographic Office reflect hydrographic, topographic, and navigational information obtained from foreign mapping and charting organizations as well as from a vast worldwide data collection effort by specialized units under Navy control. Navy aircraft, ships, submarines, and unmanned sensors, equipped with sophisticated data recording and measuring equipment for geophysical data, provide much of the information needed for both today's marine charting needs and tomorrow's total understanding of the ocean environment.

The basic nautical charts of the Oceanographic Office are supplemented by a variety of special-purpose charts and navigational publications, tables, and manuals which are also available to the general public. Among the more interesting and useful charts are the Time-Zone Chart of the World, world magnetic charts, Pilot Charts, charts on the gnomonic projection on which a straight line depicts the shortest (great circle) distance between the connected points, and charts on the azimuthal equidistant projection, centered on particular cities, from which the distance and azimuth to any other point on the earth's surface can be visually obtained. A general introductory catalog of the charts and other publications of the U.S. Naval Oceanographic Office, Washington, D.C. 20390, is available free of charge upon request.

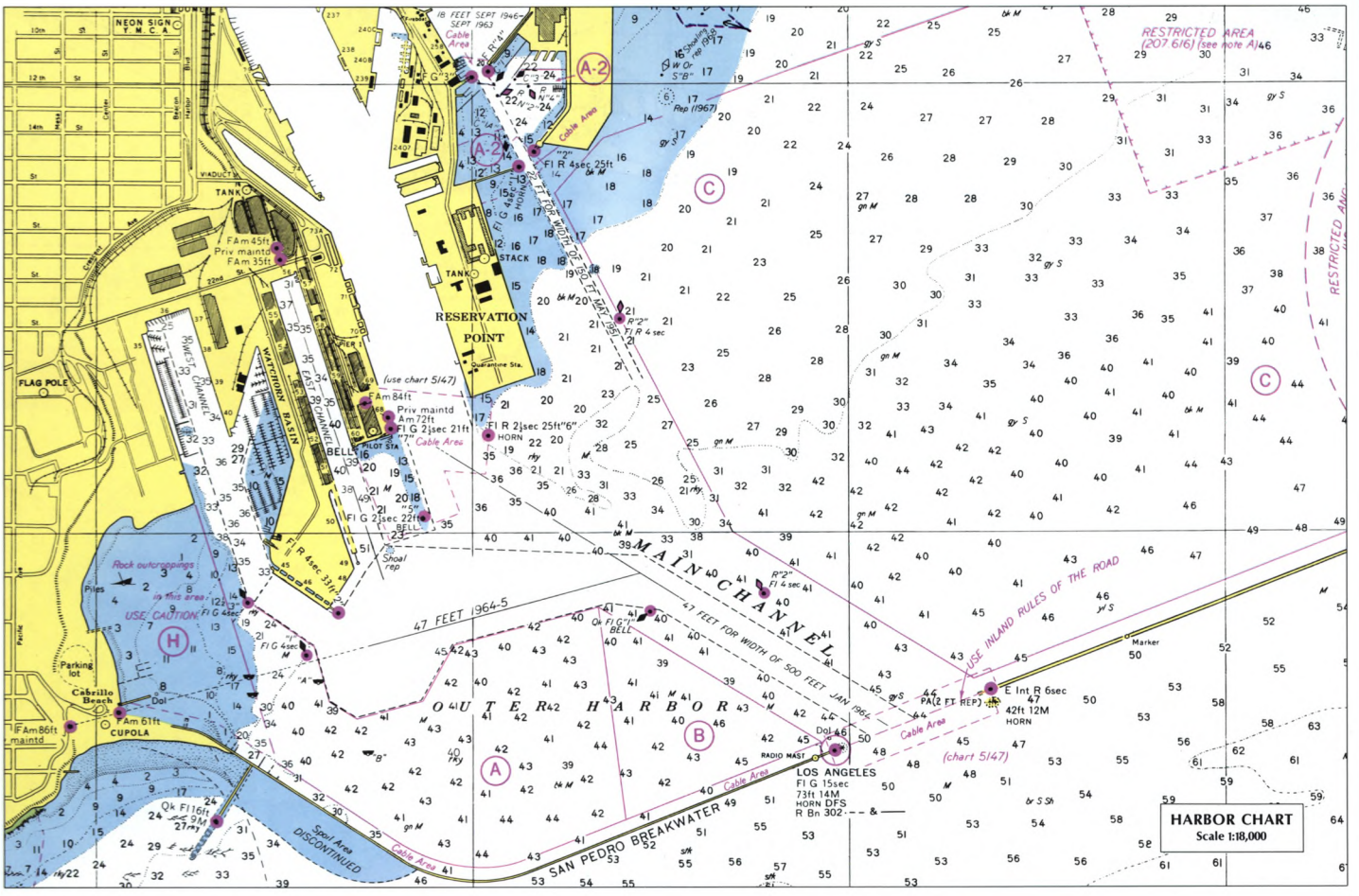

Sailing charts have scales of 1:600,000 and smaller. These plotting charts are constructed on the Mercator projection and are used for offshore sailing between distant coastal ports and for approaching the coast from the open ocean. On such charts the shoreline and topography are generalized; and only offshore soundings, principal lights, outer buoys, and landmarks visible at considerable distances are shown.
General charts have scales from 1:100,000 to 1:600,000. They are constructed on the Mercator projection and are used when a vessel's course is well offshore but when its position can be fixed by landmarks, lights, buoys, and characteristic soundings.
Hydrographic information is not generally shown for inshore areas on these small-scale charts where larger scale chart coverage is available (see index below). These nautical charts are published by and available from the U.S. Coast and Geodetic Survey.
TYPES OF CHARTS
General chart
5502
Sailing chart
5021
Compiled from U.S. Coast and Geodetic Survey, United States nautical chart catalog, Washington, 1967; updated by supplementary information to Dec., 1968
HAWAII
SCALE 1:7,500,000
Chart 4000 includes the entire archipelago
GENERAL AND SAILING CHARTS
Albers Equal Area Projection
SCALE 1:12,000,000
BATHYMETRIC MAPS
DECEMBER, 1968
1:25,000 - scale maps, published
1:250,000 - scale maps, published
1:250,000 - scale maps, planned
1:400,000 - scale maps, published
On June 10, 1964, the United States acquired at least 850,000 square statute miles of a new sea frontier. The very substantial water-covered addition to the U.S. continental landmass was the result of U.S. ratification of the United Nations-sponsored Law of the Sea, Convention on the Continental Shelf, to which the United States and 33 other nations are now parties.
The U.S. Coast and Geodetic Survey is presently engaged in a program to produce a series of basic 1:250,000-scale bathymetric maps of the U.S. continental shelf. This coverage will require approximately 170 maps, displayed on a Transverse Mercator Projection with a Universal Transverse Mercator rectangular grid, at a contour interval appropriate to the topography of the area and the amount of depth data available.
These bathymetric maps will serve as a foundation upon which to record future exploratory efforts and geophysical measurements relating to the economic potential and scientific evaluations of the continental shelf. They will serve in the marine environment in essentially the same way that a topographic map serves on land and are basic to an orderly investigation and development of an underwater region.
The chief source of information for compiling the maps is the archival file of the Coast and Geodetic hydrographic surveys conducted over a period of approximately 100 years. These systematic surveys were produced primarily for the construction and maintenance of the agency's nautical charts.
In addition to the production of this basic series, the Coast and Geodetic Survey is actively engaged in cooperative bathymetric-geophysical mapping programs with other Federal and State agencies. The maps to the left indicate areas for which published bathymetric maps are available.
COAST, HARBOR, INTRACOASTAL WATERWAY, AND SMALL-CRAFT CHARTS
Compiled from U.S. Coast and Geodetic Survey, United States nautical chart catalog, Washington, 1967; updated by supplementary information to Dec., 1968
Albers Equal Area Projection
SCALE 1:7,500,000
Nautical charts on this index are constructed on the Mercator projection. They are designed primarily for the use of the mariner and include all available information necessary for safe navigation. They are published by and available from the U.S. Coast and Geodetic Survey.
Coast charts have scales from 1:50,000 to 1:100,000. They are intended for navigating coastwise inside the offshore reefs and shoals, entering bays and harbors of considerable size, and navigating certain inland waterways.
Harbor charts have scales larger than 1:50,000. They are used for navigation and anchorage in harbors and small waterways.
Intracoastal Waterway (inside route) charts have a scale of 1:40,000. They embrace the inside routes along the Atlantic and Gulf coasts of the United States. These charts are being converted to small-craft chart format, and as soon as each small-craft chart is completed, the existing Intracoastal Waterway chart of the area will be discontinued.
Small-craft charts are specially designed and have varying scales, usually larger than 1:50,000. They are folded into convenient panels and issued in a protective cover.
TYPES OF CHARTS
Coast chart
1249
Harbor chart
Intracoastal Waterway chart
Small-craft chart
Dual coverage: small-craft and Intracoastal Waterway charts
PACIFIC OCEAN
ATLANTIC OCEAN
GULF OF MEXICO
GULF OF MAINE
STRAITS OF FLORIDA

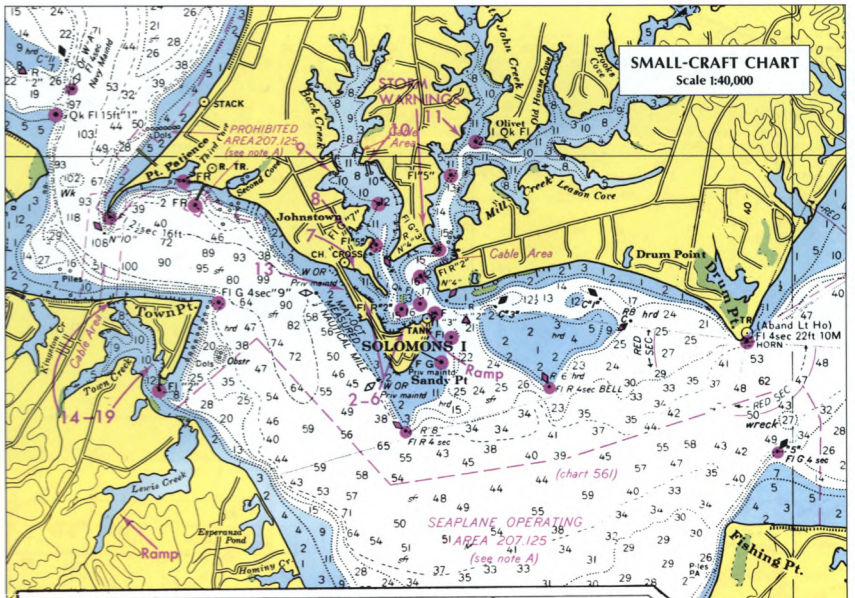

GENERAL AND SAILING CHARTS
General chart
Sailing chart
SCALE: 1:24,000,000
COAST AND HARBOR CHARTS
Albers Equal Area Projection
SCALE 1:7,500,000
TYPES OF CHARTS
Coast chart
Harbor chart
Compiled from U.S. Coast and Geodetic Survey, United States nautical chart catalog, Washington, 1967; updated by supplementary information to Dec., 1968
SAILING CHART
Scale 1:1,412, 349
ARCTIC OCEAN
BERING SEA
PACIFIC OCEAN
GULF OF ALASKA
ALEUTIAN ISLANDS
CHUKCHI SEA
BERING STRAIT
BRISTOL BAY
NORTON SOUND
COOK INLET
KOTZEBUE SOUND
U.S.–RUSSIA CONVENTION OF 1867
ARCTIC CIRCLE
Point Barrow
St Lawrence Island
St Matthew Island
Nunivak Island
Pribilof Islands
Anchorage
Whittier
Cordova
Icy Bay
Yakutat
Skagway
Juneau
Lituya Bay
Cape Edgecumbe
Petersburg
Cape Bartolome
DIXON ENTRANCE
Kukak Bay
Kodiak
Port Moller
Akutan
Dutch Harbor
Chirikof Island
Kiska Island
Attu Island
Aska Island
Nikolski Bay
Cordell Bank
Pt Reyes
Drakes Bay
San Pablo Bay
Vallejo
Benicia
Richmond
Oakland
Mt. Diablo 3849
SAN FRANCISCO
Pt Bonita
Pt. San Pedro
Pt. Montara
RADIO TOWER (KNBR) 680 kHz
Black Mt. 2787
San Jose
DIAPHONE
Pescadero Pt.
Pigeon Pt
Pt. Año Nuevo
Loma Prieta 3806
Santa Cruz
Noonday Rock
Farallon Is
Pioneer Seamount
Guide Seamount
DUMPING AREA (see note A)
DISUSED DUMPING AREA (see note A)
PROHIBITED DUMPING GROUND (see note)
EXPLOSIVES DUMPING AREA (DISUSED)
AREA "U4" (see note B)
AREA "U5" (see note B)
AREA "U2"
AREA "U3"

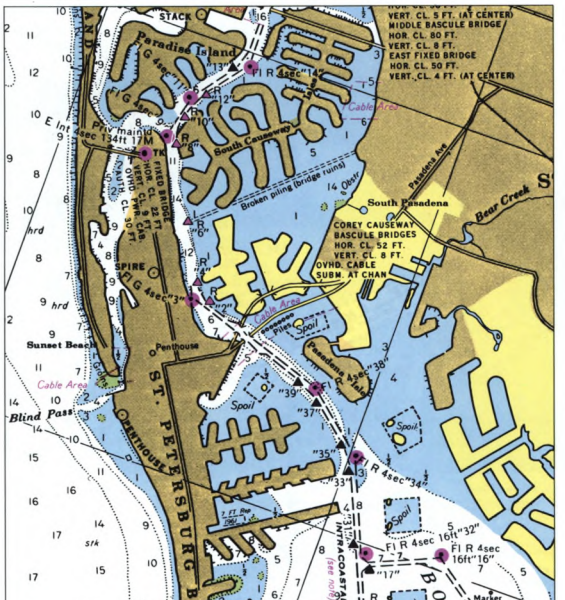

GENERAL CHART
Scale 1:400,000
Brooklyn
Jamaica
Hempstead
Bay Shore
Sayville
Babylon
Lindenhurst
Amityville
Freeport
Rockville Centre
E. Rockaway
Jamaica Bay
Great South Bay
Fire Island
FIRE ISLAND
Staten
Ft. Wadsworth
Ft. Hamilton
Coney I.
Rockaway Inlet
Long Beach
Jones Inlet
Rockaway Beach
ROMER SHOAL
Raritan Bay
Keansburg
Keyport
Sandy Hook
AMBROSE
HIGHLANDS
Cholera Bank
Long Branch
Elberon
Asbury Park
Ocean Grove
Shark R.
Belmar
Spring Lake
Sea Girt
Manasquan
Pt. Pleasant
Bay Head
PRECAUTIONARY AREA
DANGER AREA
CAUTION


COAST CHART
Scale 1:80,000
Rockaway Inlet
Rockaway Pt
AMBROSE CHANNEL
Romer Shoal
Flynns Knoll
SANDY HOOK CHANNEL
LORAN TOWER
Sandy Hook
False Hook Channel
GENERAL ANCHORAGE
AMBROSE - HORN
PRECAUTIONARY AREA
DANGER AREA
Cable Area
Obstruction
Fish haven

299







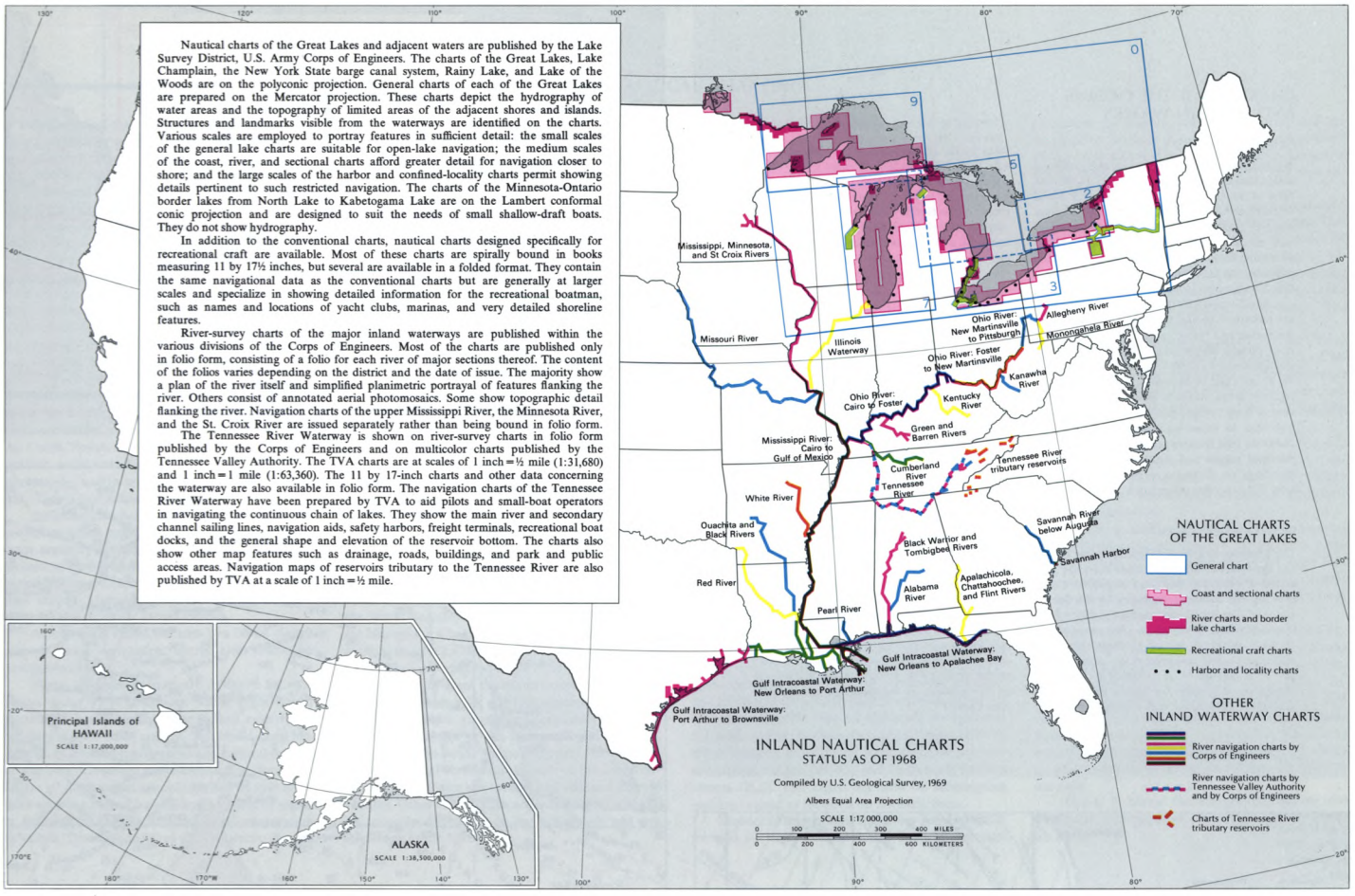
NO	LOCATION	TIDES: MEAN RANGE - FT	TIDES: HRS EARLIER THAN BALTIMORE	DEPTHS: APPROACH - FT (REPORTED)	DEPTHS: ALONGSIDE - FT (REPORTED)	SERVICES: LAUNCHING RAMP	SERVICES: REPAIRS: HULL-ELECTRONIC-MOTOR	SERVICES: MARINE RAILWAY - FT	SERVICES: LIFT - FIXED - PORTABLE - TONS	SERVICES: BOAT RENTAL	SERVICES: MEALS - LODGING	SERVICES: TOILETS - SHOWERS	SUPPLIES: WATER - ICE - BOTTLED GAS	SUPPLIES: GROCERIES - HARDWARE	SUPPLIES: BAIT - TACKLE	SUPPLIES: DIESEL OIL - PUMP - TRUCK	SUPPLIES: GASOLINE - PUMP - CAN
1	LONG BEACH	1.0	4¼	6½	5½	BE	S						TS	W			P
2	SOLOMONS ISLAND	1.2	5	25	11	BE		HEM		P12			TS	WI	H		P
4	SOLOMONS ISLAND	1.2	5	15	12	BE		EM			MC	ML	TS	WI	GH	BT	P
5	SOLOMONS ISLAND	1.2	5	10	4	BE						ML	TS	WI			P
6	SOLOMONS ISLAND	1.2	5	25	15	BE		EM			M	L	TS	WI	H	BT	P
7	SOLOMONS ISLAND	1.2	5	15	3	B					RMC	L		I		B	P
8	JOHNSTOWN	1.2	5	11	10	BE	S	HEM	75	P1	C		TS	WIB			P
9	BACK CREEK	1.2	5	15	10	BE	S	HEM	45	P10	RMC	ML	TS	WIB	GH	BT	P
10	BACK CREEK	1.2	5	15	18	BE	N	HEM	50	P25		ML	TS	WI	H		P
11	ST JOHN CREEK	1.2	5	5	5	BE		H	40					W			

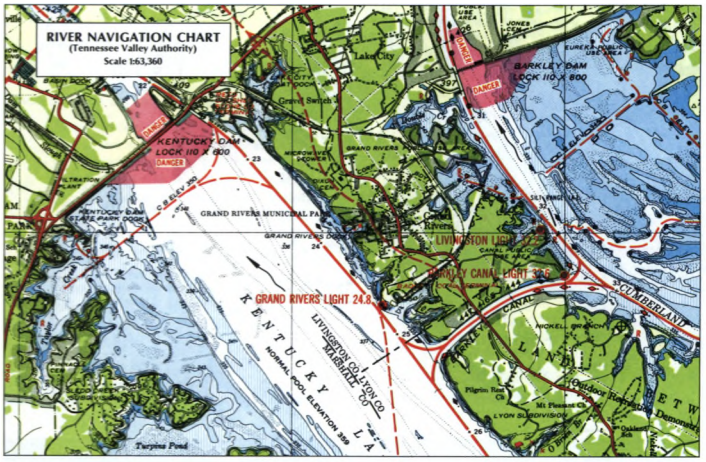
Nautical charts of the Great Lakes and adjacent waters are published by the Lake Survey District, U.S. Army Corps of Engineers. The charts of the Great Lakes, Lake Champlain, the New York State barge canal system, Rainy Lake, and Lake of the Woods are on the polyconic projection. General charts of each of the Great Lakes are prepared on the Mercator projection. These charts depict the hydrography of water areas and the topography of limited areas of the adjacent shores and islands. Structures and landmarks visible from the waterways are identified on the charts. Various scales are employed to portray features in sufficient detail: the small scales of the general lake charts are suitable for open-lake navigation; the medium scales of the coast, river, and sectional charts afford greater detail for navigation closer to shore; and the large scales of the harbor and confined-locality charts permit showing details pertinent to such restricted navigation. The charts of the Minnesota-Ontario border lakes from North Lake to Kabetogama Lake are on the Lambert conformal conic projection and are designed to suit the needs of small shallow-draft boats. They do not show hydrography.

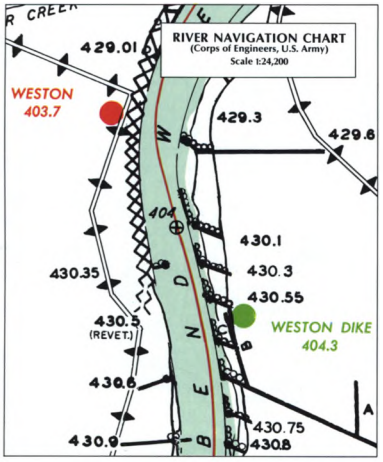
In addition to the conventional charts, nautical charts designed specifically for recreational craft are available. Most of these charts are spirally bound in books measuring 11 by 17½ inches, but several are available in a folded format. They contain the same navigational data as the conventional charts but are generally at larger scales and specialize in showing detailed information for the recreational boatman, such as names and locations of yacht clubs, marinas, and very detailed shoreline features.

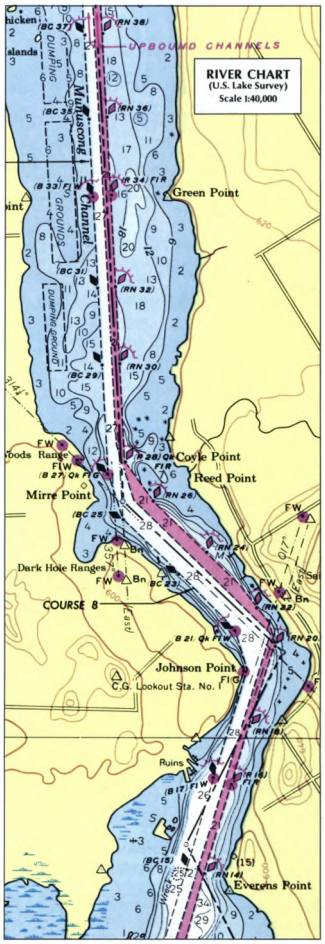
River-survey charts of the major inland waterways are published within the various divisions of the Corps of Engineers. Most of the charts are published only in folio form, consisting of a folio for each river of major sections thereof. The content of the folios varies depending on the district and the date of issue. The majority show a plan of the river itself and simplified planimetric portrayal of features flanking the river. Others consist of annotated aerial photomosaics. Some show topographic detail flanking the river. Navigation charts of the upper Mississippi River, the Minnesota River, and the St. Croix River are issued separately rather than being bound in folio form.

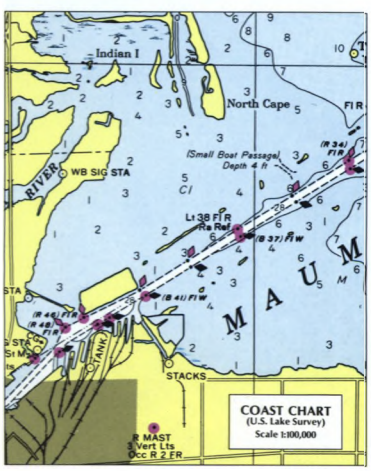
The Tennessee River Waterway is shown on river-survey charts in folio form published by the Corps of Engineers and on multicolor charts published by the Tennessee Valley Authority. The TVA charts are at scales of 1 inch = ½ mile (1:31,680) and 1 inch = 1 mile (1:63,360). The 11 by 17-inch charts and other data concerning the waterway are also available in folio form. The navigation charts of the Tennessee River Waterway have been prepared by TVA to aid pilots and small-boat operators in navigating the continuous chain of lakes. They show the main river and secondary channel sailing lines, navigation aids, safety harbors, freight terminals, recreational boat docks, and the general shape and elevation of the reservoir bottom. The charts also show other map features such as drainage, roads, buildings, and park and public access areas. Navigation maps of reservoirs tributary to the Tennessee River are also published by TVA at a scale of 1 inch = ½ mile.

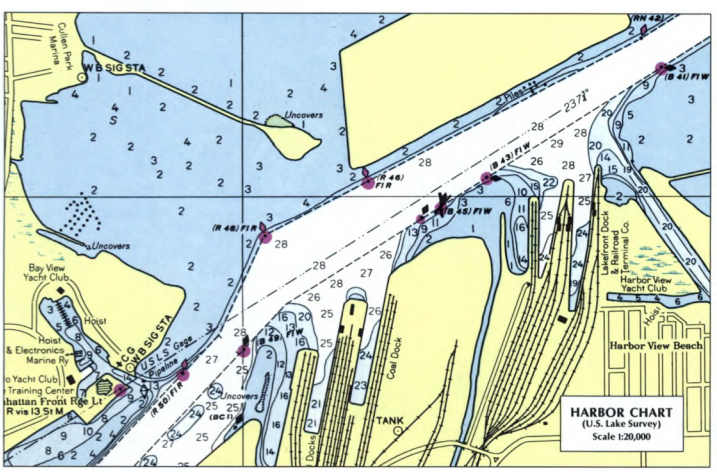












CHARTING OF THE OCEANS AND FOREIGN WATERS

GENERAL CHARTS

Nautical charts are constructed on many different scales, ranging from about 1:2,500 to 1:14,000,000. Most of the charts published by the U.S. Naval Oceanographic Office are of large and medium scales (1:2,500 to 1:600,000) for harbor and coastwise navigation and differ little in basic presentation and data content from similar-scale charts produced for U.S. waters by the U.S. Coast and Geodetic Survey.

Small-scale (1:600,000 to 1:14,000,000) charts are published by the Oceanographic Office for the oceans and foreign waters of the world. The chart section shown here is from H.O. 1290, a small-scale (1:3,322,500) general chart covering the entire Gulf of Mexico, Caribbean Sea, and adjacent areas, which is used for general planning of long voyages and fixing position on the high seas. As shown on this chart, the shoreline and other land features are generalized, and only principal names and depth contours, offshore soundings (in fathoms), principal navigational aids, and magnetic information are shown.

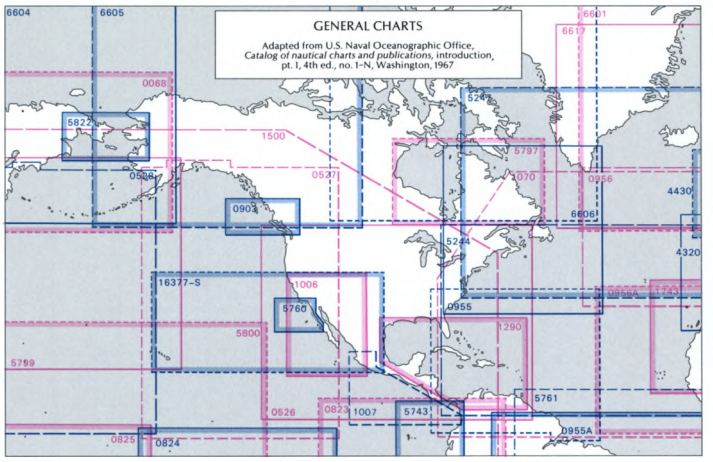
BATHYMETRIC CHARTS

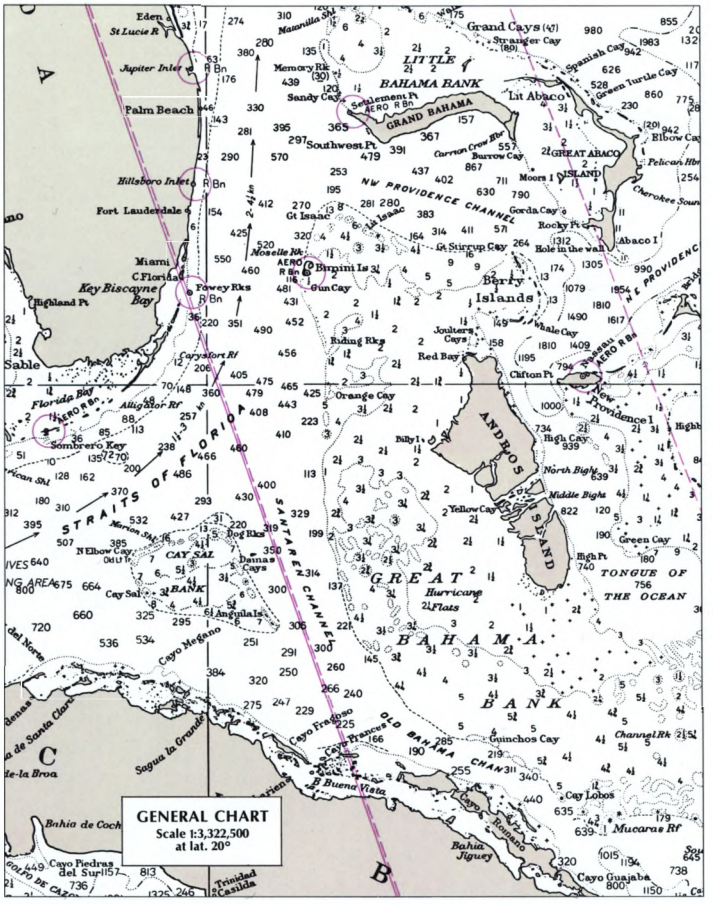
The tremendous growth of interest in the oceans and the marine sciences in recent years has generated a need for new and improved charts showing the bottom topography of the oceans and seas. The section shown here is taken from Oceanographic Office chart, *The world*, H.O. 15,254–7, which is one of 12 sheets providing continuous world coverage of the area between lat. 70° S. and 84° N. at a scale of 1:12,233,000. Depths on this chart are shown by means of gradient tints, selected spot soundings, and isobaths at 100 fathoms and at 500-fathom intervals from 500 to 4,500 fathoms. Other detail, which is generalized to scale, includes shoreline, major rivers, names of countries and principal cities, international boundaries, principal land relief and elevations, selected ship tracks and distances, average limits of sea and pack ice, and principal bathymetric nomenclature.

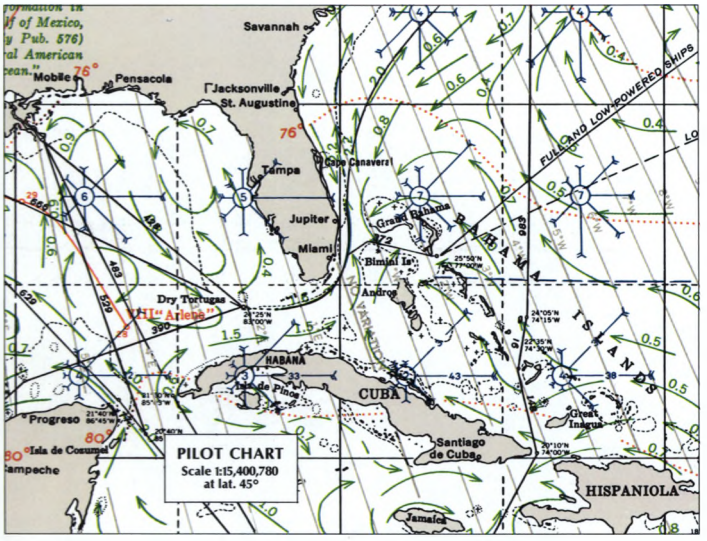
PILOT CHARTS

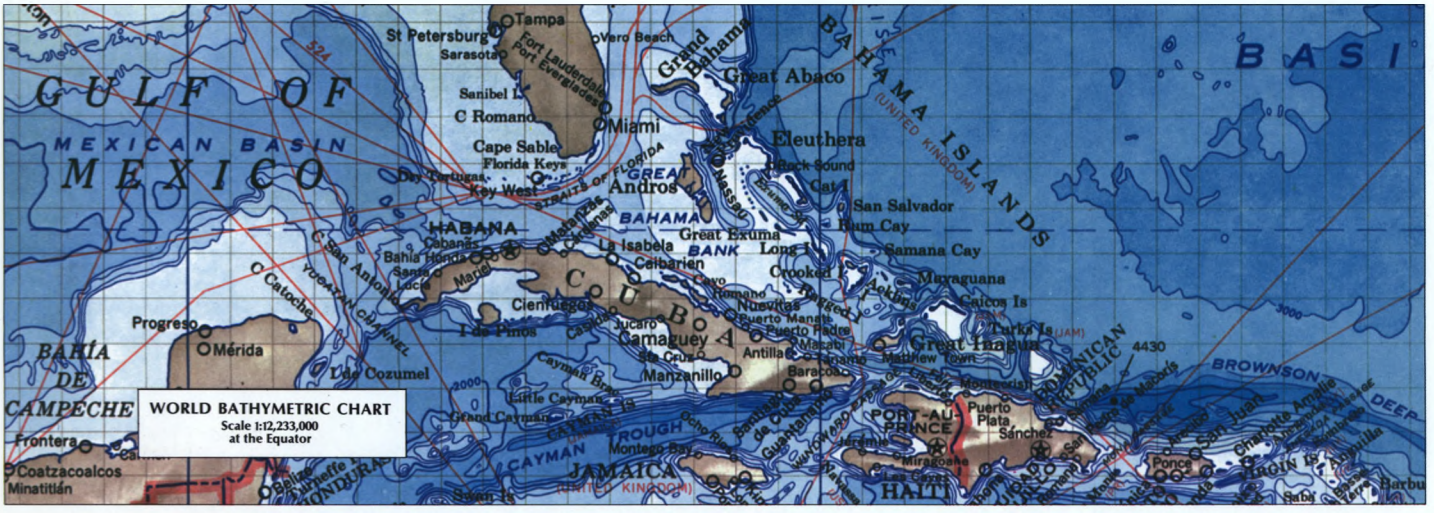
Among the most useful and popular special-purpose charts issued by the Oceanographic Office are the Pilot Charts, which are published each month for the North Atlantic Ocean and the North Pacific Ocean, and in atlas form for (1) the South Atlantic Ocean and Central American waters, and (2) the South Pacific and Indian Oceans. The section shown here is from the May 1968 edition of *Pilot chart of the North Atlantic Ocean*, H.O. 1400.

Pilot Charts present in graphical form the available facts or conclusions resulting from many years of research in navigation, oceanography, and meteorology to assist mariners in selecting the safest and quickest routes and avoiding dangers. Their principal features are monthly averages for: prevailing winds and currents; percentage of gales, calms, and fog; line of equal air and water temperature and atmospheric pressure; and limits of both field ice and icebergs. Also presented are lines of equal magnetic variation, location of ocean station vessels, and recommended routes or steamer tracks. Timely articles dealing with navigation and related topics are printed on the backs of the monthly Pilot Charts.









AERONAUTICAL CHARTING

Aeronautical charts are especially designed maps which graphically portray for the navigator the topographic and cultural features of the earth's surface and the electronic control systems needed for air navigation under visual flight rules (VFR) and instrument flight rules (IFR).

Aeronautical charting had its beginning in the United States in 1924 when the Army Air Corps issued the first sheets of a series of strip maps for military use covering limited areas between Air Corps fields. In 1926, the U.S. Congress passed the Air Commerce Act, which gave formal recognition to the need for aeronautical charts and authorized the Secretary of Commerce to direct the U.S. Coast and Geodetic Survey to provide charts for air navigation as adequate as those then provided for ocean navigation. The first aeronautical charts published under the authority of the act were issued in 1927 and were similar to those first published by the Army Air Corps. Today, several U.S. Government agencies publish aeronautical charts covering the globe at many scales and in many forms to satisfy the needs of U.S. civil and military aviation.

Aeronautical charts must be based on a map projection which meets the navigator's need for maximum accuracy of direction and distance. The basic projection used for aeronautical charting is the Lambert Conformal Conic Projection. Other projections used are the Mercator (conformal, transverse, and oblique) and the Polar Stereographic.

Aeronautical charts fall into two broad classifications—visual navigation charts and instrument navigation charts.

Visual navigation charts are designed for navigation under VFR conditions where flight is conducted by visual reference to the ground, even though the pilot may be radio assisted. The visual-chart base consists of selected topographic and cultural features of the area. Contours express elevation, form, and degree of slope and are supplemented by spot elevations showing critical heights and a system of terrain or gradient tints which indicate layers of elevations by colors. Drainage features such as rivers, streams, canals, and other bodies of water are especially selected to suit the scale and purpose of the chart. Cultural features such as cities, roads, railroads, reservoirs, dams, and other manmade objects are shown in relation to their importance as landmarks for aviation use. Modern aeronautical charts include an overprint of relief shading to assist the pilot in terrain identification and to emphasize hazardous terrain.

The topographic base of aeronautical charts often violates the principles of conventional maps. Many items normally included on topographic maps are omitted in order not to obscure those details that are of greater importance to the pilot, while some features are exaggerated or displaced in order to enhance their value as a landmark.

Visual charts also include an aeronautical overprint which varies in detail and content with the scale and purpose of the chart. The data normally used in visual flight include communications and navigational facilities, vertical and horizontal limits of controlled airspace, obstructions that are hazardous to flight, and special-use and restricted airspace.

Visual charts are published in several series ranging in scale from 1:250,000 to 1:2,000,000 to meet the needs of all VFR operations from the slow- to medium-speed aircraft to the high-speed long-range aircraft. The several series are the Local Chart at scale 1:250,000; the Sectional Chart, 1:500,000; the world aeronautical chart, 1:1,000,000; and the Jet Navigation Chart, 1:2,000,000. A planning chart at the scale of 1:2,333,232 (1 inch = 32 nautical miles) is published covering the conterminous United States in two sheets to meet the requirements for preflight planning for both VFR and IFR operations.

Visual charts are revised frequently to reflect manmade changes in the landscape and the revisions to the National Airspace System (NAS). Sectional and local aeronautical charts of the conterminous United States are revised and reissued every 6 months. Other visual charts are revised semiannually or annually, depending on the complexity and rate of change to the NAS.

Instrument navigation charts portray in graphic form the entire control system embodied in the NAS. They are the means by which the pilot conducts enroute navigation and terminal procedures for landing at aerodromes under IFR.

Instrument charts are published in two basic series—radio navigation charts for enroute navigation and instrument approach procedure charts for terminal operations.

Enroute low-altitude radio navigation charts show the complete low-altitude airspace system and all other data required to operate safely and efficiently in accordance with Federal Aviation Administration rules and regulations. Area charts provide large-scale coverage of high-density areas in the low-altitude structure. Enroute high-altitude charts are published for flight at or above 18,000 feet and show the jet routes and other data required for operation in the high-altitude structure. Because of the constantly changing nature of the NAS and the fact that the controlled airspace is amended every 28 days, radio navigation charts are sold on subscription and revised and reissued every 28 days, effective concurrently with the airspace amendment. Subscriptions are available by areas, such as the conterminous United States, Alaska, Hawaii, the Caribbean, or on an individual chart basis.

Instrument approach procedure charts (IAPC) are published for over 1,000 aerodromes in the United States whose instrument procedures have been authorized by the Federal Aviation Administration. The charts are 5x8 inches and are punched to fit a looseleaf binder. The charts show the instrument-approach procedure, the aerodrome diagram, and all related data. Each procedure is identified for use with a specific type of electronic navigational aid, such as low/medium frequency ranges (RNG), radio beacons or compass locators (ADF), omnidirectional ranges (VOR), and instrument landing system (ILS). The charts are sold on subscription and are revised as required on a weekly basis.

Standard instrument departure charts (SID) provide air traffic control coded departure routing clearances in graphic and textual form, and are designed to facilitate transition between takeoff and enroute operations. The SID charts are published in bound booklet form and are revised and reissued every 56 days.

Another series classified in the instrument chart category is the Aircraft Position Chart Series. This series is especially designed to meet the needs of U.S. flag carriers conducting international flights over extensive water areas. The charts are for plotting lines of position from electronic aids such as Loran and Consol and from celestial observations. The charts are revised semiannually.

The aeronautical charting activities of the United States are coordinated by the Inter-Agency Air Cartographic Committee, composed of representatives from the U.S. Department of Commerce, the Federal Aviation Administration, and the U.S. Department of Defense.

This committee reviews the air cartographic requirements of the United States and, where possible, develops specifications for a common product to meet the operational requirements of both civil and military aviation.

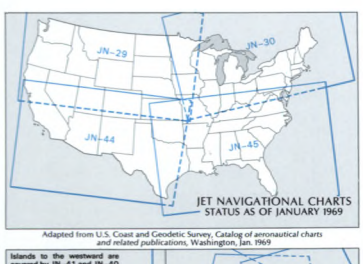
The Coast and Geodetic Survey, Environmental Science Services Administration, produces the aeronautical charts of the United States for both civil and military use and for international air routes required by U.S. civil aviation if unavailable from military charting agencies.

The Aeronautical Chart and Information Center, U.S. Air Force, produces aeronautical charts for all areas outside the United States to meet the needs of military aviation. Air Force charts of foreign areas required by U.S. civil aviation are sold through the sales offices of the Coast and Geodetic Survey. In addition, the Aeronautical Chart and Information Center produces specialized air cartographic materials of the United States for military use only.

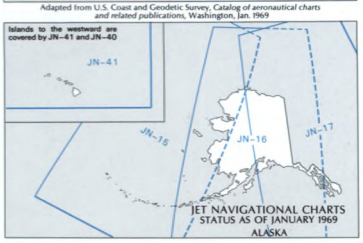
The U.S. Naval Oceanographic Office also produces aeronautical charts for use by naval aviators.

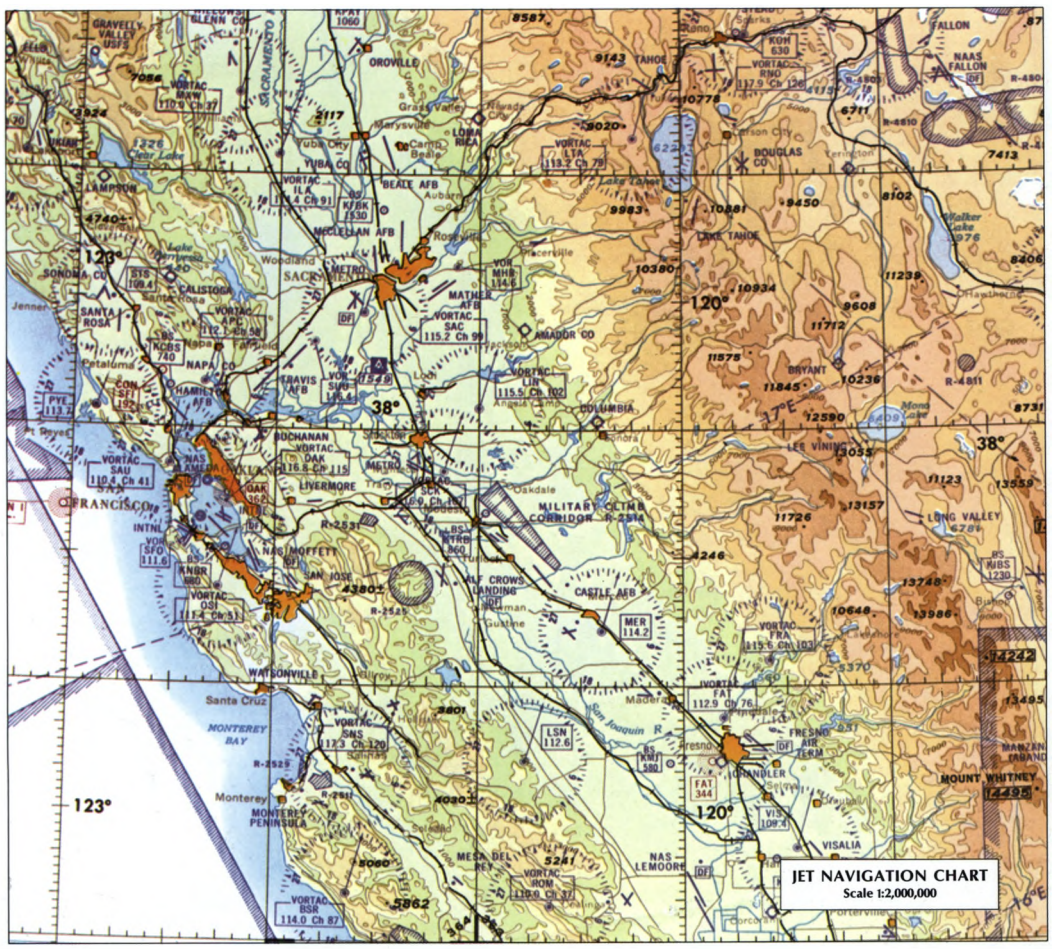
JET NAVIGATION CHARTS

Jet navigation charts (JNC) are designed for use in long-range high-altitude high-speed navigation. The four charts published by the U.S. Coast and Geodetic Survey are part of a worldwide series. They are on the Lambert Conformal Conic Projection at the scale of 1:2,000,000. Topographic features include large cities, roads, railroads, drainage, and relief. Relief is indicated by contour lines, spot elevations, and gradient tints. All aeronautical information necessary to conform to the purpose of the chart is shown.



Adapted from U.S. Coast and Geodetic Survey, *Catalog of aeronautical charts and related publications*, Washington, Jan. 1969





ENROUTE CHARTS

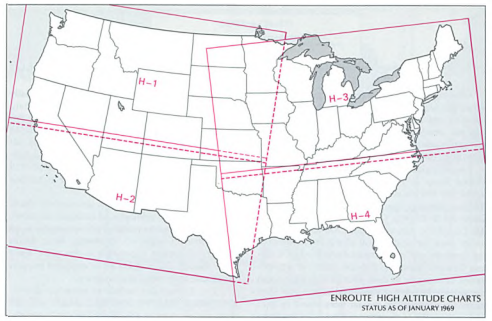
Enroute charts are published and distributed by the U.S. Coast and Geodetic Survey. They are constructed on the Lambert Conformal Conic Projection.

ENROUTE HIGH ALTITUDE CHARTS provide aeronautical information for enroute instrument navigation in the high-altitude stratum. They are at a scale of 1 inch equals 38.5 nautical miles. Information includes the portrayal of jet routes; position, identification, and frequencies of radio navigation aids; communications data; selected aerodromes; distances; time zones; special-use airspace; radar jet advisory areas; and related data.

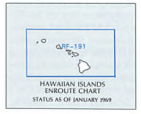
ENROUTE LOW ALTITUDE CHARTS provide aeronautical information for enroute instrument navigation in the low-altitude stratum, except the Caribbean chart which is for all altitudes. They are at scales compatible to the amount of detail included: 1 inch equals 10, 12, 16, or 20 nautical miles. Area charts, which are part of this series, furnish terminal data at larger scales in congested areas (1 inch equals 5 miles and 1 inch equals 6 miles). Information includes the portrayal of the complete National Airspace System; limits of controlled airspace; position, identification, and frequencies of radio navigation aids; communications data; selected aerodromes; minimum enroute and obstruction-clearance altitudes; airway mileages; reporting points; restricted areas; and related data.

THE HAWAII ENROUTE CHART is designed to provide aeronautical data for enroute instrument navigation at all altitudes. It is at the scale of 1 inch equals 15 nautical miles. Charted information includes the portrayal of airways; position, identification, and frequencies of radio navigation aids; communications data; selected aerodromes; restricted areas; airway mileages, reporting points; minimum enroute and obstruction-clearance altitudes; and related data.

ALASKA ENROUTE CHARTS: Both high- and low-altitude enroute charts are published for Alaska. These charts are at the scale of 1 inch equals 45 and 30 nautical miles respectively. They contain the same information as those published for the conterminous United States.



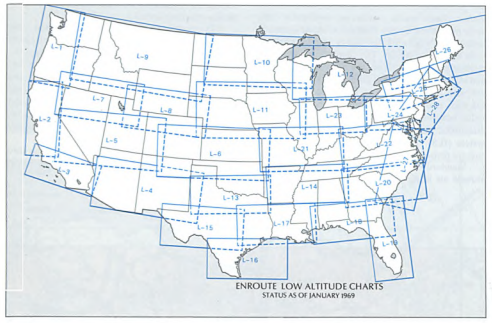
ENROUTE HIGH ALTITUDE CHARTS
STATUS AS OF JANUARY 1969



HAWAIIAN ISLANDS
ENROUTE CHART
STATUS AS OF JANUARY 1969

ALASKA ENROUTE CHARTS
STATUS AS OF JANUARY 1969

Adapted from U.S. Coast and Geodetic Survey, Catalog of aeronautical charts, Washington, Jan. 1969



ENROUTE LOW ALTITUDE CHARTS
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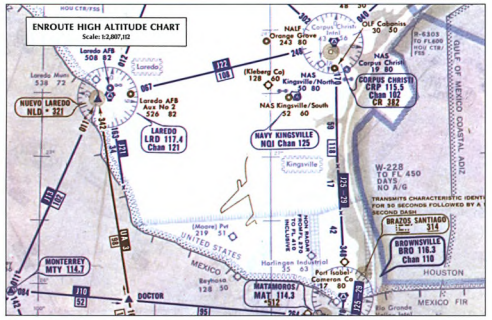
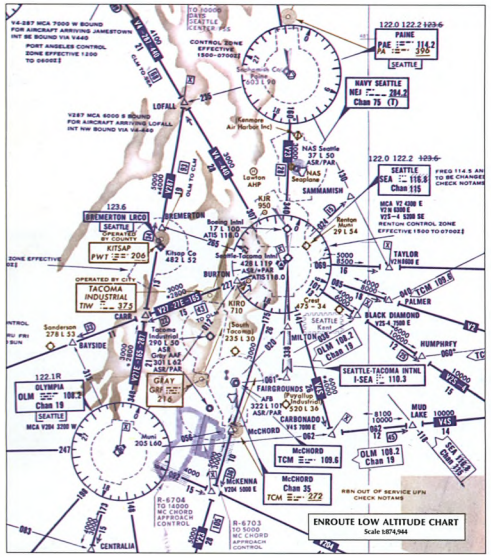
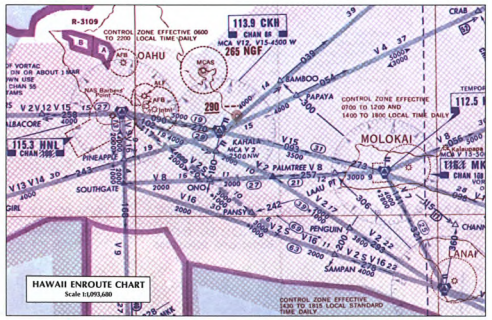


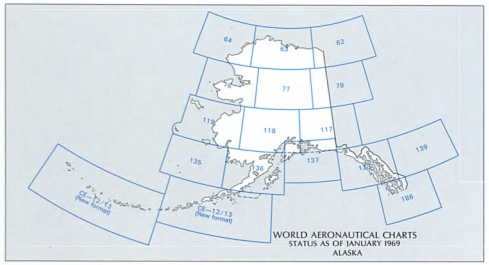




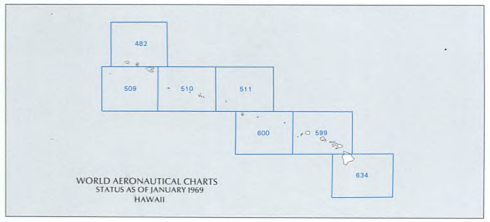
WORLD AERONAUTICAL CHARTS

World aeronautical charts (WAC) covering the United States are published and distributed by the U.S. Coast and Geodetic Survey. They are part of a standard series of aeronautical charts covering land areas of the world and designed for navigation by moderate-speed aircraft. These charts are published at a scale of 1:1,000,000 (one inch equals 13.7 nautical miles) and on the Lambert Conformal Conic Projection. Much detail shown on the sectional series is omitted on this series because of the smaller scale.

Topographic information includes cities and towns, principal roads, railroads, distinctive landmarks, drainage, and relief. Relief is shown by spot elevations, contour lines, and gradient tints. Aeronautical information includes visual and radio aids to navigation, aerodromes, airways, restricted areas, obstructions, and other related data. Plans are now being made to redesign the WAC series; however, no production or publication schedule is available. These charts will have the same construction format as the new sectional series.



WORLD AERONAUTICAL CHARTS
STATUS AS OF JANUARY 1969
ALASKA



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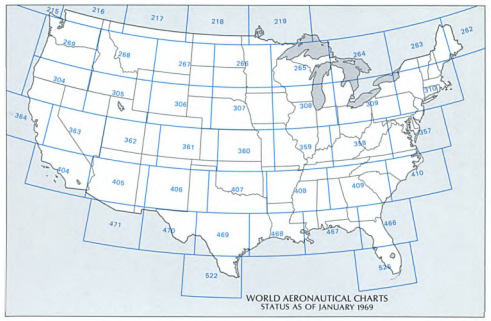
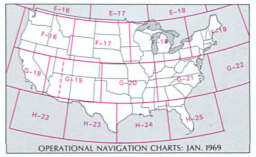
STATUS AS OF JANUARY 1969
HAWAII



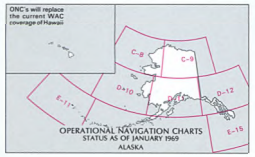
Adapted from U.S. Coast and Geodetic Survey, Catalog of aeronautical charts, Washington, Jan. 1969

OPERATIONAL NAVIGATION CHARTS

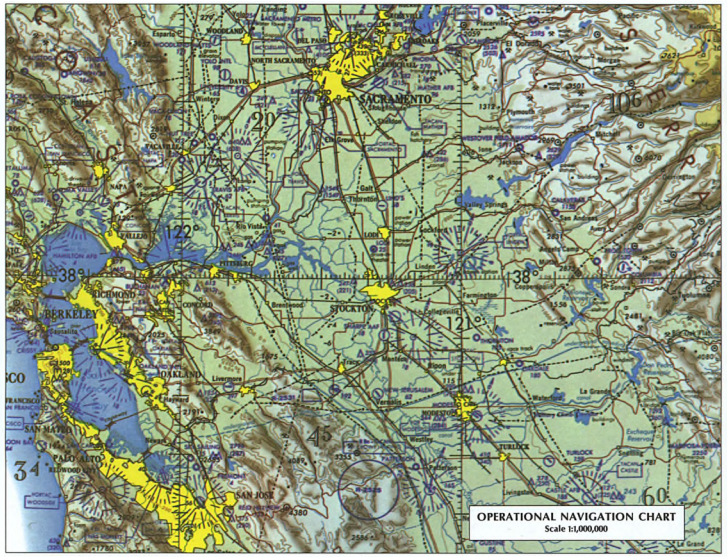
Operational navigation charts (ONC) are specially designed to satisfy military requirements. They contain basically the same information as the World Aeronautical Chart (WAC) Series, except that relief is portrayed by shadient relief (combination of shaded relief and gradient tint), as well as contour lines. The ONC series is replacing the WAC series outside the United States and also in Hawaii. In those areas, WAC's will be available only where the ONC's have not been issued.



OPERATIONAL NAVIGATION CHARTS: JAN. 1969



OPERATIONAL NAVIGATION CHARTS
STATUS AS OF JANUARY 1969
ALASKA



SECTIONAL AND LOCAL CHARTS

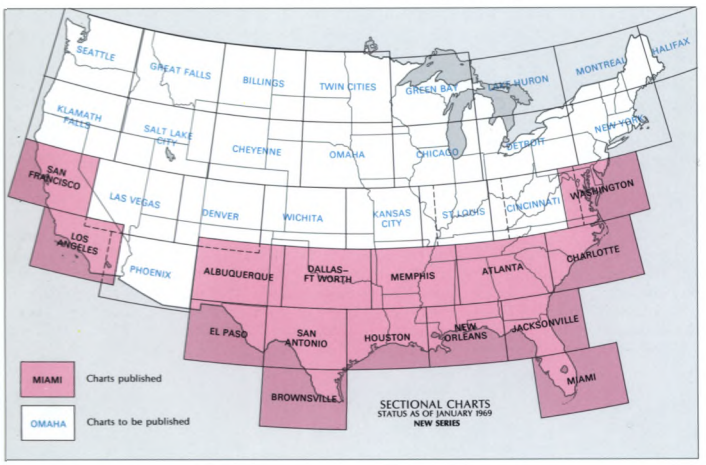
Sectional charts and local charts, published by the U.S. Coast and Geodetic Survey on the Lambert Conformal Conic Projection, are designed for visual navigation of slow- to medium-speed aircraft. Sectional charts are at a scale of 1:500,000 (1 inch equals 6.85 nautical miles) and local charts are at a scale of 1:250,000 (1 inch equals 3.43 nautical miles), except the Honolulu chart which is at the scale of 1:125,000 (1 inch equals 1.7 nautical miles). Topographic information comprises the portrayal of relief and a judicious selection of visual checkpoints, including populated places, drainage, roads, railroads, and other distinctive landmarks. Aeronautical information includes visual and radio aids to navigation, aerodromes, controlled airspace, restricted areas, obstructions, and related data.

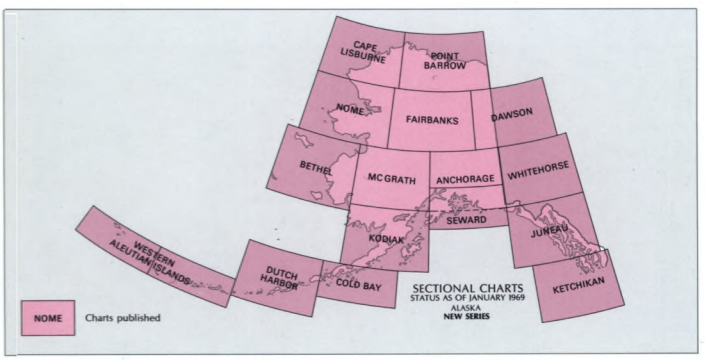
The first charts of a new series of 1:500,000-scale sectional aeronautical charts of the 48 conterminous United States have been published. The new series will cover the 48 States in 37 sheets, printed back-to-back for greater coverage per sheet, and will replace the 87 sheets of the present sectional series. Charts of the present series will be gradually discontinued as complete coverage of each is provided by the new charts. The portrayal of terrain on the new charts emphasizes landforms by relief shading and also includes contours, elevation tints, and spot elevations. Aeronautical information included is similar to that on the present sectional charts. The charts are folded to 5× 10-inch size for convenient use and storage in the cockpit.

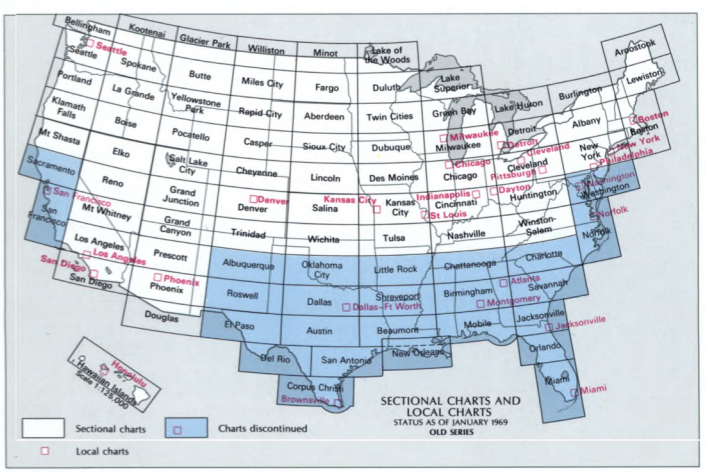
A similar new series of 16 sectional charts now provides 1:500,000-scale coverage of Alaska for the first time. These charts are constructed to the same specifications as those for the 48 States.

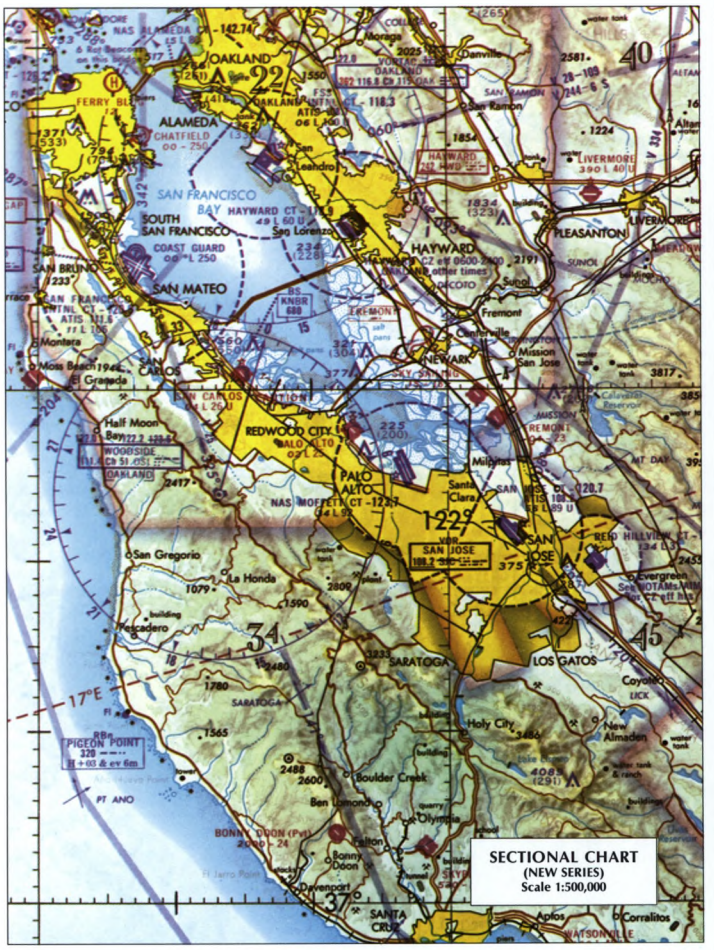
Local charts will be discontinued individually upon the publication of the new series of sectional charts which have insets of the local areas.

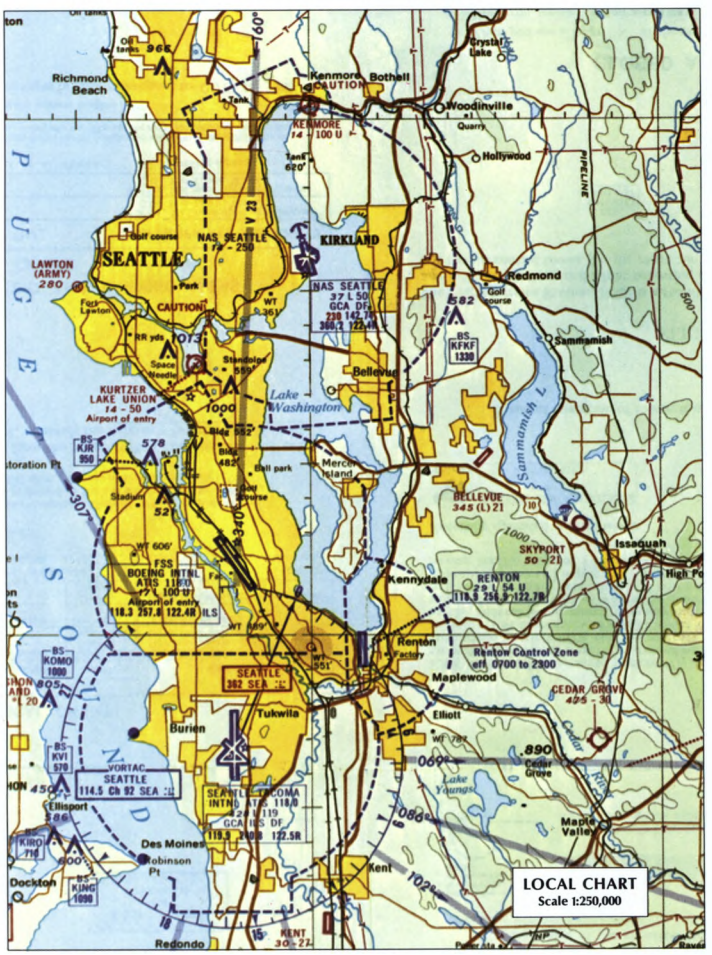
Compiled from information provided by U.S. Coast and Geodetic Survey, 1969











TOPOGRAPHIC MAPPING

Topographic maps are graphic representations of selected manmade and natural features of the earth's surface plotted to definite scales. The distinguishing aspect of topographic maps is the portrayal of the shape and elevation of the terrain. Such maps record in convenient, readable form physical characteristics of the terrain as determined by precise engineering surveys and measurements.

Topographic maps have many uses as basic tools for planning and executing projects that are necessary for modern living. They are an essential part of geologic and hydrologic research, of mineral investigations, and of studies on the quantity and quality of water. They greatly facilitate the study and application of flood control, soil conservation, and reforestation. Topographic maps are of prime importance in planning highways, airports, dams, pipelines, transmission lines, industrial plants, and countless other types of construction. Intelligent and efficient development of natural resources depends on the availability of adequate topographic mapping.

The rapidly growing list of map users includes many people who have discovered the advantages of topographic maps in the pursuit of outdoor activities such as hunting, fishing, and vacationing. Reliable maps showing relief features, woods, clearings, and watercourses are of inestimable value to the serious hiker. There is, in fact, very little of the outdoors that cannot be better understood and appreciated with the aid of topographic maps.

NATIONAL TOPOGRAPHIC PROGRAM

The National Topographic Program is intended to meet national and local needs for maps used in inventory, development, and management of the natural resources of the country, as well as in highway and regional planning, conservation, defense, and many other activities. The production, maintenance, and distribution of the National Topographic Map Series of the United States and its outlying areas are responsibilities of the U.S. Geological Survey.

A map series is a group of maps which conform to the same specifications or have a common unifying characteristic such as scale. The National Topographic Map Series is composed of the basic series listed below:

7½-minute quadrangle (1:24,000 scale)
Puerto Rico 7½-minute quadrangle (1:20,000 scale)
15-minute quadrangle (1:62,500 scale)
Alaska (1:63,360 scale)
1:250,000 scale
National Park (varying scales)
State (1:500,000 and 1:1,000,000 scales)
*United States (varying scales)
International Map of the World (1:1,000,000 scale)
*Antarctic (varying scales)
*Trust Territory of the Pacific Islands (1:25,000 scale).

Topographic maps prepared by the Army Topographic Command, Coast and Geodetic Survey, Forest Service, Mississippi River Commission, and Tennessee Valley Authority, in connection with their regular activities, are edited and published by the Geological Survey and are included in the National Topographic Map Series. Domestic mapping operations currently in progress by these agencies are included in the map below.

From its beginning in 1879, the Geological Survey topographic program has been directed toward adequate topographic mapping of the entire country. In the United States, as in other countries throughout the world, a progressive change in what is considered to be adequate mapping has taken place. The trend has been toward larger scale maps that have more detail, accuracy, and information. In the late 1950's, it became apparent that the detail and accuracy of the 1:24,000-scale maps are essential for most regions of the conterminous United States, and that any program which resulted only in smaller scale maps would be uneconomical.

In developing the National Topographic Program, needs for mapping are evaluated according to relative importance and urgency. New projects are added annually to the extent that available funds and mapping capacity permit. The projects are selected on the basis of highest composite priority determined from requests presented annually by a number of Federal agencies, by State and local agencies, and by other organizations.

The program is financed primarily through direct appropriations by Congress, but State and local agencies also contribute funds for mapping which are matched on a dollar-for-dollar basis with Federal funds under cooperative mapping programs. The mapping thus developed serves the State or local need on a priority basis and, at the same time, contributes to the National Topographic Program.

The National Topographic Program consists of three principal parts: standard quadrangle mapping, map revision, and small-scale and special mapping.

STANDARD QUADRANGLE MAPPING is defined as topographic mapping of 7½- and 15-minute quadrangles covering the United States and its outlying areas, generally at 1:24,000 and 1:62,500 scales (1:63,360 for Alaska). Since 1957 the Geological Survey has performed all topographic surveys for standard quadrangle mapping in the conterminous States and Hawaii with accuracy and content required for publication at 1:24,000 scale. Maps of a few areas have been published initially at 1:62,500 scale; however, the 1:24,000-scale surveys for these areas, in the form of map manuscripts, are available as advance prints and for future publication at the larger scale. Most Alaska mapping has been prepared and published at 1:63,360 scale. About 80 percent of the United States is covered by either published maps or advance manuscripts of maps in the 7½- and 15-minute quadrangle series, and an active program is underway to complete the coverage as soon as possible.

One of the most important characteristics of standard quadrangle mapping is horizontal and vertical accuracy. Under the National Topographic Program, maps are compiled to meet National Map Accuracy Standards. To meet the accuracy requirements, the horizontal accuracy at 1:24,000 scale must be such that at least 90 percent of well-defined points tested will not be in error by more than 40 feet. Vertical accuracy must be such that at least 90 percent of the elevations tested will not be in error by more than one-half the contour interval, with an allowance for horizontal displacement within the permissible horizontal error of the map.

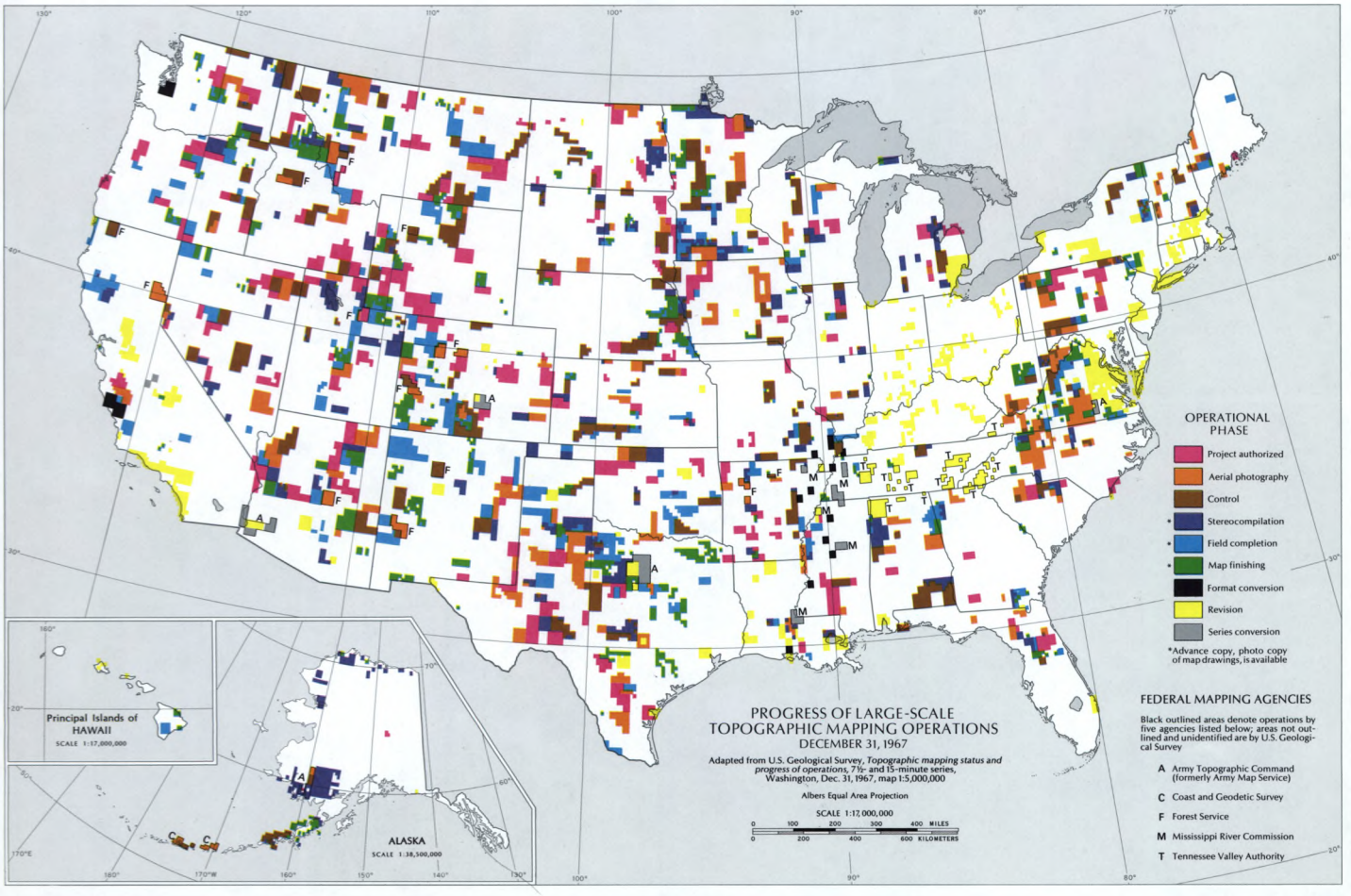
MAP REVISION is the process by which standard quadrangle maps are kept up to date. Topographic maps become obsolete because of changes resulting from economic expansion and population growth and in mapping standards. New highway and public works construction, urbanization, and changes in land-use patterns all make existing topographic maps progressively less informative, as do the more gradual changes in the terrain resulting from erosion and shifts in surface-water flow patterns. As these changes occur in an area covered by a map, there is a rapid decrease in the number of uses for which the map is suited without costly revision.

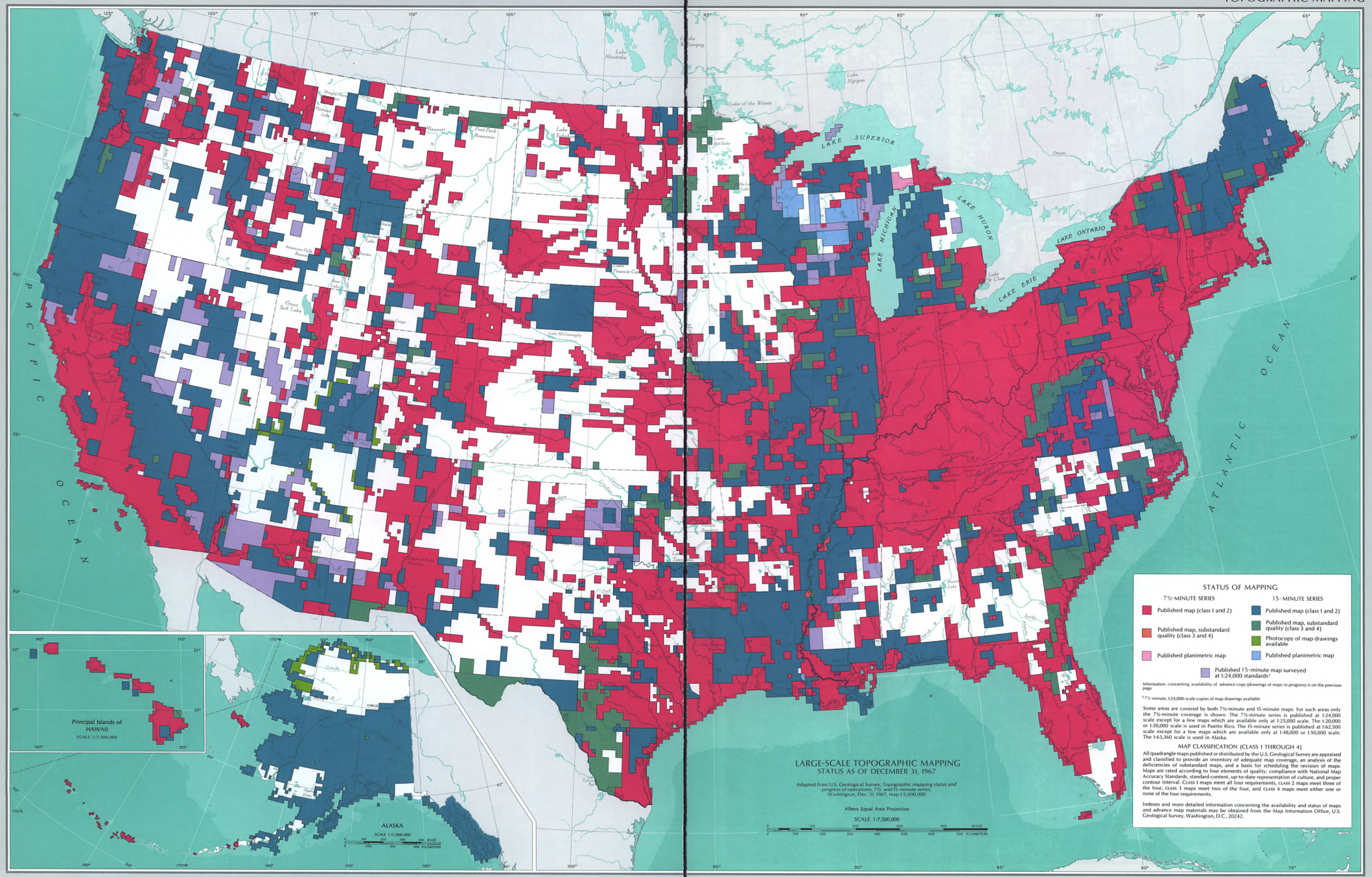
Normal map revision generally involves the same compilation and publication procedures used in the production of new mapping. As a result, a revised map generally has the same characteristics as a new map and the date of revision appears in the map margin. The cost and time required to revise a standard quadrangle map will vary depending on the number and nature of the deficiencies which require correction.

To expedite the revision program, a special form of revision called interim revision was implemented by the Geological Survey in 1967. It consists primarily of updating planimetric features which are visible on aerial photographs, without undertaking additional surveys in the field. The updated information is overprinted in purple on the features of the old map. Maps updated under the interim-revision program are available in a much shorter time and at considerably lower cost than maps revised by normal methods.

SMALL-SCALE AND SPECIAL MAPPING.—Miscellaneous small-scale and special maps are prepared from available source data and new compilation to meet a variety of special needs. The program includes all maps of the National Topographic Map Series except the standard quadrangle maps. Topographic maps published under this program are listed or shown in the several indexes on the pages that follow.

*No index of this series is shown in the Atlas




PACIFIC OCEAN
ATLANTIC OCEAN
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO
Principal Islands of HAWAII
SCALE 1:7,500,000
ALASKA
SCALE 1:12,000,000
STATUS OF MAPPING
7½-MINUTE SERIES
Published map (class 1 and 2)
Published map, substandard quality (class 3 and 4)
Published planimetric map
15-MINUTE SERIES
Published map (class 1 and 2)
Published map, substandard quality (class 3 and 4)
Photocopy of map drawings available
Published planimetric map
Published 15-minute map surveyed at 1:24,000 standards[1]
Information concerning availability of advance copy (drawings of maps in progress) is on the previous page
[1] 7½-minute, 1:24,000-scale copies of map drawings available
Some areas are covered by both 7½-minute and 15-minute maps. For such areas only the 7½-minute coverage is shown. The 7½-minute series is published at 1:24,000 scale except for a few maps which are available only at 1:25,000 scale. The 1:20,000 or 1:30,000 scale is used in Puerto Rico. The 15-minute series is published at 1:62,500 scale except for a few maps which are available only at 1:48,000 or 1:50,000 scale. The 1:63,360 scale is used in Alaska.
MAP CLASSIFICATION (CLASS 1 THROUGH 4)
All quadrangle maps published or distributed by the U.S. Geological Survey are appraised and classified to provide an inventory of adequate map coverage, an analysis of the deficiencies of substandard maps, and a basis for scheduling the revision of maps. Maps are rated according to four elements of quality: compliance with National Map Accuracy Standards, standard content, up-to-date representation of culture, and proper contour interval. CLASS 1 maps meet all four requirements, CLASS 2 maps meet three of the four, CLASS 3 maps meet two of the four, and CLASS 4 maps meet either one or none of the four requirements.
Indexes and more detailed information concerning the availability and status of maps and advance map materials may be obtained from the Map Information Office, U.S. Geological Survey, Washington, D.C. 20242.
LARGE-SCALE TOPOGRAPHIC MAPPING
STATUS AS OF DECEMBER 31, 1967
Adapted from U.S. Geological Survey, Topographic mapping status and progress of operations, 7½- and 15-minute series, Washington, Dec. 31, 1967, map I-5,000,000
Albers Equal Area Projection
SCALE 1:7,500,000

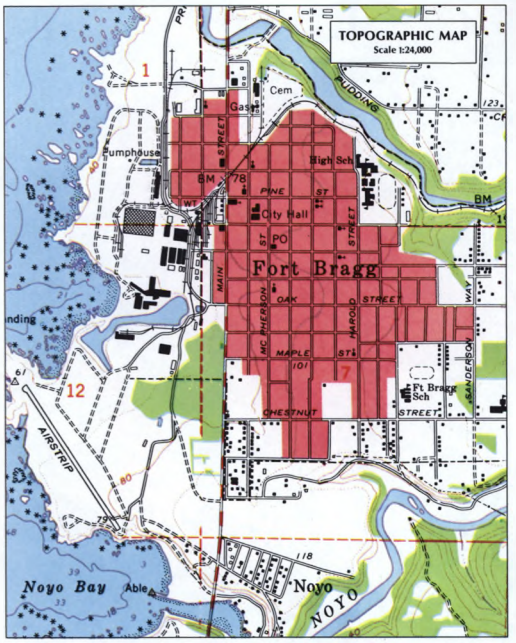
1:24,000-SCALE MAPS

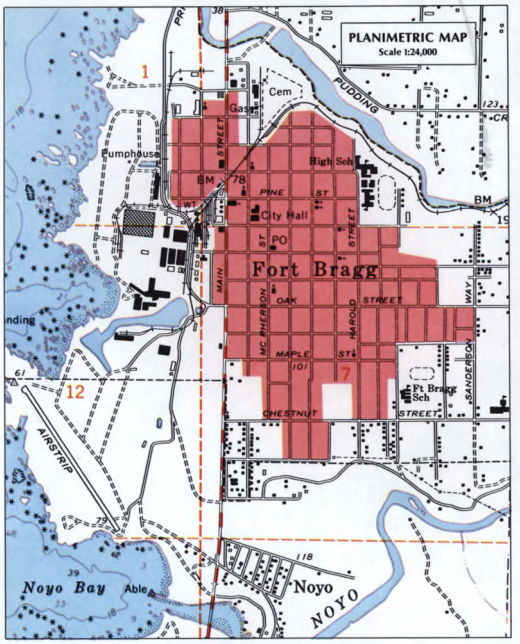
As a principal part of the National Topographic Program, the U.S. Geological Survey prepares and publishes general-purpose topographic maps in the 7½-minute series at a scale of 1:24,000 (1 inch represents 2,000 feet) and on a polyconic projection. Each map sheet measures 7½ minutes in latitude and longitude and covers an area ranging from 67 square miles in southern Florida to 49 square miles in northern Montana. Each quadrangle map is identified by the name of a city, town, or other major feature of the mapped area and also by the geographic coordinates of its southeast corner.

The maps are printed in colors which indicate the general classes of information they represent. Black indicates culture, such as roads, railroads, boundary lines, and buildings. It is also used for names, notes, and most labels. Blue indicates water features--streams, lakes, marshes or swamps, and drainage channels. Brown represents, by contour lines, relief features or land forms such as hills, mountains, and valleys. Green indicates wooded land of various types. Red emphasizes the main highways and represents urban areas and lines and corners of U.S. and other land surveys.

Since 1957, all map manuscripts of the conterminous United States and Hawaii have been prepared to meet 1:24,000-scale standards for accuracy and content. Even if a map is published at a scale of 1:62,500, the manuscript is available at 1:24,000 for map users who need information at the larger scale. In addition to the normal multicolor printing, each new and reprinted map is published in a special printing which omits contour lines and woodland tint.

Large-scale maps, such as these at 1:24,000, are especially useful for highly developed areas or rural areas where detailed information is needed for engineering planning or similar purposes.





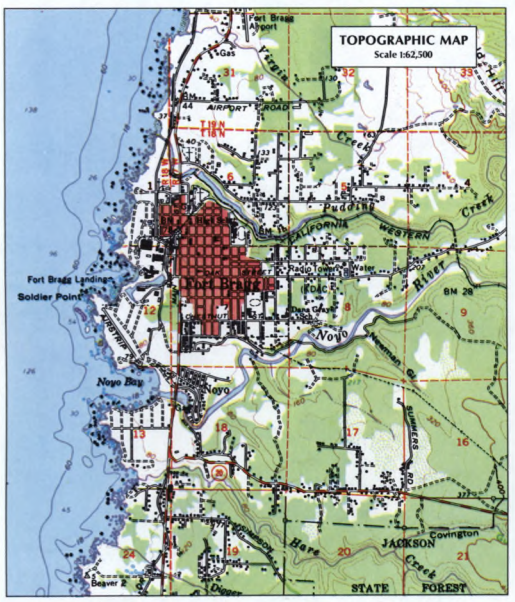
1:62,500-SCALE MAPS

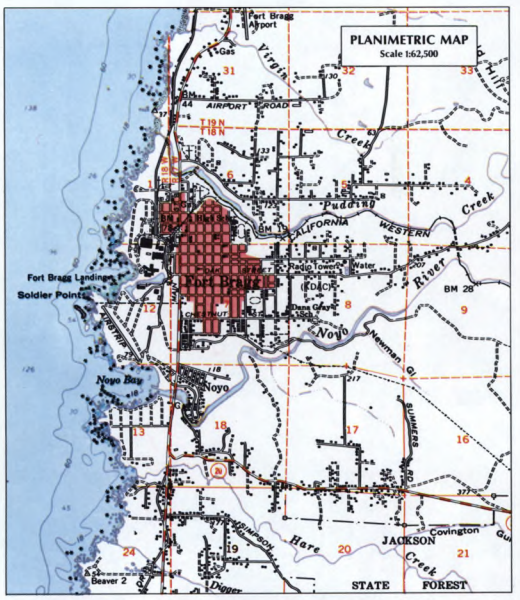
Maps of quadrangle areas measuring 15 by 15 minutes in latitude and longitude are published by the U.S. Geological Survey at the scale of 1:62,500 (1 inch represents nearly 1 mile). The areas covered by these maps range from 271 square miles in southern Florida to 197 square miles in northern Montana. Each map is identified by the geographic coordinates of its southeast corner and by the name of a city, town, or other major feature of the area; identical names may be assigned to the 15-minute quadrangle and one of the component 7½-minute quadrangles.

Maps of this series are printed in the same colors used for 7½-minute maps. Content is also generally the same, since the final map drawings are now prepared from 1:24,000-scale original manuscripts. However, the contour interval is usually twice as large, some minor features are omitted, and less hydrographic detail is shown. A special printing, without contour lines or woodland tint, is available for maps published or reprinted since 1964.

Alaska is extensively mapped at a scale of 1:63,360 (1 inch represents 1 mile). These maps are comparable to those of the 15-minute series in content, but the manuscripts are not prepared at a scale of 1:24,000 and the longitudinal width ranges from 20 to 36 minutes. Special printings, without contour lines and woodland tint, are available.

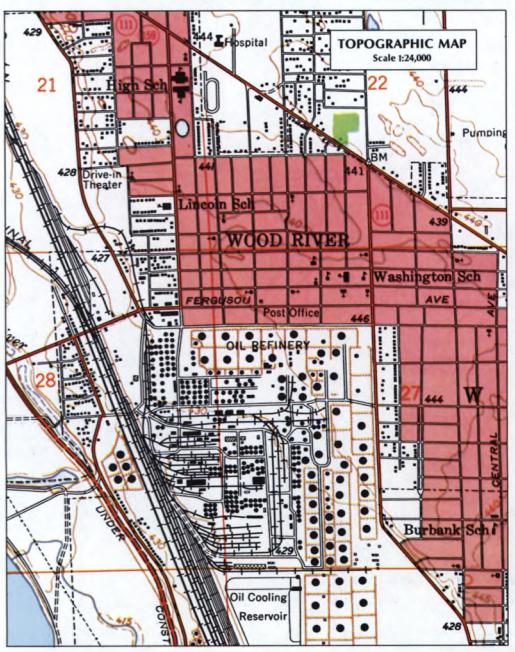
Maps at scales of 1:62,500 and 1:63,360 are generally considered adequate for all uses other than detailed planning.

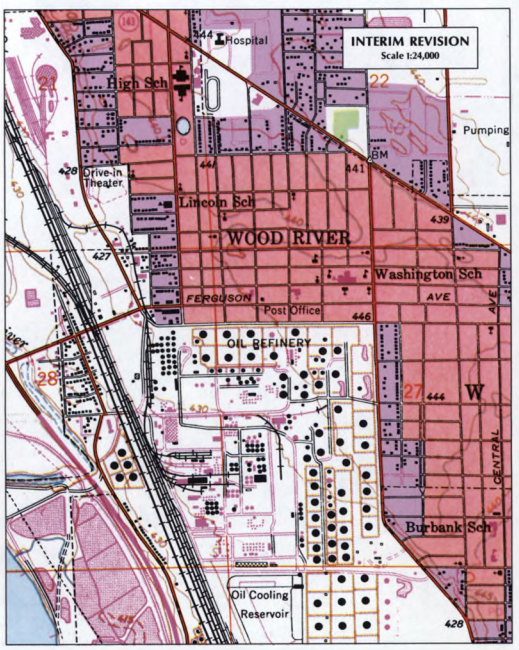


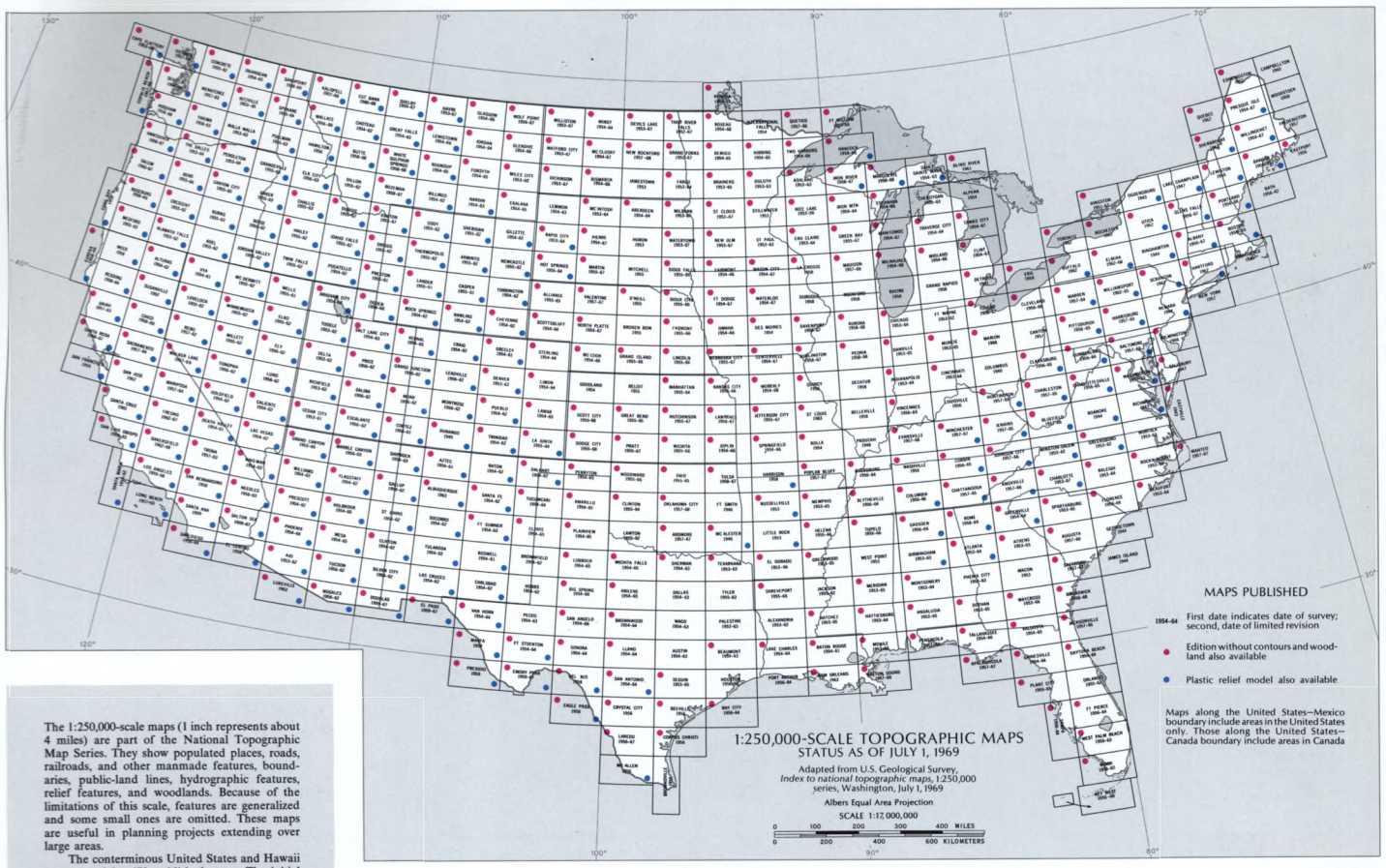


INTERIM REVISION

In 1967 the Geological Survey initiated a program of interim revision to update maps rapidly and economically by interpreting and compiling features from aerial photographs. The new information, which represents changes that have occurred since the previous map edition, is printed in purple. Features that are added to the map include highways, industrial plants, suburban housing, shopping centers, dams, reservoirs, and relocated streams. The new planimetric features are not field checked, but the additions are in effect accurate and complete. In this type of revision, major errors found on the original map are corrected, and selected interior nomenclature and marginal notes are updated. Interim revision does not include the addition of proposed roads or the updating of such map features as contour lines, fence and field lines, land lines, boundary lines, and depth curves and soundings. Woodland information is revised only where changes are sufficient to warrant recompilation.







The 1:250,000-scale maps (1 inch represents about 4 miles) are part of the National Topographic Map Series. They show populated places, roads, railroads, and other manmade features, boundaries, public-land lines, hydrographic features, relief features, and woodlands. Because of the limitations of this scale, features are generalized and some small ones are omitted. These maps are useful in planning projects extending over large areas.

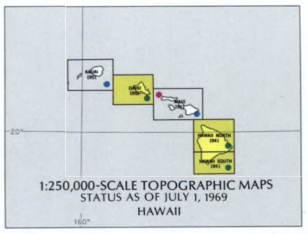
The conterminous United States and Hawaii are covered by 473 published maps. The initial editions were prepared by the Army Map Service for military use. These maps, which are now maintained and published by the U.S. Geological Survey for distribution to the public, were compiled from topographic maps of the Geological Survey and other Federal agencies, aerial photographs, State highway maps, county maps, and other available information.

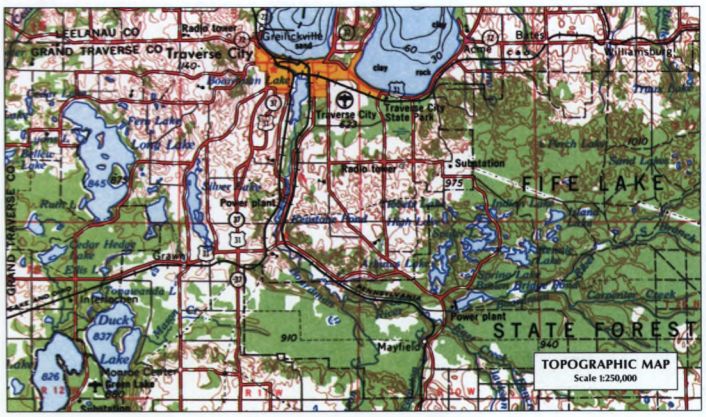
The 1:250,000-scale maps are drawn on a transverse Mercator projection, are generally published in quadrangle units of 1° of latitude by 2° of longitude, and cover areas ranging from 6,346 to 8,669 square miles, depending on the latitude. The contour interval ranges from 50 feet in relatively flat areas to 200 feet in mountainous areas. Supplementary contours at one-half the basic contour interval are sometimes added in areas of low relief for a more detailed representation than the regular interval affords.

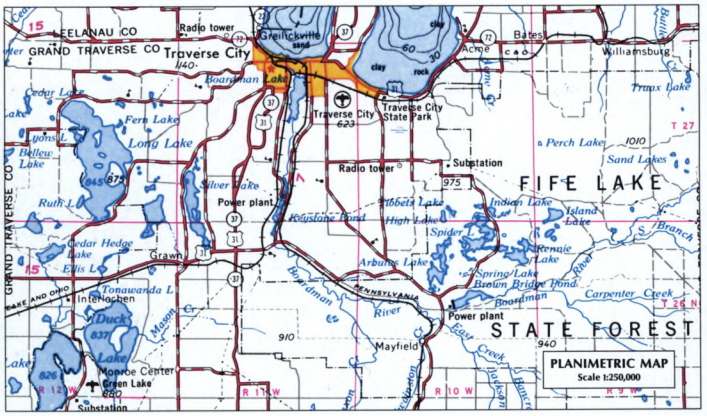
Alaska is covered by 153 topographic maps at this scale prepared by the Geological Survey. The maps are generally published in quadrangle units of 1° of latitude by 2° or 3° of longitude and cover areas ranging from 4,580 square miles in the latitude of Point Barrow to 7,309 square miles in south-central Alaska. Many of the Alaska maps are also available in a shaded-relief edition.

Puerto Rico is shown on a similar topographic map but at a scale of 1:240,000.

In cooperation with the National Science Foundation, the Geological Survey is preparing a series of reconnaissance topographic maps of West Antarctica and the Transantarctic Mountains at a scale of 1:250,000 with shaded relief. These maps are published in quadrangle units of 1° latitude and vary in longitude from 3° to 15°, depending on the latitude, and represent areas from 4,500 to 6,500 square miles. Because the compilation information is limited in some areas, many of these maps show only partial coverage.







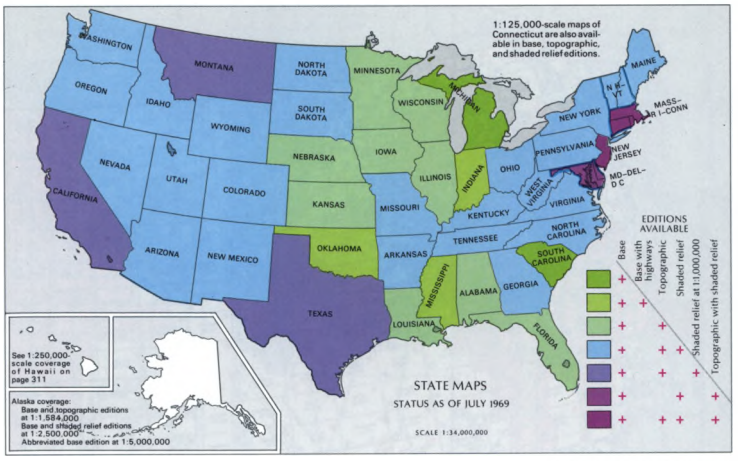
STATE MAP SERIES

State maps are published by the U.S. Geological Survey in base, topographic, and shaded-relief editions. These maps, constructed on the Lambert conformal conic projection at a scale of 1:500,000 (1 inch represents approximately 8 miles), are available in all three editions for most of the conterminous States. There are maps of Alaska at scales of 1:1,584,000 and 1:2,500,000.

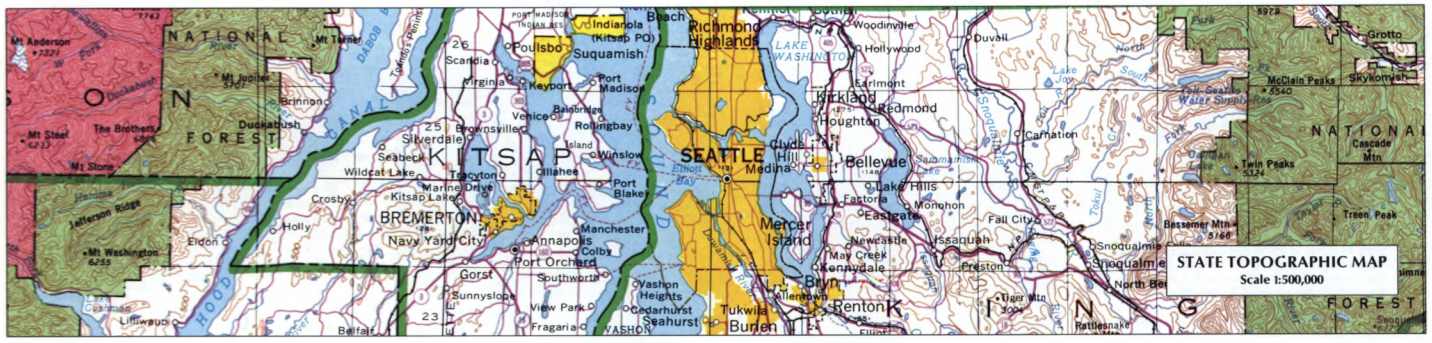
The base edition for State maps shows counties, populated places, railroads, public-land lines, and hydrographic features. Base maps of the 48 conterminous States are also published in a black and white edition at a scale of 1:1,000,000 (1 inch represents approximately 16 miles).

The topographic edition portrays the shape of the terrain and ground elevations by contour lines at intervals of 200 or 500 feet, depending on the magnitude of the relief. This edition shows highways, national parks and monuments, wildlife refuges, national forests, and Indian reservations.

On the shaded-relief edition, the shading is overprinted on a simplified base map which usually shows only county boundaries, county seats, hydrographic features, and large cities.



Compiled by U.S. Geological Survey, 1969

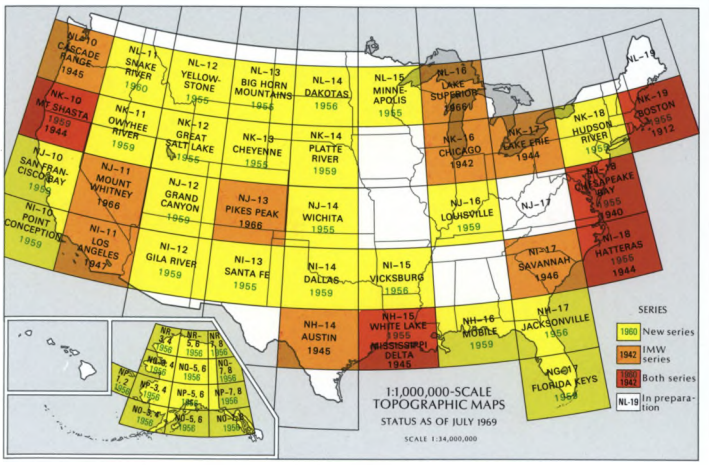


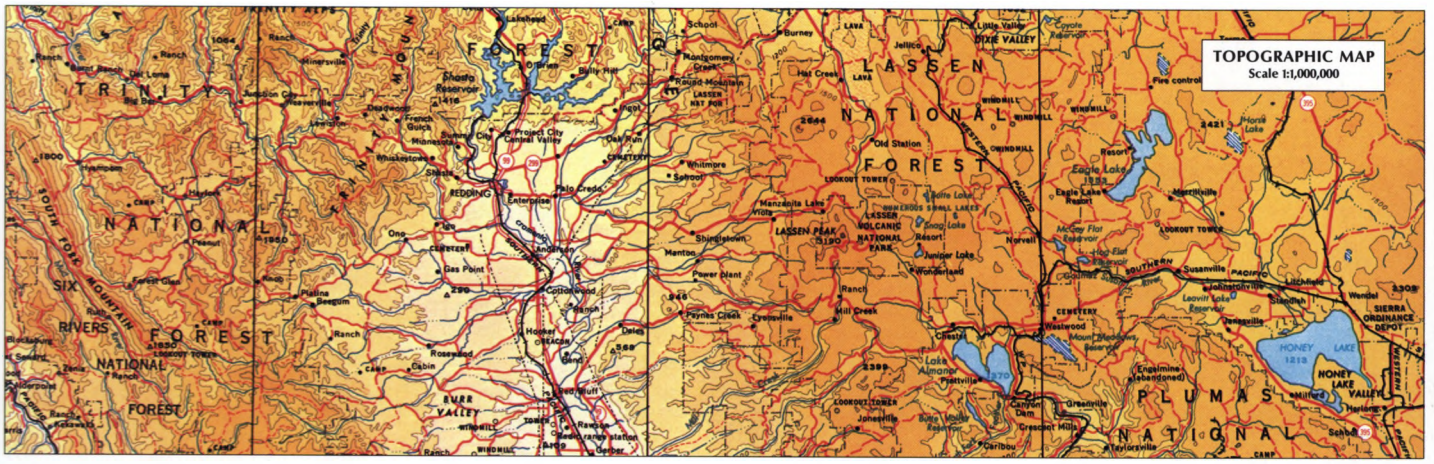
1:1,000,000-SCALE MAPS

The U.S. Geological Survey is publishing a series of topographic maps of the United States at the scale of 1:1,000,000 (1 inch represents approximately 16 miles on the ground). The initial edition of 14 maps was published as the United States' contribution to the International Map of the World (IMW) in accordance with standard specifications for that series. Another series of maps at this scale prepared by the Army Map Service (now U.S. Army Topographic Command) is distributed by the Geological Survey for civil use. Although this latter series does not conform to IMW specifications in all respects the maps usually contain more recent information than maps of the original IMW series and will satisfy the same general purposes. Five of the maps are available in both the IMW and Army Map Service series.

The Geological Survey is producing IMW maps for the remainder of the country not covered at 1:1,000,000 scale. These maps conform to new IMW specifications adopted in 1962.

The maps show principal populated places, roads and railroads, political boundaries, and hydrographic features. Relief features are shown by contour lines and hypsometric tints. Each map is numbered in accordance with the designation system adopted for the IMW series and is named for one of the principal localities or natural features within its area. The maps are published in quadrangle units of 4° of latitude by 6° of longitude (12° for Alaska) and cover areas ranging from 73,734 to 122,066 square miles, depending on the latitude.



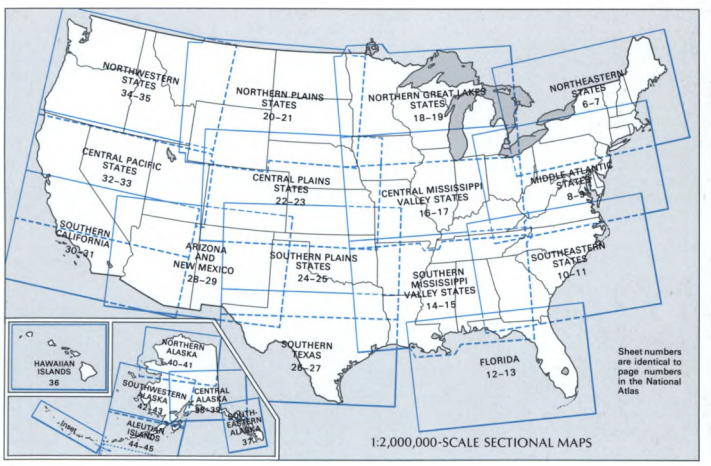


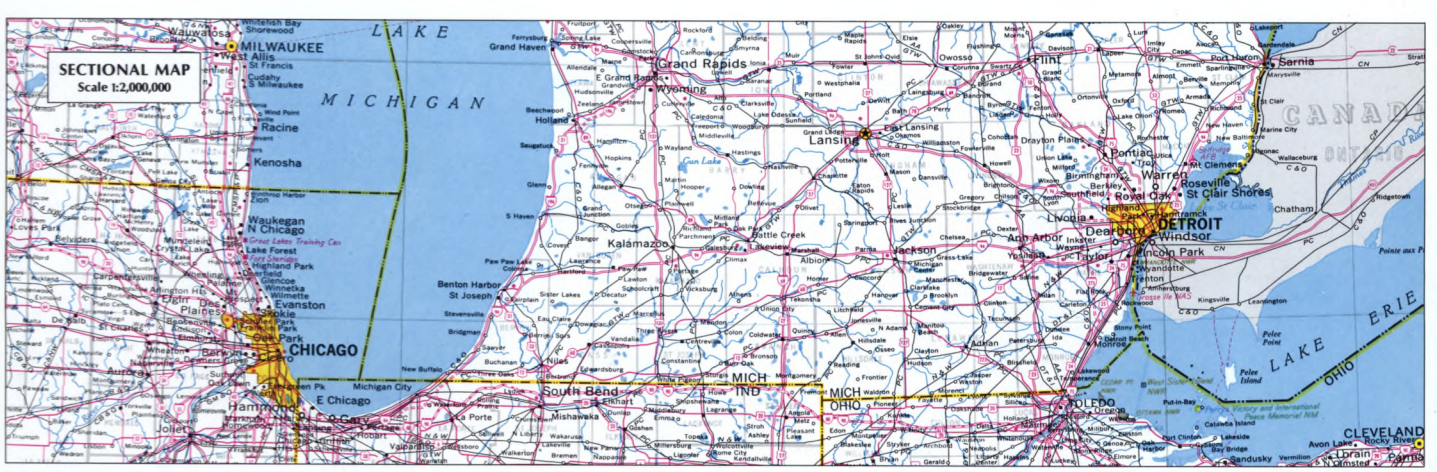
Compiled by U.S. Geological Survey, 1969

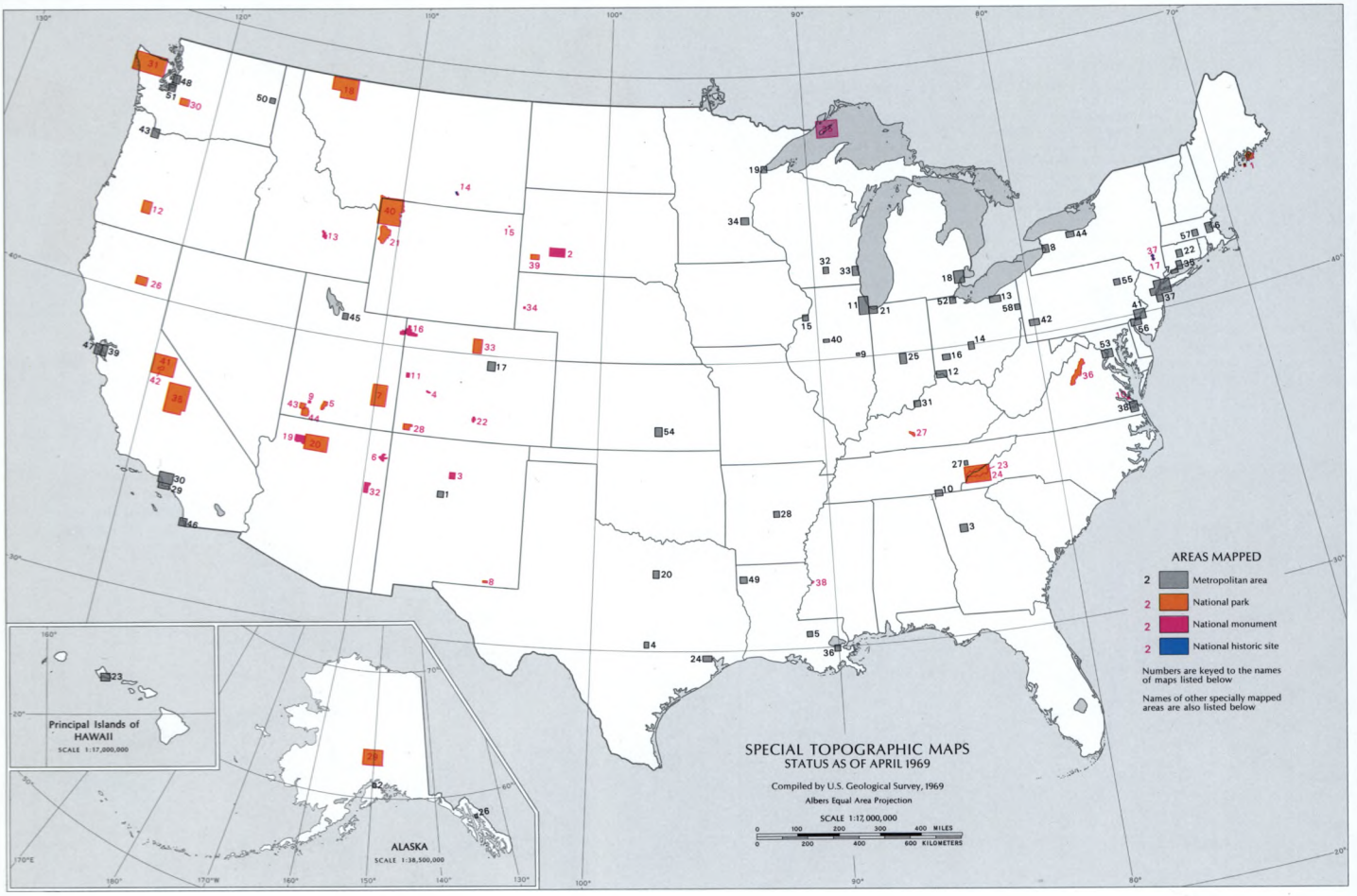
1:2,000,000-SCALE SECTIONAL MAPS

The U.S. Geological Survey has prepared this series of planimetric maps specifically for this Atlas. These maps are compiled on the Albers Equal Area projection and depict all 50 States at the uniform scale of 1:2,000,000, or one inch represents approximately 32 miles. To maintain a uniform scale throughout the 50 States, it was necessary that Alaska, California, Montana, and Texas each be shown on more than one sectional map. However, each of the other 46 States is depicted in its entirety on one sectional map. An index map on page 5 shows the geographic extent of each of these sectional maps; a legend describes the symbolization.

Information portrayed on these general reference maps includes populated places, roads and railroads, political boundaries, hydrographic features, major defense installations, airfields and airports, selected elevations, and four types of reserved lands: National forests, parks and monuments, wildlife refuges, and Indian reservations. Based on their proclamation boundaries, these lands have been shown areally down to a minimum of approximately 1100 acres; below that size a uniform spot symbol has been used.







Topographic maps of several national parks, monuments, and historic sites are published and distributed by the U.S. Geological Survey. These maps, ranging widely in scales, depict, in addition to the culture and drainage, the relief of the earth's surface by contour lines. Some of the maps are available with a shaded relief overprint.

Metropolitan area maps, at a scale of 1:24,000, are made by combining the content of several quadrangle maps that cover the selected cities and their adjacent areas. Each map is generally printed as a single sheet; however, larger cities require the maps to be on two or more sheets. They are used principally for urban studies.

Many other special topographic maps and sheets are available; some are listed below. Detailed descriptions of all maps published for each State are available from the Geological Survey.

NATIONAL PARKS, MONUMENTS, AND HISTORIC SITES

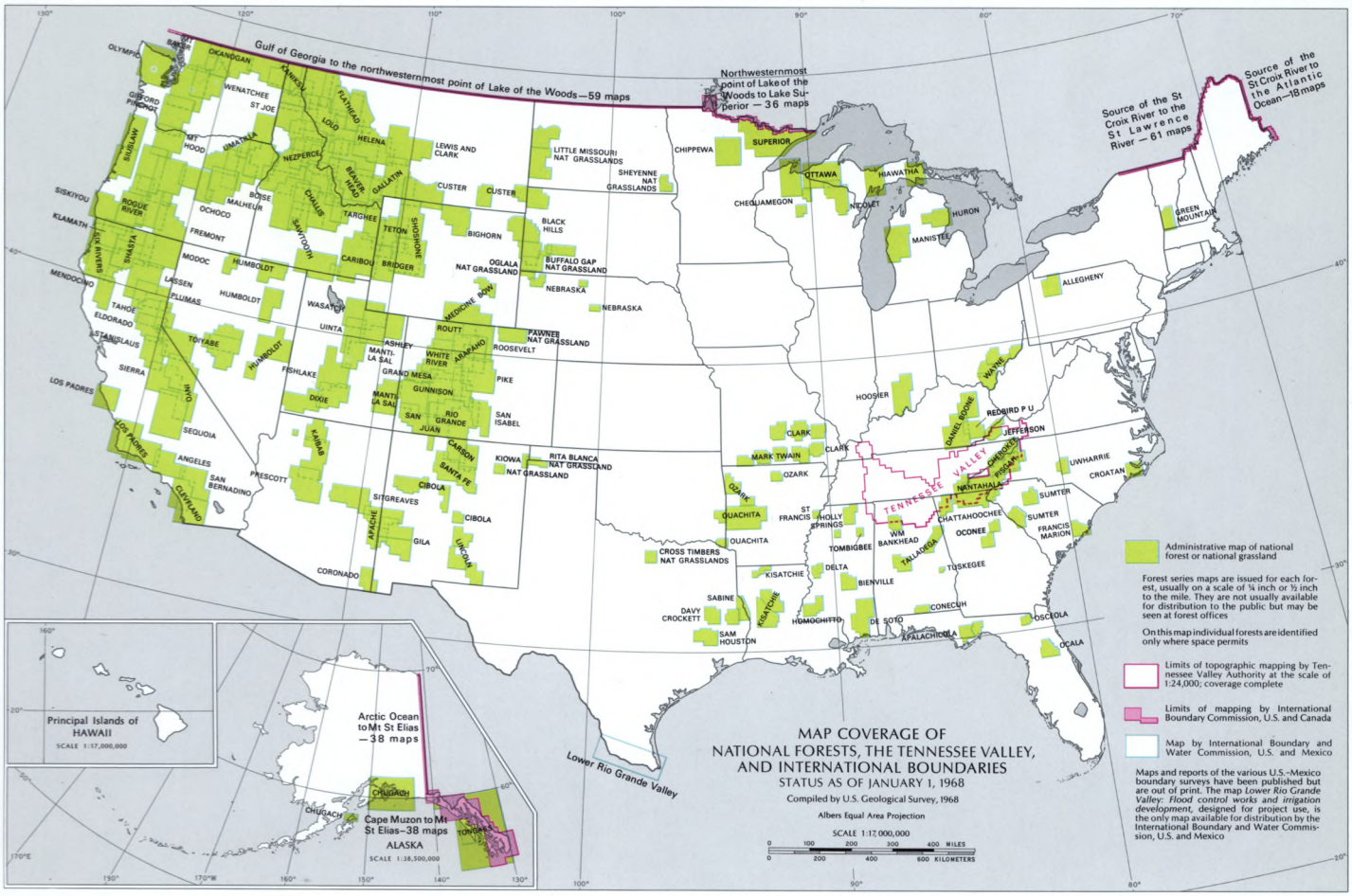
1	Acadia National Park and vicinity, Maine	1:24,000	1956
2	Badlands National Monument, S. Dak.	1:62,500	1960
3	Bandelier National Monument and vicinity, N. Mex.	1:24,000	1953
4	Black Canyon of the Gunnison National Monument, Colo.	1:24,000	1953
5	Bryce Canyon National Park, Utah	1:31,680	1932
6	Canyon de Chelly National Monument, Ariz.	1:48,000	1938
7	Canyonlands National Park, Utah	1:62,500	1968
8	Carlsbad Caverns National Park, N. Mex.	1:24,000	1934
9	Cedar Breaks National Monument, Utah	1:15,840	1936
10	Colonial National Monument (Yorktown Battlefield), Va.	1:9,600	1931
11	Colorado National Monument, Colo.	1:24,000	1962
12	Crater Lake National Park and vicinity, Oreg.	1:62,500	1956
13	Craters of the Moon National Monument, Idaho	1:31,680	1957
14	Custer Battlefield, Mont.	1:24,000	1891
15	Devils Tower National Monument, Wyo.	1:4,800	1949
16	Dinosaur National Monument, Colo.–Utah	1:62,500	1941
17	Franklin D. Roosevelt National Historic Site, N.Y.	1:960	1946
18	Glacier National Park, Mont.	1:125,000	1938
19	Grand Canyon National Monument, Ariz.	1:48,000	1936
20	Grand Canyon National Park and vicinity, Ariz.	1:62,500	1962
21	Grand Teton National Park, Wyo.	1:62,500	1948
22	Great Sand Dunes National Monument, Colo.	1:24,000	1938
23	Great Smoky Mountains National Park, Tenn.–N.C. (2 sheets)	1:62,500	1931
24	Great Smoky Mountains National Park and vicinity, Tenn.–N.C.	1:125,000	1961
25	Isle Royale National Park, Mich.	1:62,500	1957
26	Lassen Volcanic National Park and vicinity, Calif.	1:62,500	1957
27	Mammoth Cave National Park, Ky.	1:31,680	1930
28	Mesa Verde National Park, Colo.	1:24,000	1967
29	Mount McKinley National Park, Alaska	1:250,000	1951
30	Mount Rainier National Park, Wash.	1:62,500	1955
31	Olympic National Park and vicinity, Wash.	1:125,000	1957
32	Petrified Forest National Monument, Ariz.	1:62,500	1967
33	Rocky Mountain National Park, Colo.	1:62,500	1961
34	Scotts Bluff National Monument, Nebr.	1:15,840	1939
35	Sequoia and Kings Canyon National Parks and vicinity, Calif.	1:125,000	1967
36	Shenandoah National Park, Va. (2 sheets)	1:62,500	1930
37	Vanderbilt Mansion National Historic Site, N.Y.	1:3,600	1946
38	Vicksburg National Military Park, Miss.	1:9,600	1935
39	Wind Cave National Park and vicinity, S. Dak.	1:24,000	1957
40	Yellowstone National Park, Wyo.–Mont.–Idaho	1:125,000	1961
41	Yosemite National Park and vicinity, Calif.	1:125,000	1958
42	Yosemite Valley, Calif.	1:24,000	1958
43	Zion National Park (Kolob section), Utah	1:31,680	1957
44	Zion National Park (Zion Canyon section), Utah	1:31,680	1957

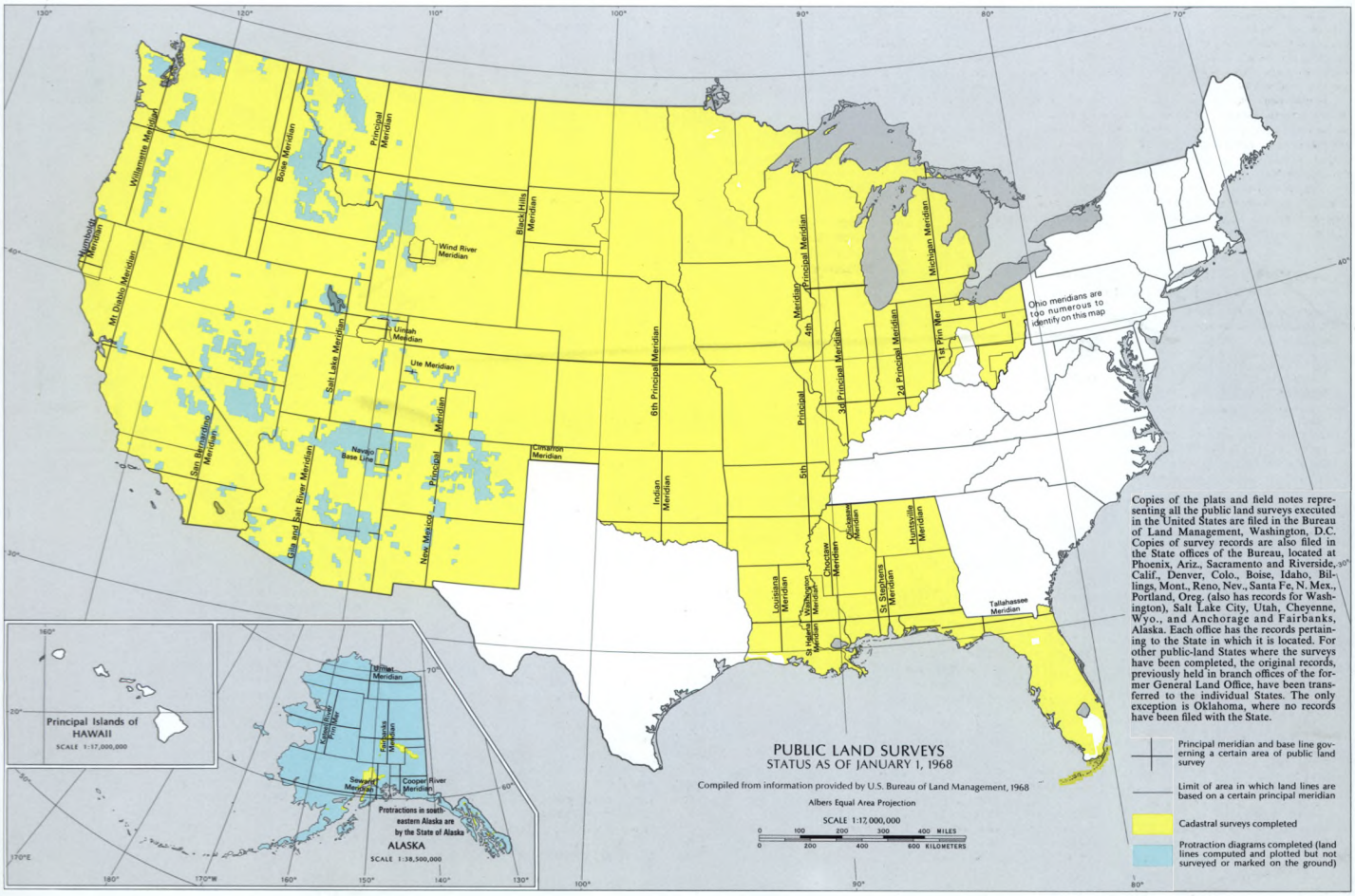
METROPOLITAN AREAS

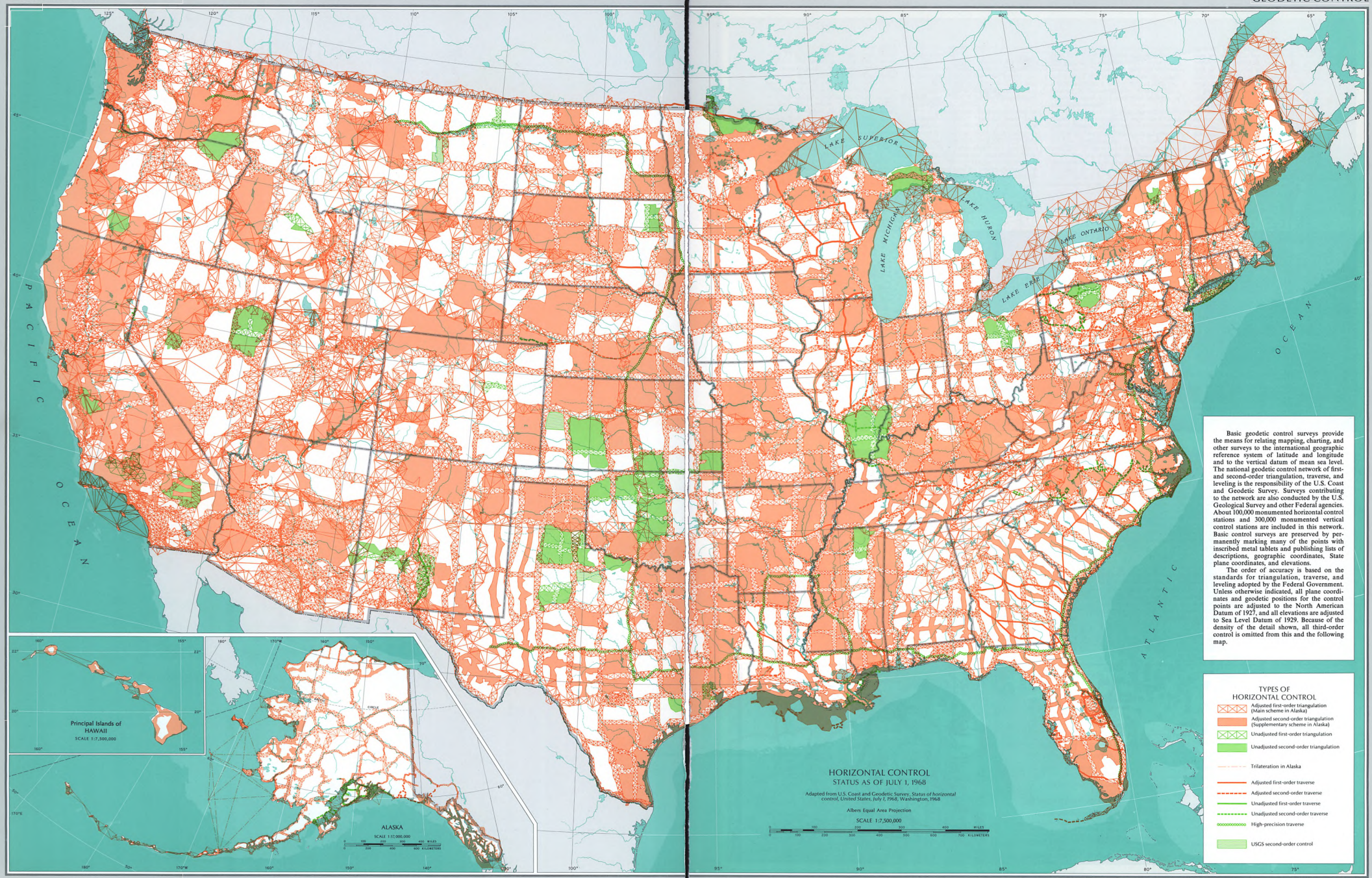
1	Albuquerque, N. Mex.	1960
2	Anchorage, Alaska	1962
3	Atlanta, Ga.	1955
4	Austin, Tex.	1955
5	Baton Rouge, La.	1963
6	Boston, Mass.	1958
7	Bridgeport, Conn.	1951
8	Buffalo, N.Y.	1948
9	Champaign–Urbana, Ill.	1950
10	Chattanooga, Tenn.–Ga.	1958
11	Chicago, Ill.–Ind. (3 sheets)	1953
12	Cincinnati, Ohio–Ky.	1961
13	Cleveland, Ohio	1963
14	Columbus, Ohio	1955
15	Davenport, Rock Island, Moline, Ill.–Iowa	1953
16	Dayton, Ohio	1955
17	Denver, Colo.	1957
18	Detroit, Mich.–Ont., Canada (2 sheets)	1952
19	Duluth, Superior, Minn.–Wis.	1954
20	Fort Worth, Tex.	1955
21	Gary, Ind.	1960
22	Hartford, New Britain, Conn.	1953
23	Honolulu, Hawaii	1954
24	Houston, Tex.	1955
25	Indianapolis, Ind.	1959
26	Juneau, Alaska	1948
27	Knoxville, Tenn.	1953
28	Little Rock, Ark.	1961
29	Long Beach, Calif.	1951
30	Los Angeles, Calif. (2 sheets)	1953
31	Louisville, Ky.–Ind.	1955
32	Madison, Wis.	1959
33	Milwaukee, Wis.	1959
34	Minneapolis, St. Paul, Minn.	1952
35	New Haven, Conn.	1954
36	New Orleans, La.	1952
37	New York, N.Y.–N.J.–Conn. (8 sheets)	1954–1957
38	Norfolk, Portsmouth, Newport News, Va.	1955
39	Oakland, Calif.	1947
40	Peoria, Ill.	1949
41	Philadelphia, Pa.–N.J. (2 sheets)	1955–1956
42	Pittsburgh, Pa.	1960
43	Portland, Vancouver, Oreg.–Wash.	1961
44	Rochester, N.Y.	1952
45	Salt Lake City, Utah	1963
46	San Diego, Calif.	1953
47	San Francisco, Calif.	1954
48	Seattle, Wash.	1950
49	Shreveport, La.	1960
50	Spokane, Wash.	1963
51	Tacoma, Wash.	1961
52	Toledo, Ohio–Mich.	1952
53	Washington, D.C.–Md.–Va.	1965
54	Wichita, Kans.	1961
55	Wilkes-Barre, Pittston, Pa.	1947
56	Wilmington, N.J.–Del.–Pa.	1955
57	Worcester, Mass.	1953
58	Youngstown, Ohio–Pa.	1954

OTHER AREAS

	Airlie, Oreg.	1914–1922
	Asher, Okla.	1906
	Austin area, Reese River mining district, Nev.	1956
	Bingham mining map, Utah	1899–1900
	Bisbee and vicinity, Ariz.	1902
	Breckenridge special, Colo.	1908
	Bridge Canyon, Ariz.	1926
	Bull Valley district, Utah	1938
	Camp Gordon and vicinity, Ga.	1887
	Camp Mills, N.Y.	1897
	Cartersville mining district, Ga.	1941
	Central City, Colo.	1904
	Central Owens Valley, Calif.	1905–1911
	Central Valley delta area, Calif.	1957
	Central Valley north area, Calif.	1957
	Central Valley south area, Calif.	1957
	Charlottesville and vicinity, Va.	1935
	Coeur d'Alene district, Idaho–Mont.	1900–1901
	Creede and vicinity, Colo.	1910
	Dahlonega district, Ga.	1905
	Denver Mountain area, Colo.	1948
	Denver Mountain parks, Colo.	1903–1923
	Dry Creek area, Idaho	1946
	Elk Basin, Wyo.–Mont.	1944
	Ely, Nev.	1906
	Ely Range, Nev.	1916
	Eureka mining district, Nev.	1931
	Genesee, Calif.	1891
	Gold Hill mining area, Colo.	1937–1938
	Goldfield special, Nev.	1905
	Hannibal and vicinity, Mo.–Ill.	1936
	Hinsdale, Mont.	1903–1904
	Hot Springs and vicinity, Ark.	1910–1911
	Idaho Springs special, Colo.	1904
	Joplin district, Mo.–Kans.–Okla.	1900
	Kauai (Island), Hawaii	1910
	Kellogg and vicinity, Idaho	1937
	King Hill area, Idaho	1946
	Kittitas drainage district, Wash. (3 sheets)	1938–1939
	La Barge, Wyo.	1935–1936
	Lanai (Island), Hawaii	1923
	Little Eightmile mining district, Idaho	1930–1931
	Lonesome, Mont.	1904
	Lordsburg, N. Mex.	1931–1932
	Magdalena district, N. Mex.	1910–1929
	Manhattan and vicinity, Nev.	1914
	Marysville, Mont.	1899
	Maui (Island), Hawaii	1929
	Molokai (Island), Hawaii	1921–1922
	Mono Lake and vicinity, Calif.	1899–1914
	Mullan and vicinity, Idaho	1938–1939
	National Bison Range, Mont.	1929
	Naval Petroleum Reserve No. 1, Calif.	1928
	Needles, Ariz.–Calif.	1949–1950
	Niagara Gorge, N.Y.–Canada	1912
	Niihau (Island), Hawaii	1926
	Nisqually Glacier, Wash.	1966
	Northwest part of Prague, Okla.	1906
	Oahu (Island), Hawaii	1922–1923
	Owens Lake and vicinity, Calif.	1905–1911
	Picture Gorge, Oreg.	1953
	Pikes Peak and vicinity, Colo.	1952
	Platoro mining area, Colo.	1936
	Pottsville and vicinity, Idaho–Mont.	1940
	Ray and vicinity, Ariz.	1910
	Rochester mining district, Nev.	1916
	Rock Run and vicinity, Ala.–Ga.	1940–1941
	Saco special, Mont.	1903
	Salton Sink, Calif.	1906
	San Antonio, Texas	1954
	Silver Plume special, Colo.	1904
	Smelterville and vicinity, Idaho	1937
	Squaw Butte Ranch, Oreg.	1936
	Sugarloaf–St. Kevin mining districts, Colo.	1929
	Summitville mining area, Colo.	1936
	Superior coal district, Wyo.	1943
	Superior mining district, Wyo.	1940
	Taos and vicinity, N. Mex.	1936
	Taylorsville, Calif.	1891
	Tenmile district, Colo.	1882
	Tenmile mining district, Colo. (2 sheets)	1939
	Tennessee River Basin (base map)	1933
	Tennessee River Basin (hydraulic map)	1933
	Terlingua district, Texas	1902
	Tintic mining district, Utah	1911
	Tinton and vicinity, Wyo.–S. Dak.	1939
	Tombstone and vicinity, Ariz.	1907
	Tombstone district, Ariz.	1904–1905
	Umiat special, Alaska	1945
	Valdez and vicinity, Alaska	1911–1912
	Willow Creek district, Wyo.	1942–1943
	Yerington district, Nev.	1913–1914

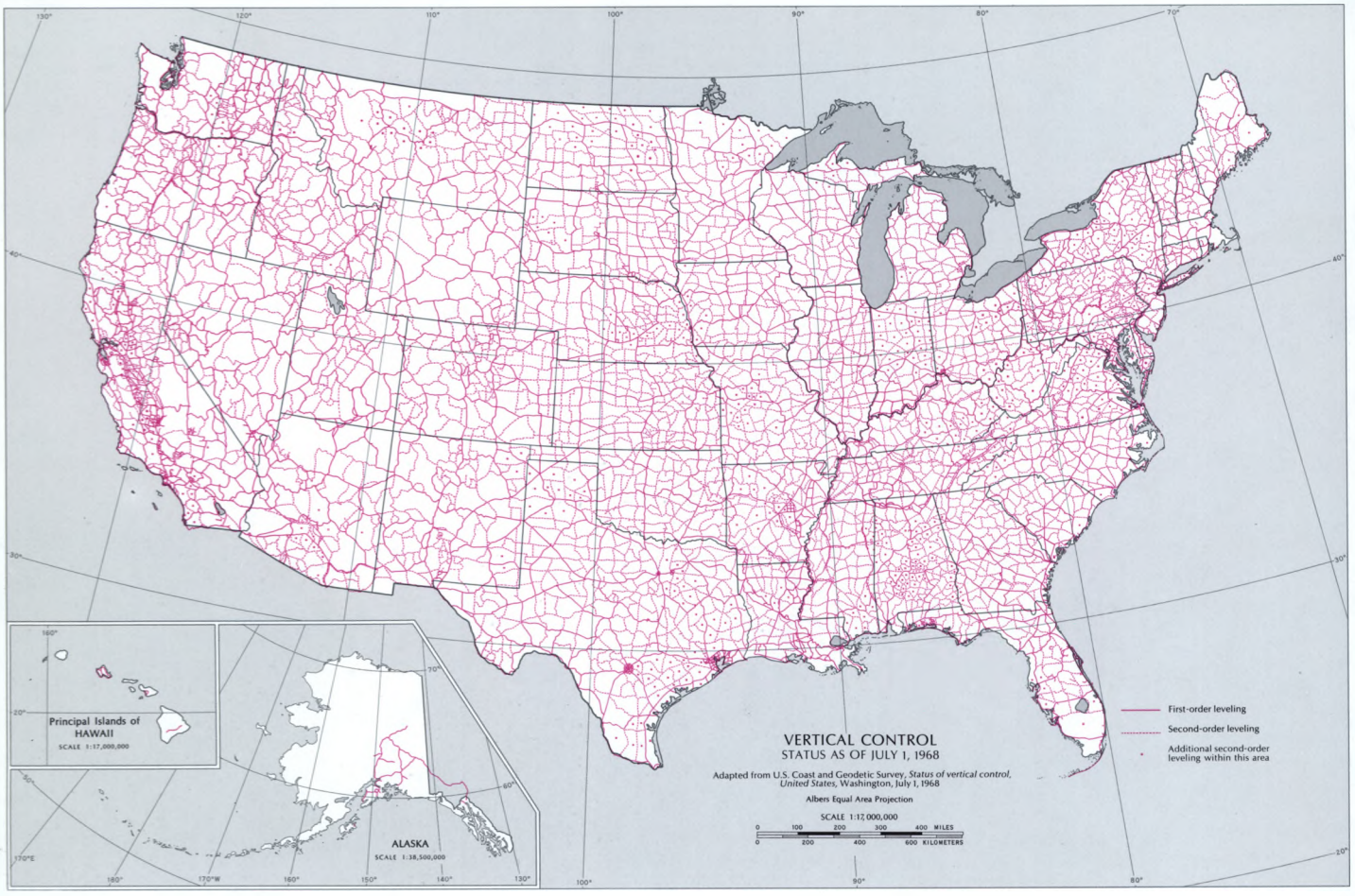

Gulf of Georgia to the northwesternmost point of Lake of the Woods—59 maps
Northwesternmost point of Lake of the Woods to Lake Superior — 36 maps
Source of the St Croix River to the St Lawrence River — 61 maps
Source of the St Croix River to the Atlantic Ocean—18 maps
Arctic Ocean to Mt St Elias —38 maps
Cape Muzon to Mt St Elias—38 maps
Lower Rio Grande Valley
Principal Islands of HAWAII
SCALE 1:17,000,000
ALASKA
SCALE 1:38,500,000
TENNESSEE VALLEY
MAP COVERAGE OF NATIONAL FORESTS, THE TENNESSEE VALLEY, AND INTERNATIONAL BOUNDARIES
STATUS AS OF JANUARY 1, 1968
Compiled by U.S. Geological Survey, 1968
Albers Equal Area Projection
SCALE 1:17,000,000
0 100 200 300 400 MILES
0 200 400 600 KILOMETERS
Administrative map of national forest or national grassland
Forest series maps are issued for each forest, usually on a scale of ¼ inch or ½ inch to the mile. They are not usually available for distribution to the public but may be seen at forest offices
On this map individual forests are identified only where space permits
Limits of topographic mapping by Tennessee Valley Authority at the scale of 1:24,000; coverage complete
Limits of mapping by International Boundary Commission, U.S. and Canada
Map by International Boundary and Water Commission, U.S. and Mexico
Maps and reports of the various U.S.-Mexico boundary surveys have been published but are out of print. The map *Lower Rio Grande Valley: Flood control works and irrigation development*, designed for project use, is the only map available for distribution by the International Boundary and Water Commission, U.S. and Mexico


Principal Islands of HAWAII
SCALE 1:17,000,000
ALASKA
SCALE 1:38,500,000
Protractions in southeastern Alaska are by the State of Alaska
Ohio meridians are too numerous to identify on this map
PUBLIC LAND SURVEYS
STATUS AS OF JANUARY 1, 1968
Compiled from information provided by U.S. Bureau of Land Management, 1968
Albers Equal Area Projection
SCALE 1:17,000,000
0 100 200 300 400 MILES
0 200 400 600 KILOMETERS
Copies of the plats and field notes representing all the public land surveys executed in the United States are filed in the Bureau of Land Management, Washington, D.C. Copies of survey records are also filed in the State offices of the Bureau, located at Phoenix, Ariz., Sacramento and Riverside, Calif., Denver, Colo., Boise, Idaho, Billings, Mont., Reno, Nev., Santa Fe, N. Mex., Portland, Oreg. (also has records for Washington), Salt Lake City, Utah, Cheyenne, Wyo., and Anchorage and Fairbanks, Alaska. Each office has the records pertaining to the State in which it is located. For other public-land States where the surveys have been completed, the original records, previously held in branch offices of the former General Land Office, have been transferred to the individual States. The only exception is Oklahoma, where no records have been filed with the State.
Principal meridian and base line governing a certain area of public land survey
Limit of area in which land lines are based on a certain principal meridian
Cadastral surveys completed
Protraction diagrams completed (land lines computed and plotted but not surveyed or marked on the ground)



Basic geodetic control surveys provide the means for relating mapping, charting, and other surveys to the international geographic reference system of latitude and longitude and to the vertical datum of mean sea level. The national geodetic control network of first- and second-order triangulation, traverse, and leveling is the responsibility of the U.S. Coast and Geodetic Survey. Surveys contributing to the network are also conducted by the U.S. Geological Survey and other Federal agencies. About 100,000 monumented horizontal control stations and 300,000 monumented vertical control stations are included in this network. Basic control surveys are preserved by permanently marking many of the points with inscribed metal tablets and publishing lists of descriptions, geographic coordinates, State plane coordinates, and elevations.

The order of accuracy is based on the standards for triangulation, traverse, and leveling adopted by the Federal Government. Unless otherwise indicated, all plane coordinates and geodetic positions for the control points are adjusted to the North American Datum of 1927, and all elevations are adjusted to Sea Level Datum of 1929. Because of the density of the detail shown, all third-order control is omitted from this and the following map.



VERTICAL CONTROL
STATUS AS OF JULY 1, 1968

Adapted from U.S. Coast and Geodetic Survey, *Status of vertical control, United States*, Washington, July 1, 1968

Albers Equal Area Projection

SCALE 1:17,000,000

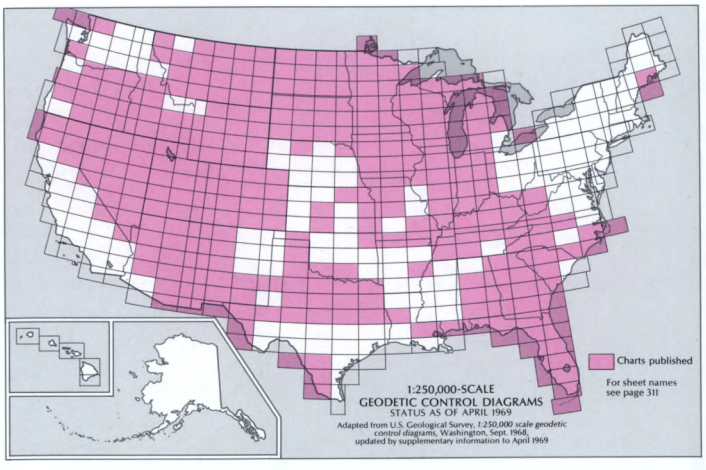
0 100 200 300 400 MILES
0 200 400 600 KILOMETERS

GEODETIC CONTROL DIAGRAMS

Since 1959 the U.S. Coast and Geodetic Survey and the U.S. Geological Survey have been cooperating in the publication of a series of diagrams at the scale of 1:250,000 which show the location and order (quality) of geodetic control established by each agency. The control consists of monumented points; located objects, such as water tanks, lookout towers, and church steeples; level lines; transit and theodolite traverse lines; triangulation lines and nets; electronic surveys; and measured base lines. State survey control which meets prescribed accuracy standards is shown in some instances. Preparation of diagrams for Alaska and Hawaii is not planned at this time.

DESCRIPTIVE LISTS OF GEODETIC CONTROL

Records of geodetic control surveys are maintained independently by the Coast and Geodetic Survey and the Geological Survey; each agency publishes and distributes descriptions of the control for which it is responsible. The lists published by the Coast and Geodetic Survey are assembled in 30-minute quadrangle booklets; a small percentage is assembled for larger or smaller units, depending on the density of the control in the particular area covered. The Geological Survey publishes vertical control lists and horizontal control lists, each assembled in separate 15-minute quadrangle units.



1:250,000-SCALE
GEODETIC CONTROL DIAGRAMS
STATUS AS OF APRIL 1969

Adapted from U.S. Geological Survey, 1:250,000 scale geodetic control diagrams, Washington, Sept. 1968, updated by supplementary information to April 1969

HORIZONTAL CONTROL

Coast & Geodetic Survey	Geological Survey	Other Agencies	
△			Monumented Point - First Order
△			Monumented Point - Second Order
▲	▲	▲	Monumented Point - Third Order
○	○	○	Located Object - Third Order
60			See separate index for names of numbered stations
WASHINGTON			Station reported not recovered
			Measured Base - Electronic or Taped
			Line of triangulation observed
			Line of triangulation observed from one end only
			Measured Length - Electronic or Taped
			Theodolite Traverse - Electronic Distance
			Transit Traverse - Taped Distance Third Order
			Transit Traverse and Leveling Third Order

VERTICAL CONTROL

Coast & Geodetic Survey	Geological Survey	Other Agencies	
			First Order
			Second Order
			Third Order

STATE SURVEY CONTROL

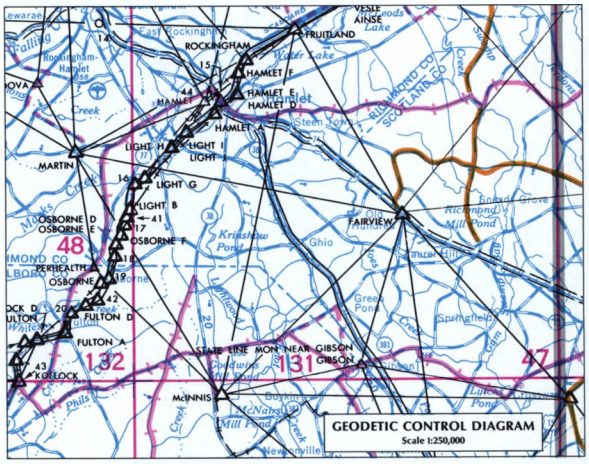
Horizontal or Vertical

CODE OF OTHER AGENCIES

AMS Army Map Service

Geodetic control established by other agencies, shown in brown, may be obtained from Coast and Geodetic Survey, Environmental Science Services Administration, Rockville, Maryland 20852.

LEGEND FOR GEODETIC CONTROL DIAGRAMS



GEODETIC CONTROL DIAGRAM
Scale 1:250,000

The map at the bottom of the page shows areas for which aerial mosaics and related products have been compiled by or for Federal and State agencies. The term "mosaic" as used herein means an assembly of individual aerial photographs which have been torn or cut, matched, and mounted to form a continuous photographic representation of an area on the earth's surface. A mosaic is usually prepared for a particular need rather than for general use; consequently, projection, scale, format, nomenclature, and related cartographic elements may vary from one mosaic to another. Mosaics may be uncontrolled, meaning assembled without regard to any horizontal control positions, or they may be controlled, meaning assembled by matching the photographic images of selected ground points to the corresponding plotted positions of those points. The aerial mosaics indicated on this map are not classified as controlled or uncontrolled.

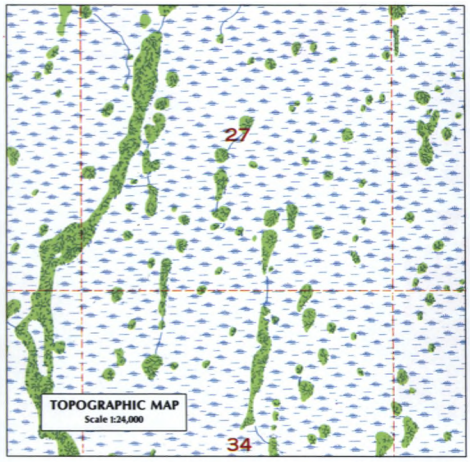
The Geological Survey maintains records of new mosaic projects. Information on plans and progress in mosaic preparation, as well as a larger scale index of available aerial mosaics, can be obtained from the Map Information Office, U.S. Geological Survey, Washington, D.C. 20242.

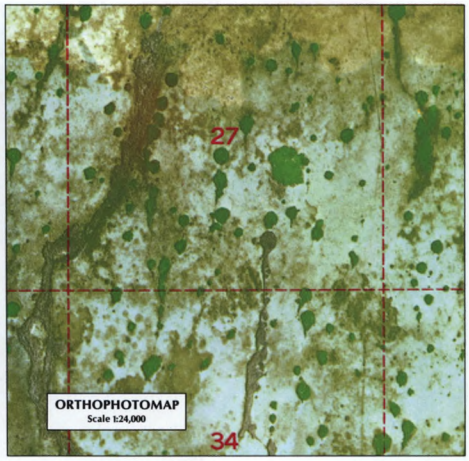
The mosaics of the Geological Survey are "orthophotomosaics." They are made from orthophotographs, which are prepared from conventional vertical aerial photographs by converting images from their natural perspective position to a true planimetric position at a uniform scale. In this conversion, incremental rectification of the photographs is used to correct positions of images displaced by differences in ground elevation and tilt of the camera.

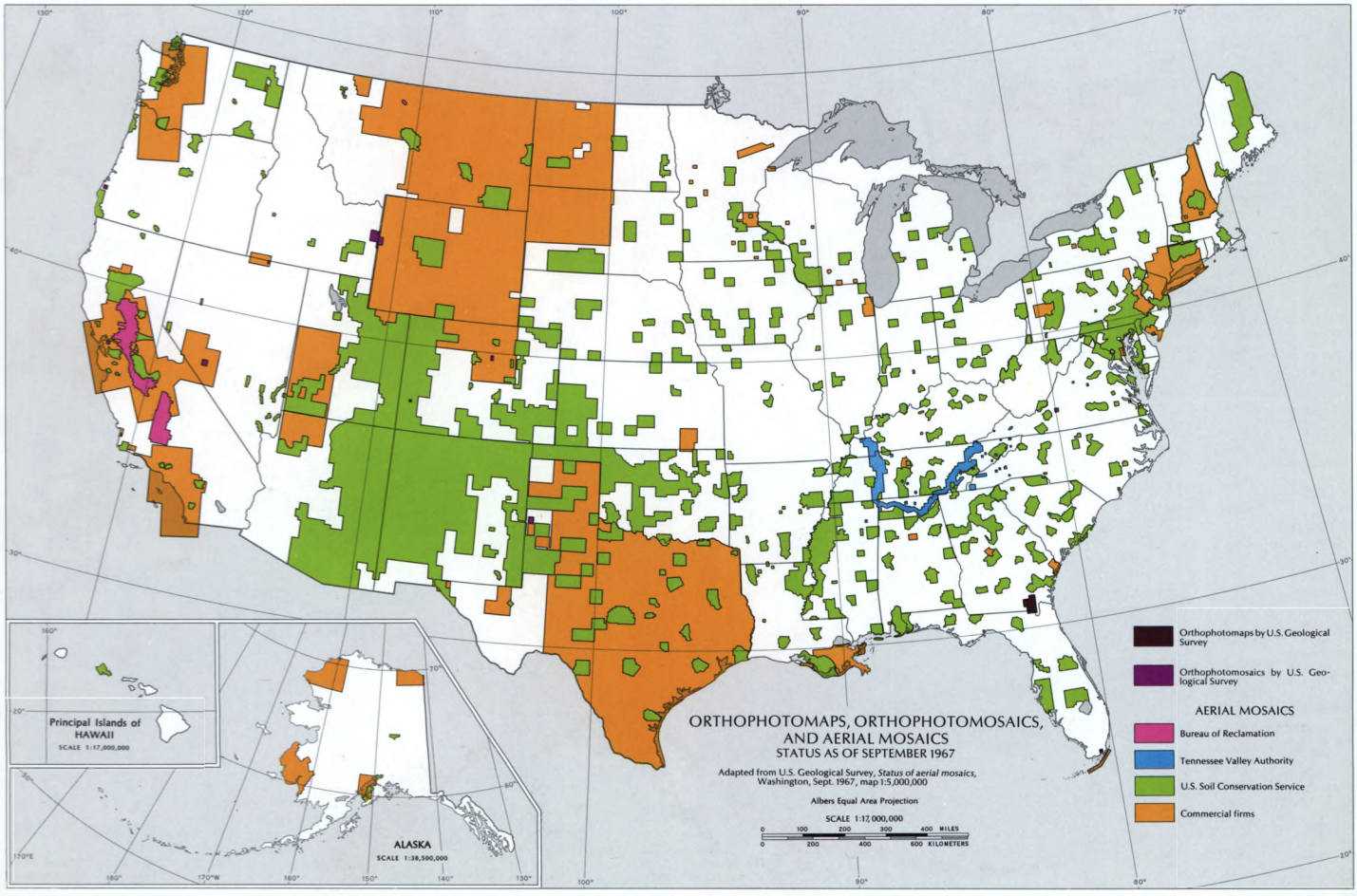
Compared with a standard topographic map, an orthophotograph is equivalent in relative accuracy but contains much more planimetric detail. Whenever a pictorial representation larger than the area covered by a single orthophotograph is needed, two or more contiguous orthophotographs, prepared at a common scale, are assembled to form an orthophotomosaic.

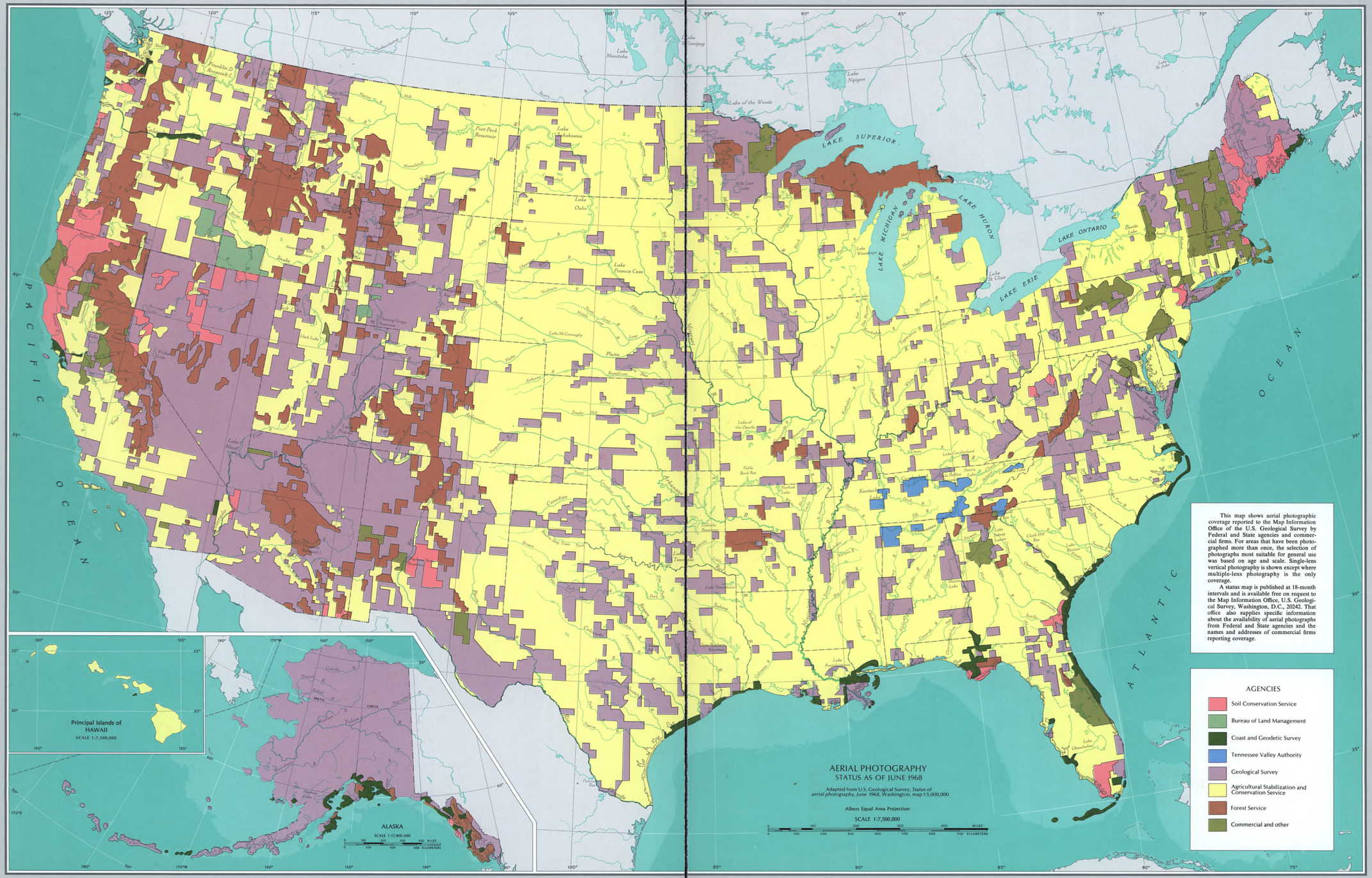
Two forms of map data—the orthophotomosaic and the topographic map—can be used either independently or combined as an orthophotomap. An orthophotomap, as prepared by the U.S. Geological Survey, is a topographic map on which the natural and cultural features of an area are depicted by color-enhanced photographic images in orthographic position. Although the orthophotomap requires some interpretation by the user, it contains an abundance of detail not found on the conventional map. The colors on an orthophotomap are selected to approximate as nearly as possible the prevalent hues of the ground surface. For selected areas with unusual terrain, orthophotomaps are preferable to conventional topographic quadrangle maps. One of these areas, the Okefenokee Swamp, has been covered by 16 orthophotomaps.

There are no fixed criteria for the kind and amount of overprinted symbols to be shown on orthophotomaps; cartographic judgment is exercised for each area to be mapped. Annotations include, at the least, names and boundary lines. In addition, depending on the area and the intended use, water features and major transportation routes may be enhanced, particularly in areas where they are partially obscured by vegetation; contours and elevations may also be added.









This map shows aerial photographic coverage reported to the Map Information Office of the U.S. Geological Survey by Federal and State agencies and commercial firms. For areas that have been photographed more than once, the selection of photographs most suitable for general use was based on age and scale. Single-lens vertical photography is shown except where multiple-lens photography is the only coverage.

A status map is published at 18-month intervals and is available free on request to the Map Information Office, U.S. Geological Survey, Washington, D.C., 20242. That office also supplies specific information about the availability of aerial photographs from Federal and State agencies and the names and addresses of commercial firms reporting coverage.

GEOLOGIC MAPPING

Geologic maps show the distribution of rocks and unconsolidated deposits which occur at the surface of the earth. Different rock units are distinguished on the basis of recognizable characteristics such as color, grain size, mineral constitution, and resistance to weathering. Their age is determined by rate of deposition, superposition, by the study of included fossils, and by analysis of products of radio-disintegration. For ease of reference, the rock units are given formal names taken from geographic features or informal names using descriptive lithologic terms.

The rock units plotted on a map by a geologist make varying patterns which reflect the geometric shapes of the original deposits and their subsequent geologic history through millions and even billions of years. The original shapes of deposits, in turn, depended upon their mode of formation and the area over which a given set of physical conditions prevailed at the time of formation. For example, a rock unit formed by the extrusion upon the surface of molten lava from a volcanic center would normally be limited in extent, but volcanic ash thrown out in a violent explosion from the same center might be spread by the wind over thousands of square miles. Rocks formed by the consolidation of sediments deposited in a broad shallow sea would be of wide areal extent in comparison with their thickness, but rocks formed from sediments deposited in an inland lake might be more restricted in area.

The original extent of rock bodies may have been altered by faulting, folding, burial, and subsequent erosion. A geologic map shows the present distribution of rock units as determined by the geologist from field examination. Included on the map are symbols showing the geometric attitude of planar and linear features of rocks, planes of former movement or faults, location of rock and fossil samples, and other geologic features such as the axes of folds or the limits of metamorphic change.

Geologic maps are generally published on topographic base maps because the pattern of outcrop of map units is so dependent upon the configuration of the earth's surface. The scale of published geologic maps thus depends upon the scale of available topographic maps. The accompanying index maps show areas of geologic mapping at a scale of 1:250,000, called small-scale geologic maps, and 1:63,360 and larger scales, called large-scale geologic maps. Even smaller scale geologic maps of States and regions are published at a scale of 1:500,000, national maps at 1:2,500,000 and 1:3,168,000, and continental maps at 1:5,000,000.

SMALL-SCALE GEOLOGIC MAPS

Geologic mapping at 1:250,000 makes up an important part of the U.S. Geological Survey's geologic-investigations program. The 1:250,000 and smaller scale geologic maps generally are based upon the generalization of available large-scale geologic maps supplemented by reconnaissance geologic mapping at intermediate scales. Mapping at 1:250,000 has now expanded to a point where it constitutes about one-fifth of the geologic-mapping program of the Geological Survey. Many State geological surveys also have 1:250,000-scale geologic-mapping programs which are underway or completed. This joint effort by the Federal and State surveys as a nationwide program promises to provide geologic-map coverage of two-thirds of the United States by 1985.

The U.S. Geological Survey is participating in 1:250,000-scale geologic-mapping programs that will provide extensive or complete coverage of Alaska, Nevada, Colorado, and Nebraska within a few years. Single-sheet 1° by 2° geologic maps have been started in parts of Washington, Oregon, Idaho, Montana, Wyoming, Utah, Arizona, New Mexico, Iowa, North Carolina, South Carolina, Tennessee, and Virginia.

The 1:250,000-scale geologic maps have a variety of uses. They help define areas where the need for larger scale maps is most critical, and they direct attention to broad geologic problems involving large segments of the earth's crust. They have already proved to be ideal for geologic analysis of major tectonic and stratigraphic problems, for analysis of mineral provinces, and for relating broad geophysical anomalies to surface geology.

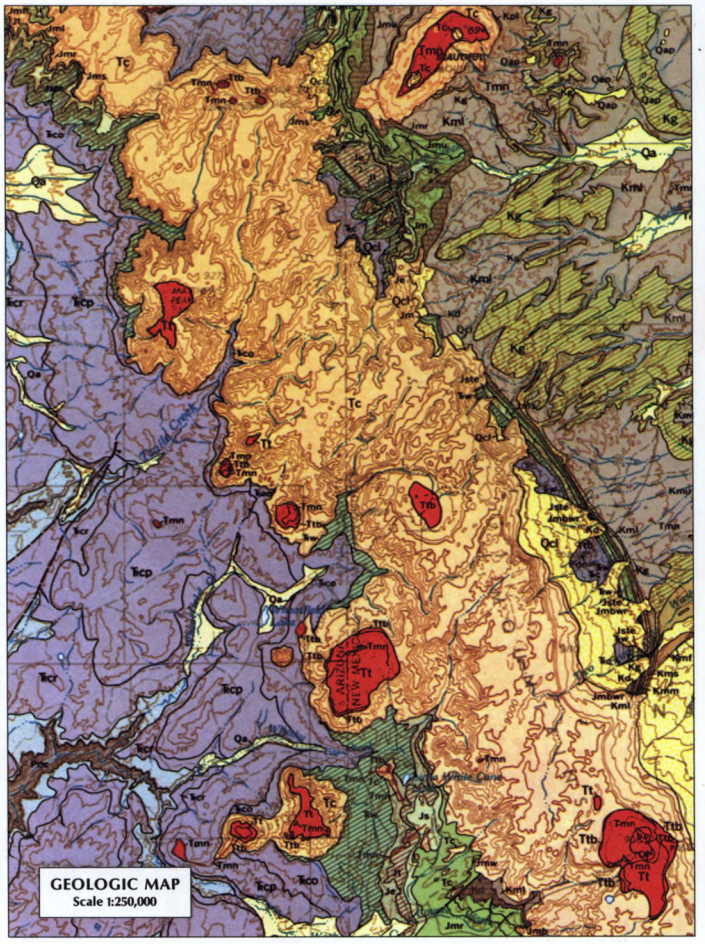
LARGE-SCALE GEOLOGIC MAPS

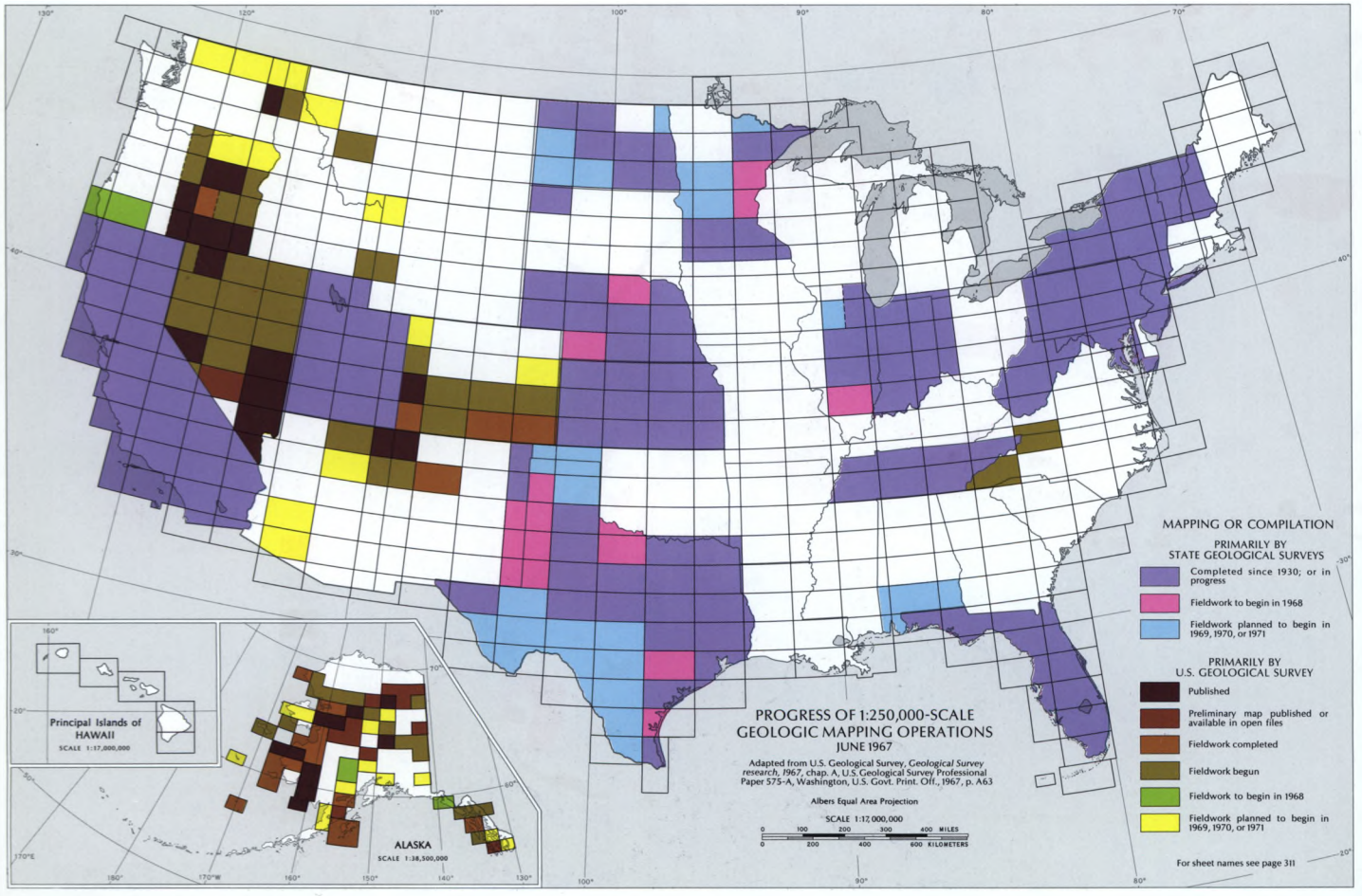
Large-scale geologic mapping, principally at scales of 1:24,000 and 1:62,500, constitutes about four-fifths of the geologic-mapping program of the Geological Survey. Geologic maps at large scale are available for only about 20 percent of the conterminous United States. Approximately half of these maps have been produced by the Geological Survey; the remaining maps were produced mostly by various State organizations and educational institutions. The ultimate goal is to obtain complete detailed geologic-map coverage of the entire Nation.

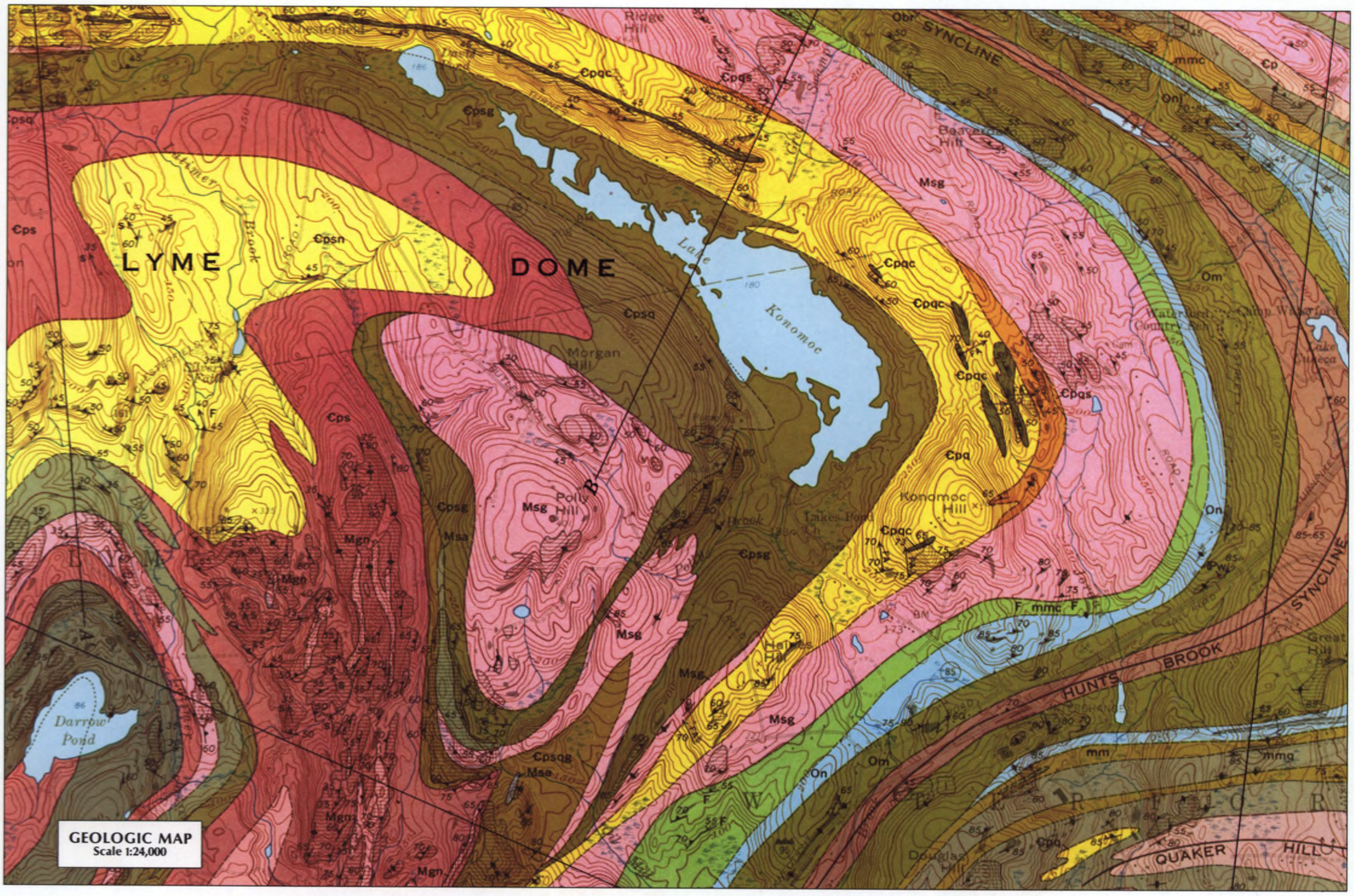
The Geological Survey is carrying out large-scale geologic-mapping projects in many parts of the country, with intensive cooperative programs underway in Kentucky, Massachusetts, Connecticut, and Puerto Rico. Other areas where extensive mapping is underway include Arizona, California, Colorado, Idaho, Montana, Michigan, New Mexico, and Washington.

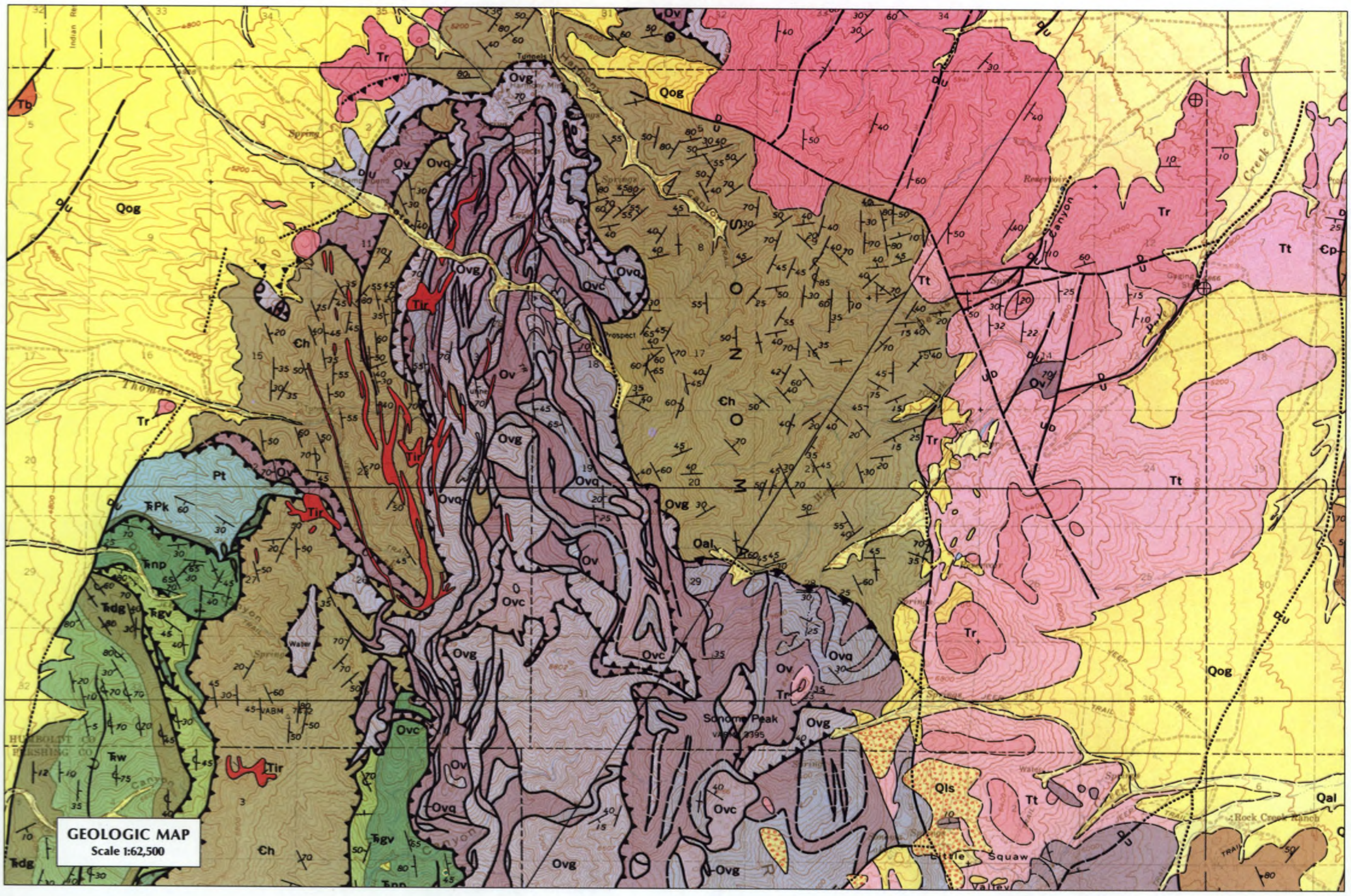
Large-scale geologic maps play a vital role in furthering our scientific knowledge of the earth and have many uses. Maps of mineralized areas are used to (1) locate and explore for economic mineral deposits, (2) elucidate the scientific principles that underlie formation and distribution of ore deposits, and (3) prepare reserve and resource estimates.

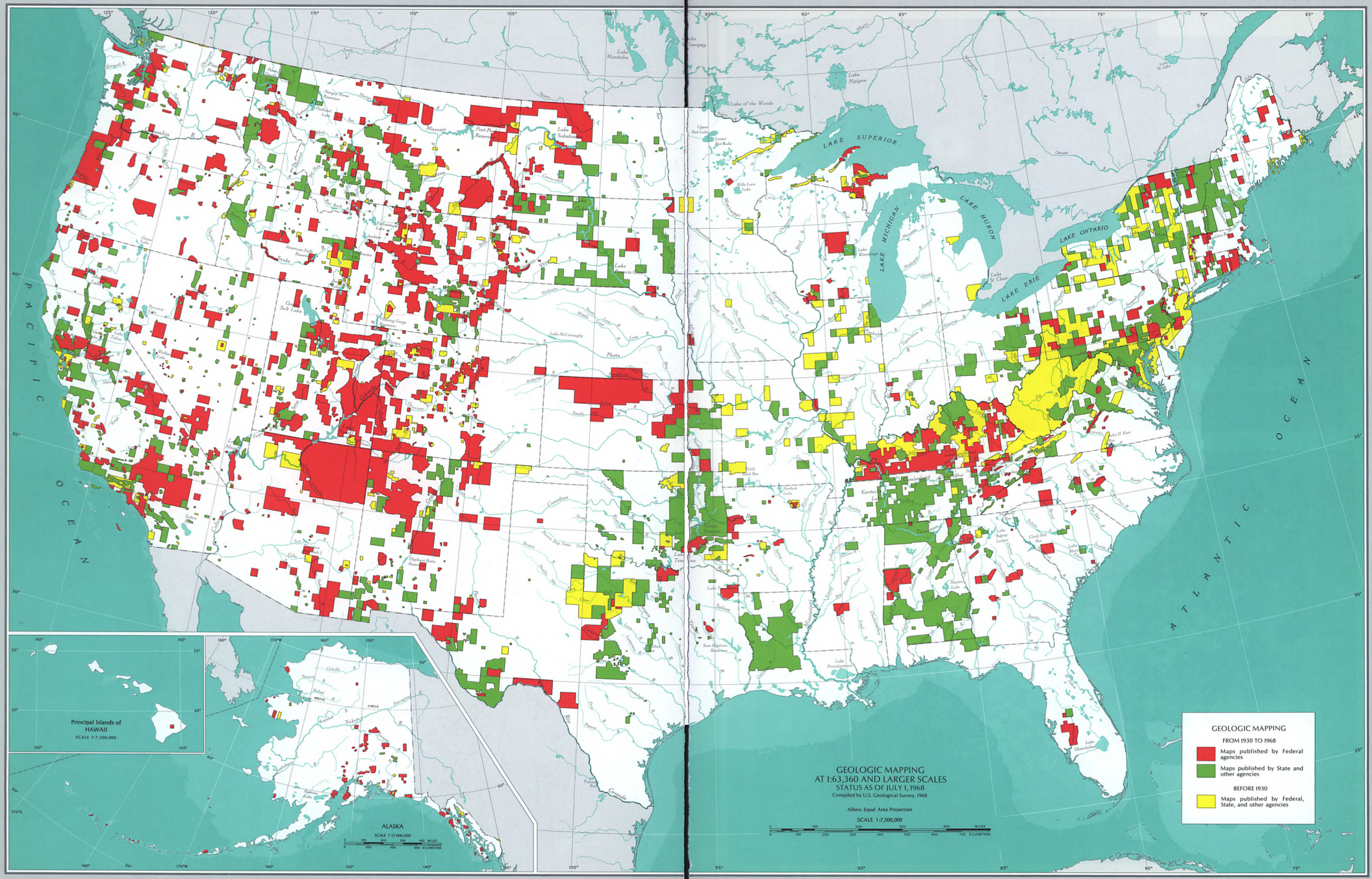
Geologic maps are used extensively in planning and carrying out large-scale engineering works and in locating damsites and planning highway alinements and subway routes. Actual construction is aided through location of construction materials and estimation of costs in site preparation. In some areas, geologic maps are indispensable in avoiding such hazards as landslides, swelling clays, and extensive seismic damage during earthquakes.






LYME
DOME
SYNCLINE
HUNTS BROOK SYNCLINE
QUAKER HILL
Lake Konomoc
Darrow Pond
Konomoc Hill
Polly Hill
Morgan Hill
GEOLOGIC MAP
Scale 1:24,000


Qog
Tr
Tt
Ovg
Ovc
Ovq
Ov
Ch
Pt
Qal
Qls
Sonoma Peak
Rock Creek Ranch
Squaw Valley
GEOLOGIC MAP
Scale 1:62,500


PACIFIC OCEAN
ATLANTIC OCEAN
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO
Principal Islands of HAWAII
SCALE 1:7,500,000
ALASKA
SCALE 1:12,000,000
GEOLOGIC MAPPING
AT 1:63,360 AND LARGER SCALES
STATUS AS OF JULY 1, 1968
Compiled by U.S. Geological Survey, 1968
Albers Equal Area Projection
SCALE 1:7,500,000
GEOLOGIC MAPPING
FROM 1930 TO 1968
Maps published by Federal agencies
Maps published by State and other agencies
BEFORE 1930
Maps published by Federal, State, and other agencies

SOILS MAPPING

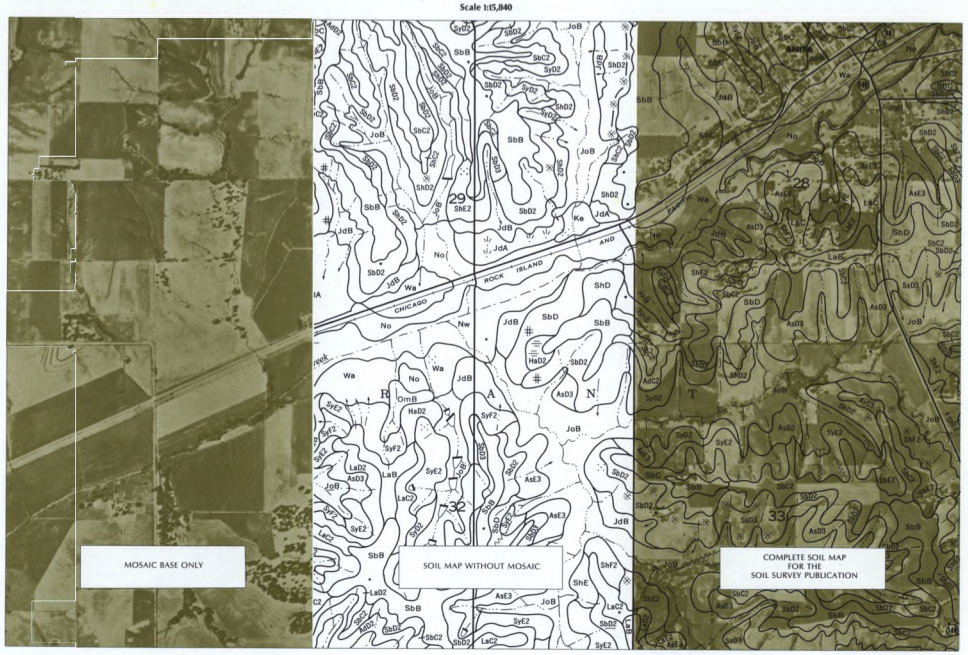
Soil is the home of plants and animals. All three have evolved together in the upper layers of earthy material wet by rains and warmed by the sun. To a pedologist (soil scientist), this surface rind of the earth is the pedosphere. The pedosphere overlaps the lithosphere of geologists and the biosphere of ecologists.

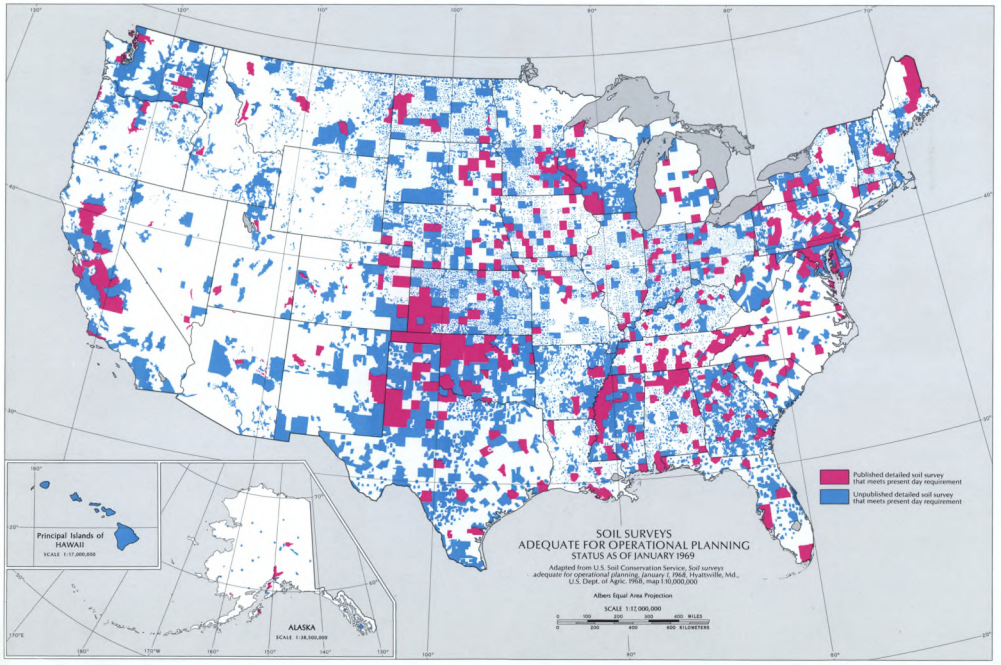
The pedosphere is made up of many thousands of kinds of soil, each with a unique set of physical, chemical, and biological characteristics arranged in a unique morphology. Besides having a singular genetic history, each soil responds differently to management for crops, grasses, and trees, as well as to use in building roads, houses, and other structures.

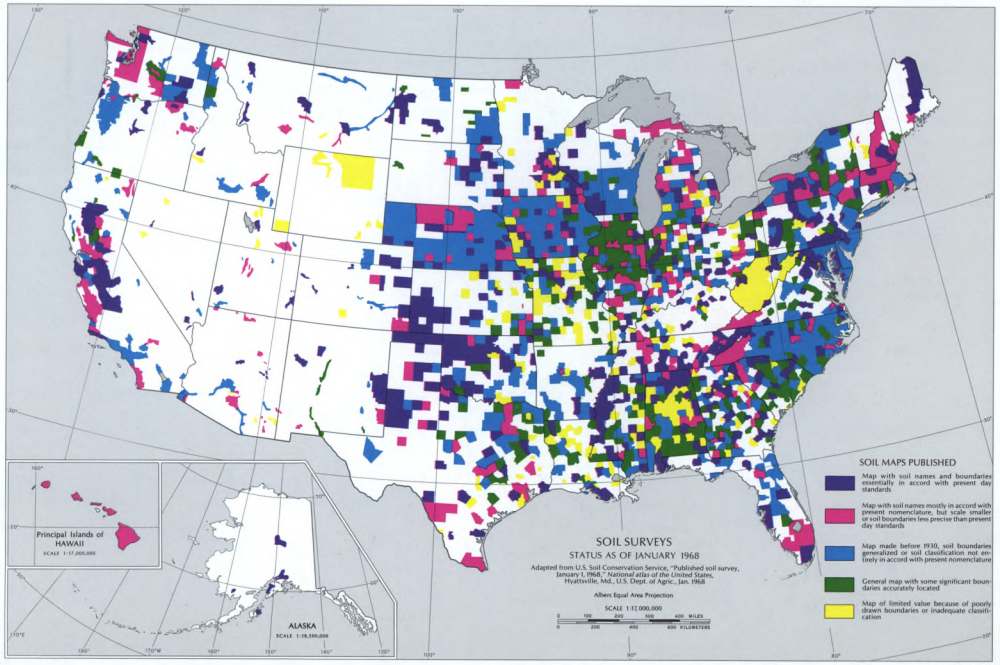
Each soil is the result of five interacting elements: (1) the forces of climate and (2) the activities of plants and animals working on (3) earthy materials, as conditioned by (4) relief, and (5) time or age of landform. Each kind of soil has its own specific geographic pattern in relation to its unique genetic environment. Knowledge from farmers and researchers about uses of each kind of soil makes it possible to plan soil use in specific places where detailed soil maps are available. What is learned about a soil in one country can be applied to the same kind of soil in another country.

The map on page 327 that shows coverage of "Published soil surveys" also indicates the degree to which the published soil surveys meet present-day standards and requirements. Many of these older surveys, however, are still useful for general planning. They were used for farm planning in past years when our knowledge of soils was limited and when less capital was required to use soils as efficiently as then possible. Another map on page 326 shows the coverage by "Soil surveys adequate for operational planning," both published and unpublished.

In areas of unpublished soil surveys, soil survey field sheets and soil descriptions and interpretations may be available for local use. Arrangements to purchase or otherwise obtain these sheets can be made through State conservationists of the Soil Conservation Service. A sample of a "Soil survey field sheet" is shown. On page 327 are illustrations that show progress toward a printed soil map: (1) mosaic base, (2) soil map without mosaic base, and (3) a completed soil map as it would appear in a published soil survey.







HYDROLOGIC INVESTIGATION ATLASES

Hydrologic atlases fulfill a major objective of the water-resources investigations of the U.S. Geological Survey. The atlases, developed from basic-data collection and special studies, present a wide range of hydrologic and hydrogeologic facts concerning the Nation's water resources. Some hydrologic information is difficult and cumbersome to express meaningfully in text but can be depicted clearly and simply in map form for ready interpretation, especially when supplemented by other graphics and notes.

More than 300 hydrologic atlases have been published by the U.S. Geological Survey. Most of these atlases have been prepared in cooperation with State, county, and municipal agencies and cover areas of existing and potential water problems or areas where general hydrologic mapping and inventory were desired. Currently, atlases are being oriented to cover natural hydrologic units, such as drainage basins. These atlases provide a more meaningful presentation relating to the future development of the Nation's water resources. Each atlas consists of one or more sheets whose basic format is a map presentation that may cover any combination of subjects. Subjects most frequently treated in this manner are water availability and delineation of areas inundated by floods. Frequently used combinations of subjects may include information on surface drainage, precipitation and climate, geology, availability of ground and surface water, water quality and use, and streamflow characteristics.

The scale of maps used for hydrologic atlases depends on the type of presentation and on the availability of the maps. The principal maps are most frequently at a scale of 1:24,000. Atlases dealing with large regions, however, may require a scale of 1:250,000 or smaller. Hydrologic information is shown on the map superimposed on either a topographic or a planimetric base map of the study area. The principal maps are supplemented by smaller maps, graphs, tables, and text that illustrate facts and present relevant data and analyses. Photographs are occasionally used to illustrate changes caused by significant hydrologic events, landforms with hydrologic significance, important hydrologic structures, or other information. References to sources of additional information relating to the areas are also given.

Additional information about hydrologic atlases is available from the U.S. Geological Survey.

WATER AVAILABILITY MAPS

The accompanying sample map is from a hydrologic investigations atlas sheet that depicts the general availability of ground water. It contains, superimposed on a 1:250,000 scale planimetric map, symbols that represent the quantity of ground water, in gallons per minute, that is generally available per well throughout the areas shown. It also shows, for areas where data are available and where the yield per well is sufficient, the depth to ground-water level. Limits of yield and depth to water level in unstudied areas are estimated on the basis of the best geologic and hydrologic data available and are subject to revision. Such maps are intended for use as a convenient guide in planning water-supply projects for domestic, municipal, industrial, and irrigation uses.

In recent years, work on determining water availability has advanced on about 1,000 separate projects per year, but barely one-third of the country is covered. Present work is aimed toward the acquisition within the next decade of generalized or detailed coverage for 75 percent of the Nation with some information for the remainder. Mapping is selective with greater stress on those areas where population and water use are growing the fastest.

FLOOD INUNDATION MAPS

The accompanying part of a map from a hydrologic atlas sheet shows areas inundated by two particular floods. The flood boundaries and related data are superimposed on a topographic map at a scale of 1:24,000. On the atlas sheet the map is supplemented by data in the form of graphs that show frequency of flood discharge and flood stages at gaging stations in the area. Graphs of profiles show the elevations of floodwaters, and the elevations are keyed to the flood map. These data can be used to evaluate the depth and frequency of flooding that affect the economic development of flood-plain lands. They are intended to be a tool for individuals, governmental agencies, and others delegated with the responsibilities of solving existing flood problems and of formulating effective flood-plain regulations that would minimize the creation of new flood problems. The maps are useful, for example, in preparing building and zoning regulations, locating waste disposal facilities, purchasing open space including underwriting a mortgage and calculating flood insurance, developing recreational areas, and managing surface water in relation to ground-water resources.

Flood atlases have been published for areas of the Nation, including Puerto Rico. The greatest concentration of flood mapping is for the area of northeastern Illinois. In addition to the detailed flood-inundation mapping, there are several thousand topographic quadrangles in widely scattered areas that show outlines of flood-prone areas or localities that may be subject to flood losses. These maps are being printed as part of a national program started in 1966 for managing flood losses.

WATER-TABLE, SURFACE-DRAINAGE, AND ENGINEERING SOILS MAPS

The accompanying map sample is from a hydrologic investigations atlas that presents, by the use of maps, text, graphs, and tables, information that is basic to the designing of highways and buildings, for the orderly planning and zoning of urban areas and industrial sites, and to the solving of problems related to development of water supplies. This particular sample shows, by distinctive symbols, the position of the water table, the surface drainage system, and the engineering classification of soils. That information is superimposed on a 1:24,000-scale topographic map.

The entire State of Delaware has been mapped with this type of atlas but coverage elsewhere is limited. The need for data on urban hydrology and the current emphasis on urban areas are resulting in expanded coverage.

OTHER WATER-ORIENTED SUBJECTS

Several hydrologic investigations atlases include miscellaneous information concerning water-oriented subjects. The accompanying map sample is from an atlas sheet that describes the geology and hydrology of the alluvial deposits in a selected area. The base on which the information is overprinted is a 1:24,000-scale topographic map. The contours of the bedrock, location of alluvial deposits, depth to water, testing of wells, and the well log information shown indicate the extent of ground-water deposits and places where wells can be expected to yield adequate water. The included chemical analyses indicate the suitability of the water for domestic, industrial, and commercial uses. The miscellaneous category of maps is highly variable in the type of hydrologic information portrayed and spotty in respect to nationwide coverage.