SPECIFICATIONS FOR LAND USE AND LAND COVER AND ASSOCIATED MAPS

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GENERAL OVERVIEW

The land use and land cover mapping and data compilation program being carried out by the Geography Program of the Land Information and Analysis Office with support from the Topographic Division of the U.S. Geological Survey is designed to provide nationwide systematic and comprehensive Land Use and Land Cover Maps and data for use by planners, natural resource managers, and others. All Land Use and Land Cover and Associated Maps and the digital information derived from these maps are obtained by utilizing the same specifications and are being published with a uniform format for the entire United States. This set of specifications covers only the compilation and open-file procedures for the initial release of the Land Use and Land Cover and Associated Maps. The specifications for development of the digital information will be provided as a separate document.

This program has been designed to supply complete coverage of the United States by 1982 and to provide for the periodic revision of the original maps and data in a timely manner. Revisions are scheduled to start in 1979, approximately 4 years after initiation of the program.

The set of Land Use and Land Cover and Associated Maps consists of:

1. Land Use and Land Cover Map
2. Political Unit Map
3. Hydrologic Unit Map
4. Census County Subdivision Map
5. Federal Land Ownership Map
6. State Land Ownership Map (optional)

The Land Use and Land Cover Map is compiled to portray the Level II categories of the land use and land cover classification system as documented by Anderson and others, 1976. The Level II categories of this land use and land cover classification system provide the user with a basic framework to which third and fourth level categories may be added.

The associated maps portray some natural or administrative information and provide the user with the opportunity to utilize the Land Use and Land Cover Maps and data either individually or collectively to produce graphic or statistical data for the areas portrayed on the associated maps. The mapping system is constructed in such a way that the graphical and statistical land use and land cover data can be related to other resource data such as soil, geology, hydrology, demography, and socio-economy.

The administration of this program is the responsibility of the Geography Program in the Land Information and Analysis Office of the U.S. Geological Survey. The Geography Program has developed specific classification

standards and establishes priorities for areas to be mapped. The Compilation and Interpretation Branch of the Geography Program has the responsibility for the coordination of the compilation with the Topographic Division of the Geological Survey, including adherence to mapping specifications, liaison with regional Mapping Centers, quality control of map products, and user interface.

INTRODUCTION

These specifications provide the compilers of Land Use and Land Cover and Associated Maps with the information necessary to compile and reproduce the maps for distribution. Prepared in sections, each section is devoted to compilation of one of the six types of maps, and other sections are devoted to editing, field check, and final reproduction.

The land use and land cover mapping program is designed so that standard topographic maps at a scale of 1:250,000 can be used as a base for compilation and reproduction. After the start of this mapping program, the Topographic Division began compiling intermediate-scale maps at a scale of 1:100,000. The Director's Office has authorized the Geography Program to prepare for open file release, the Land Use and Land Cover and Associated Maps at a scale of 1:100,000 if the 1:100,000-scale base is available for release at the time the Land Use and Land Cover and Associated Maps are open filed. Final authorization for the preparation of each 1:100,000-scale Land Use and Land Cover and Associated Map must be given by the Chief of the Geography Program. The 1:100,000-scale mapping format has been established as a 30' x 60' quadrangle, normally a quarter of a 1:250,000-scale quadrangle. With this configuration, quarters of some of the 1:250,000-scale maps will be compiled at 1:100,000. The basic specifications for compilation of all maps will generally remain the same for both scales, and all maps will be scribed regardless of scale or technique of compilation. Specific changes in map specifications are noted in the sections on the type of map to which they apply.

Section A

LAND USE AND LAND COVER MAP

1.--General Explanation

This map provides land use and land cover data that can be used along or in conjunction with the associated maps. The map will be compiled to show Level II categories as described in USGS Professional Paper 964 (Anderson and others, 1976) and will be used as a base for the development of digital data when such data are produced.

2.--Source Material

The Geography Program staff works closely with the Topographic Division staff to determine the availability of photographic, graphical, and other source material before authorization of a map for compilation. Primary responsibility for the search and acquisition of existing remotely sensed data necessary for the compilation of Land Use and Land Cover Maps is assigned to the Topographic Division for maps authorized for production by that Division. The criteria for selection of photographic source material are as follows: (1) for compilation, the source material must be no older than 3 years at the time of authorization; (2) the format of the remotely sensed data must be such that it is or can be rectified, if necessary, to a tilt-corrected format; (3) the scale should be no larger than 1:60,000; (4) if source photographs are available for either the summer or winter season, the winter (leaf-off conditions) photographs should be used; (5) there must be no snow cover; and (6) the photographs should not have more than 10% cloud cover. If for any reason these conditions cannot be met, the Geography Program Compilation and Interpretation Branch is to be contacted for clarification of photographic source-material utilization.

Some of the prime source materials used for compiling land use and land cover data are photographs from the NASA high-altitude U-2 and RB-57 flights. A computerized program provides a graphic photo index showing the extent of such coverage for any 1:250,000- or 1:100,000 scale map. If coverage information is needed before authorization, the Topographic Division Office of Plans and Program Development requests that the National Cartographic Information Center query the EROS Data Center data base for U-2/RB-57 coverage information to aid in authorization decisions. Two copies of the photo index and the printout of source information are made for each 1:250,000- or 1:100,000-scale area requested. Copies are reviewed by the National Cartographic Information Center for completeness and are forwarded to the Topographic Division Office of Plans and Program Development. The Topographic Division Office of Plans and Program

Development will coordinate these indices with other indices of known photographic source material such as USGS quad-centered photography, etc. These indices will be reviewed by the Topographic Division Office of Plans and Program Development to insure that sufficient photographic source material is available for compilation. If there is not sufficient photographic source material available, the Topographic Division Office of Plans and Program Development contacts the Compilation and Interpretation Branch, Geography Program, for the resolution of source material problems. If sufficient source material appears to be available, the sheet will be authorized for compilation. For areas previously authorized, a copy of the index, corrected if required, is mailed with the printout to the appropriate Mapping Center by the National Cartographic Information Center.

The Mapping Centers will then be able to order photographs for compilation from the information on the photo index and the accompanying printout data. Quad-centered high-altitude photographs and other coverage to be identified by the National Cartographic Information Center can be used to supplement this coverage. The acquisition of photographs by the Topographic Division from the EROS Data Center for the land use and land cover mapping program needs no authorization. The purchase of photographs by Topographic Division from other agencies or private concerns requires approval from the Geography Program. If the Mapping Centers, after ordering the photographic source material as indicated on the photo index and accompanying data printout, has found the photographic source material inadequate for compilation, the Mapping Center will:

1. notify Topographic Division Office of Plans and Program Development of the photographic source problem;

2. notify the Geography Program Compilation and Interpretation Branch liaison person stationed in the appropriate Topographic Division Regional Mapping Center of the problem.

At the same time an additional photographic source material search is started by Topographic Division Office of Plans and Program Development, the liaison person should also initiate a search for additional photographic source material within the region. If the area of the authorized map is not within the region for which the compiling Mapping Center is concerned, the liaison person will contact the appropriate Mapping Center liaison person to initiate the search.

The 1:250,000-scale topographic map series will be used as the base map for the compilation of the Land Use and Land Cover and Associated Maps, except when the 1:100,000-scale map is scheduled to be completed and available at the time the Land Use and Land Cover and Associated Maps

are released to open file. There may be cases where the 1:100,000-scale base maps are available for parts of the 1:250,000 sheet required for compilation. In these cases, the 1:100,000-scale maps may be authorized to be used to the extent of coverage and the remaining area will be compiled on the 1:250,000-scale base map. Instructions for handling this type of situation will be covered in Section I.

The most up-to-date 1:250,000- or 1:100,000-scale color separation plates will be used to develop the base sheet. The negative color separation plates for the base map sheet will be obtained and used to make a film positive base for compilation of land use and land cover data. The composite positive will include border information, culture, drainage, open-water tint, and land net. For 1:250,000-scale compilation, this film positive will be positioned on 30" x 42" film and will be punch-registered (see figure 1). When 1:100,000-scale maps are to be compiled, the size of the base map sheet will vary with latitudes. The following table indicates the sizes of the sheets to be used for 1:100,000-scale base-map sheet production; the various sizes will be punch-registered as shown in figure 2.

Latitude	Sheet Size
41° to 50°	30" x 42"
32° to 41°	30" x 46"
24° to 32°	30" x 48"

This film positive will be used in development of either standard or enlarged compilation manuscripts or scribecoat manuscripts for other maps of the Map Set. Special Mapping Center, upon receiving their copy of the map authorization for 1:250,000-scale compilation, will duplicate and provide composite contact film positives (contours on separate film positive) of these materials for Special Mapping Center, Mid-Continent Mapping Center, Rocky Mountain Mapping Center, and Western Mapping Center. Eastern Mapping Center will obtain and process its own base sheet materials. Normally, delivery time will be 2 to 3 weeks after receipt of the authorization by the Special Mapping Center. If there are circumstances in which a Mapping Center (other than Eastern Mapping Center) can provide the base, they must promptly inform the Special Mapping Center to avoid duplication of effort. The 1:100,000-scale composite will be prepared in the Regional Mapping Centers. Whenever possible, auxiliary sources of information useful for the compilation will be provided by the Geography Program to the Mapping Center for the use of the compiler before compilation is started. The source material will consist of land use or other types of maps supplied by the USGS, Department of Transportation, Department of Housing and Urban Development, State and local agencies, etc. In addition, low altitude 35mm photographs taken during precompilation field trips or field checking will be available in selected areas.

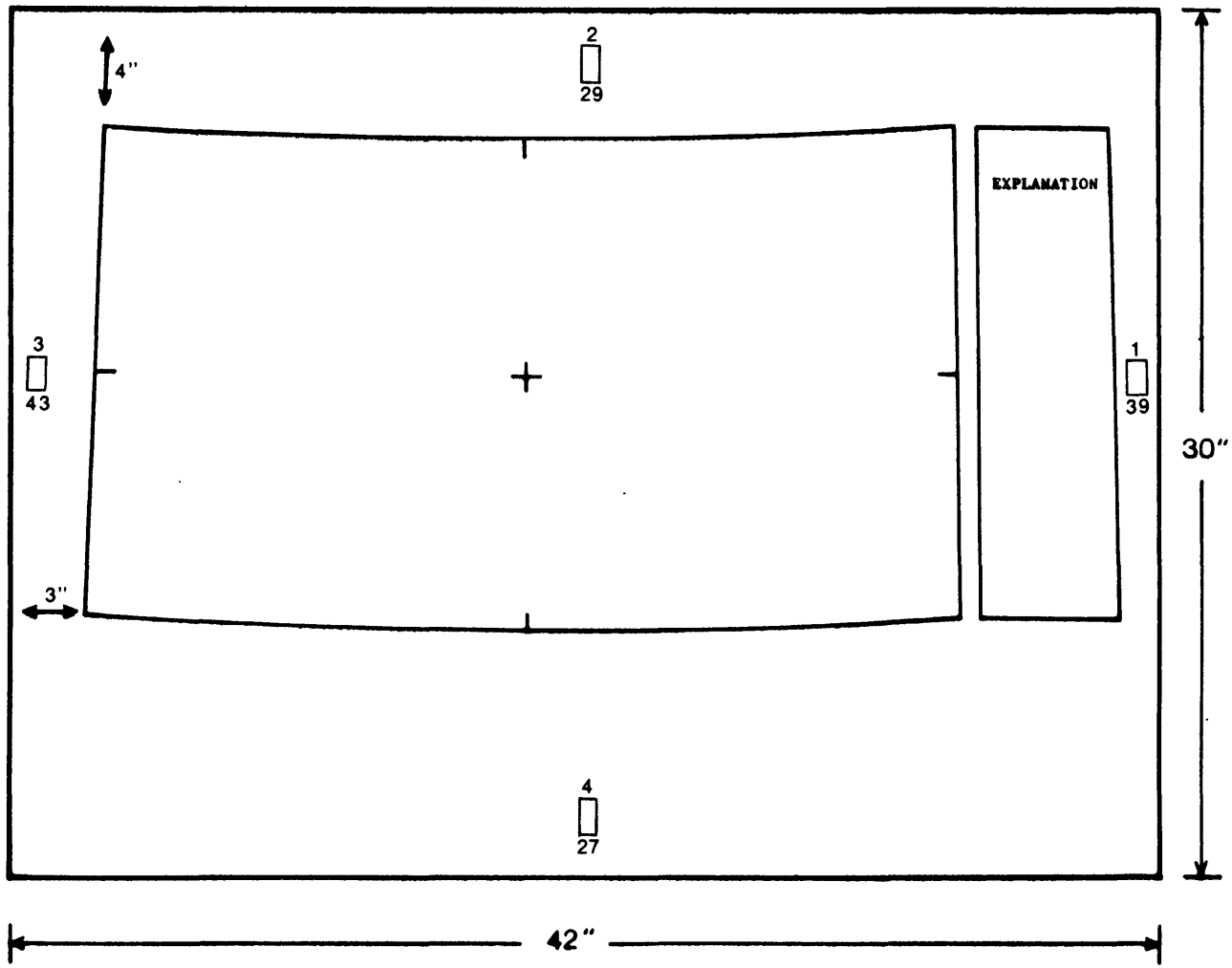
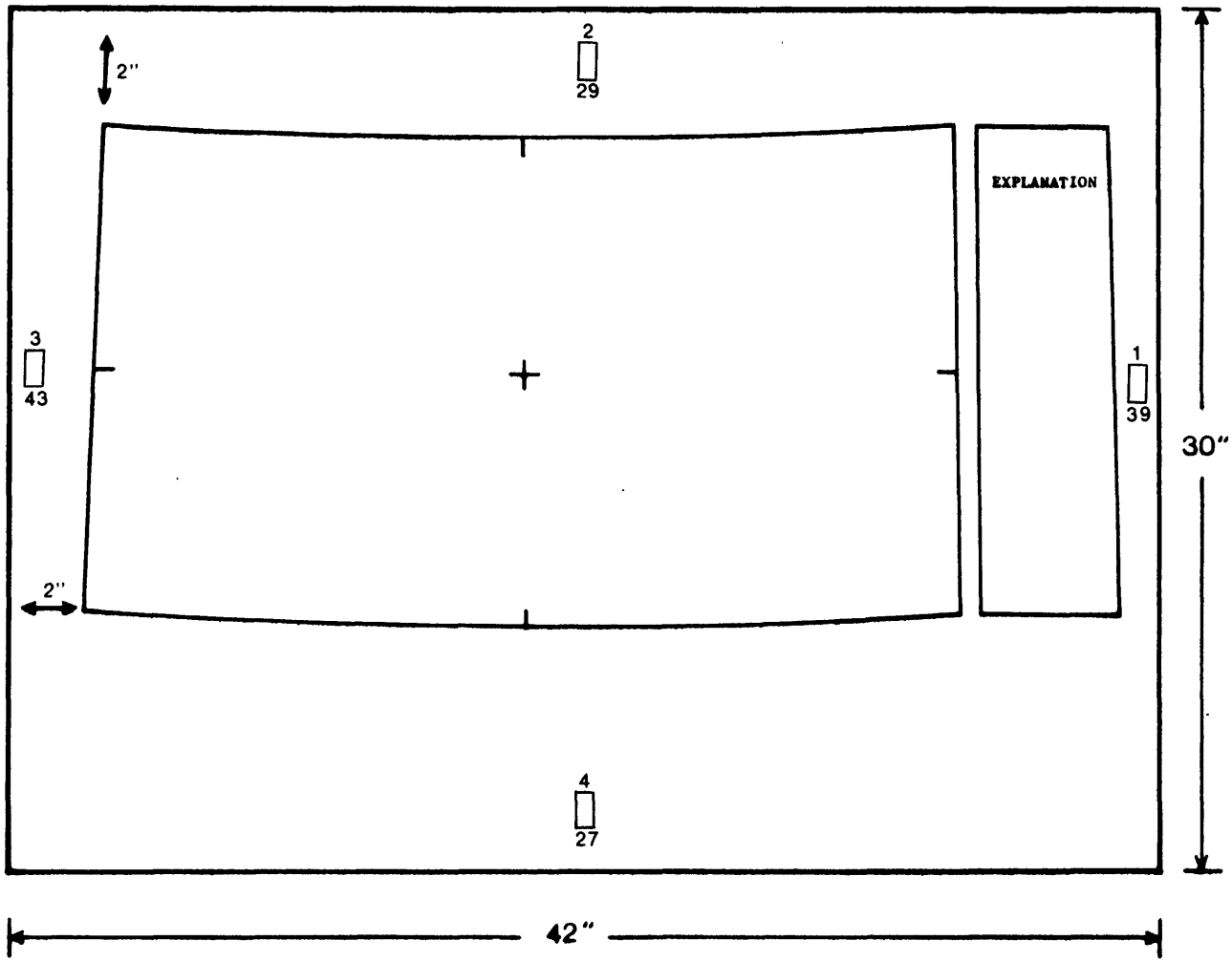


Figure 1.--Placement of punch registration for 1:250,000-scale base sheets



OTHER SHEET SIZES

30" x 46"
- Punch formula
  #1 47
  #2 29
  #3 43
  #4 27

30" x 48"
- Punch forumla
  #1 51
  #2 29
  #3 43
  #4 27

Figure 2.--Placement of punch registration for 1:100,000-scale base sheets

The classification system and Level II category definitions described in USGS Professional Paper 964 (Anderson and others, 1976) (table 1), will be used for the classification of land use and land cover types. In addition to the general definitions given in the Professional Paper, paragraph four of this section provides certain specifications unique to this mapping program which are either deviations from the definitions listed in the Professional Paper or clarifications of these definitions. These specifications constitute standards for classifying and mapping land use and land cover under this program. Professional Paper 964 (Anderson and others, 1976) is included as Appendix A.

3.--Compilation

Compilation of the Land Use and Land Cover Map can either be accomplished by photogrammetric techniques or direct transfer of detail. With either technique, the final copy will be scribed. If the photogrammetric approach is taken, the procedure and equipment selected will be the responsibility of the Center compiling the map. The compilation scale should be determined according to the characteristics of the photogrammetric equipment being used. If compilation is initiated at a scale of 1:250,000 or 1:100,000 for the Land Use and Land Cover Map, the compilation will be performed on scribecoat material 30" x 42", or at the size specified and punch-registered. The direct-detail-transfer technique will require a film viewer to be used as an interpretive tool in determining the categories of land use and land cover to be delineated. For the direct-detail-transfer technique the furnished positive transparency will be scaled and formatted to develop the compilation base as either a blue, gray, or brown line manuscript or as a scribecoat. The vegetation and/or contour plates will be used in this composite only in very special cases. If the compilation is initiated at the scale of the source material, the final manuscript will be reduced to publication scale, prepared on a piece of film 30" x 42", and punch-registered.

Before compilation, the full neatline and geographic reference ticks will be delineated on the map manuscript. These tick marks will be 0.25" in length and of the line weight specified under the portion of this section dealing with line weights and number sizes. The position of the ticks is to be as shown in figure 13.

The specifications for mapping land use and land cover, in addition to adherence to the classification categories and definitions in Professional Paper 964 (Anderson and others, 1976), include certain minimum polygon area and width restrictions:

1. All of the land use and land cover classification category polygon boundaries will be delineated as they appear in the source material with generalization only as required by map scale.

Table 1.--U.S. Geological Survey Land Use and Land Cover Classification System for Use with Remote Sensing.

LEVEL I		LEVEL II	
1	Urban or Built-up Land	11	Residential
		12	Commercial and Services
		13	Industrial
		14	Transportation, Communications and Utilities
		15	Industrial and Commercial Complexes
		16	Mixed Urban or Built-up Land
		17	Other Urban or Built-up Land
2	Agricultural Land	21	Cropland and Pasture
		22	Orchards, Groves, Vineyards, Nurseries, and Ornamental Horticultural Areas
		23	Confined Feeding Operations
		24	Other Agricultural Land
3	Rangeland	31	Herbaceous Rangeland
		32	Shrub-Brushland Rangeland
		33	Mixed Rangeland
4	Forest Land	41	Deciduous Forest Land
		42	Evergreen Forest Land
		43	Mixed Forest Land
5	Water	51	Streams and Canals
		52	Lakes
		53	Reservoirs
		54	Bays and Estuaries
6	Wetland	61	Forested Wetland
		62	Nonforested Wetland
7	Barren Land	71	Dry Salt Flats
		72	Beaches
		73	Sandy Areas Other than Beaches
		74	Bare Exposed Rock
		75	Strip Mines, Quarries, and Gravel Pits
		76	Transitional Areas
		77	Mixed Barren Land
8	Tundra	81	Shrub and Brush Tundra
		82	Herbaceous Tundra
		83	Bare Ground Tundra
		84	Wet Tundra
		85	Mixed Tundra
9	Perennial Snow or Ice	91	Perennial Snowfields
		92	Glaciers

From U.S. Geological Survey Professional Paper 964 (Appendix A)

2. The areas of the polygons to be delineated will have two minimum sizes, regardless of whether they are published at 1:250,000 or 1:100,000. The following categories have a minimum area of 4 ha (10 acres): all Urban or Built-up (11-17); Confined Feeding Operations (23); Other Agricultural Land (24); Water (52-54); Strip Mines, Quarries, and Gravel Pits (75); and Transitional (76), if urban. All other categories of land use and land cover will have a minimum area of 16 ha (40 acres).

In all categories mapped using a 4-ha (10-acre) minimum mapping unit, the minimum width of a feature to be shown must be 200 meters (660 feet). This minimum width precludes the delineation of very narrow or very long 4-ha (10-acre) tracts. All categories mapped using the 16-ha (40-acre) minimum mapping unit will use 400 meters (1320 feet) minimum width. Exceptions to this specification are limited access highways and all "double-line" rivers on the 1:250,000 base which shall have a minimum width of 92 meters (300 feet).

Each interpreter shall compile a log that notes problems encountered during the compilation of the Land Use and Land Cover Map (figure 3). This log must be as complete as possible. The compiler should list all polygons whose category identification is uncertain. This information will be required during quality control and will be used to determine the need for field checking of the compiled sheet.

4.--Land Use and Land Cover Shoreline Delineations

Problems have arisen concerning the delineation of certain shorelines because of the need to have the areal totals (county, state, etc.) of statistics developed by the Geography Program conform as closely as possible to the areal statistics published by the Bureau of the Census. Resolution of differences requires inspecting the procedures used by the Bureau of the Census for generating these statistics, and effecting a certain degree of correspondence in procedures used for delineating certain shoreline situations on the USGS Land Use and Land Cover and Associated Maps. The main problem is associated with relating "water" categories as specified in Professional Paper 964 to those bay and estuarine situations which include both "inland water" and "other than inland water" as defined and delineated by the Bureau of the Census.

In using U.S. Geological Survey Professional Paper 964 as the basis for delineation of the land use and land cover categories, category 54 defines "Bays and Estuaries" as "inlets or arms of the sea that extend inland. They are included in this system only when they are considered to be inland waters, and therefore included in the total area of the United States." In order to include "water other than inland water" as category 54 in our specifications, we must deviate slightly from the definitions as published in U.S. Geological Survey Professional Paper 964.

Date:_____ No. _____

Quadrangle:_____

Approx. Map Coordinates:_____

Possible Interpretation:_____

Interpreter's Name:_____

Description:_____

Date:_____ No. _____

Quadrangle:_____

Approx. Map Coordinates:_____

Possible Interpretation:_____

Interpreter's Name:_____

Description:_____

Date:_____ No. _____

Quadrangle:_____

Approx. Map Coordinates:_____

Possible Interpretation:_____

Interpreter's Name:_____

Description:_____

Date:_____ No. _____

Quadrangle:_____

Approx. Map Coordinates:_____

Possible Interpretation:_____

Interpreter's Name:_____

Description:_____

Figure 3.--Land use and land cover map compiler's problem sheet.

We will delineate both types of water on the Land Use and Land Cover Map utilizing the category of "Bays and Estuaries" (54) and then, through manual interpretations, separate those areas of "inland water" and areas of "other than inland water" by use of the associated maps. The procedure followed is taken from the publication prepared by the Bureau of the Census for the delineation of all "inland" and "other than inland water" (Measurement of Geographic Area, 1940, by Malcolm J. Proudfoot, U.S. Bureau of the Census). (See Appendix B.) In certain areas where generalization of the delineation as shown in the document necessitates inspection of the definitions dealing with the ways in which the shoreline will be divided between "inland" and "other than inland water," instructions shown in Area Measurement Report, U.S. Department of Commerce, Bureau of the Census, 1970, are used (Appendix B). When these two documents are used as a guide, it becomes apparent that category 54, "Bays and Estuaries," is composed of both "inland water" and "other than inland water." Since all rivers less than 1 nautical mile wide and more than one-eighth nautical mile wide are considered to be "inland water," the procedure for determining the point of termination of a river entering a bay or estuary is to follow that river downstream until it reaches a width of 1 nautical mile with no further constrictions. This then will divide rivers entering bays or estuaries from the bay or estuary proper. Delineation of the Bay and Estuary category when it is "inland water" follows definitions in Professional Paper 964 (Anderson and others, 1976). The line which delimits the seaward extent of the embayment or estuary will be the extent of the embayment or estuary and will be the line shown or determined by means of the previously mentioned Census publications. This means that on the Land Use and Land Cover Map there will be no differentiation between Bays and Estuaries (category 54) which fall in either "inland water" or "other than inland water." In delineating these two categories, the boundaries as defined for the Political Unit Map will be used.

In order to facilitate the delineation of shorelines for all maps, the following guidelines have been developed:

1. Delineate all "inland water" and "other than inland water."

2. Follow the Census guidelines for these delineations as outlined in Measurement of Geographic Area and Area Measurements of the United States (Appendix B).

3. Remember that category 54 can be either "inland water" or "other than inland water."

4. Terminate a river entering a bay or estuary when the river widens to 1 nautical mile in width traveling from land toward the bay or estuary.

5. Beware of rivers which undulate in size between 1 nautical mile and less than 1 nautical mile and therefore use judgment in the final termination of that river.

6. Do not draw a county or census subdivision line into "other than inland water" areas.

7. State lines should be drawn in "other than inland water" areas.

8. Remember that a hydrologic unit can contain both "inland" and "other than inland water."

9. Follow the shoreline on bays and estuaries and only delimit a stream where it is a double line river on a base map entering the bay and is less than 1 nautical mile in width.

10. Always maintain and overlay the common lines of delineation between other parts of the Map Set.

5.--Definition Clarification

Following is a clarification of Level II categories for purposes of land use and land cover compilation:

Urban or Built-up Land

11 Residential

The minimal residential density will be one house per 2.5 acres, i.e., 4 houses within a 4-ha (10-acre) minimum mapping unit. When the minimal density for the residential category is not met, the land use is determined by the dominant land use and land cover. This should not be so construed to apply the density factor and expand the area of delineation into other categories to achieve a 200-meter (660-foot) width requirement. The residences should be separated in such a way that the boundary of a polygon will encompass the residences and maintain the 200-meter (660-foot) width and the appropriate density. This precludes the delineation of strip developments along a highway or waterfront where minimum width requirement is not met even though the density is sufficient.

12 Commercial and Services

1. Institutional land uses are included in this category, but areas not specifically related to the purpose of the institution should be placed in the appropriate category. For example, single-family units on a military institution will be delineated as Residential. For institutions such as schools and prisons, all integral parts of the institution will be included under category 12. For example, school sports facilities will be delineated as part of the institution.

2. Agricultural experimental stations will be included under Commercial and Services (category 12).

3. Fairgrounds will be placed in category 12, and the areas to be delineated will include buildings, grandstands, race tracks, rodeo arenas, corrals, and paddock areas.

4. Golf courses will split into Other (17) and Commercial and Services (12) if the clubhouse and associated service facilities are 10 acres or more, with category 12 used to identify such facilities.

5. Differentiation between Commercial and Services (12) and Industrial and Commercial Complexes (15) is to be made as follows: Category 12 includes many varied types of land uses in combination. Category 15 only includes those industrial and commercial land uses that typically occur together or in close functional proximity within a tract of land developed specifically as an "industrial/commercial park." The uniform building style and area layout are generally the identifying features.

6. Golf courses that are a part of an institutional area will be delineated as Other Urban and Built-up Land (17), except where they are an integral part of the institution.

7. If a military airport does not have commercial flights, it will be placed under category 12. If a military airfield does have commercial flights, it goes under Transportation, Communications, and Utilities (14). The Official Airline Guide can be used to determine if an airfield is used for military flights only, or if it has commercial flights.

8. For military bases, the following rules will apply:

   a) Reservoirs which are located on a military base will be delineated as category 53.

   b) Sewage-treatment plants associated with a military installation will be placed under category 12 because they are an integral part of the military base.

   c) Outlying areas with intensive use such as target ranges will be in category 12.

   d) Training and bivouac areas which are intensely used for training to the extent that the natural land cover has been destroyed will be included in category 12. Other training and bivouac areas which are not used to the extent that the natural land cover has been destroyed will be included in the appropriate cover category.

   e) Abandoned foundations for barracks and houses on a military base should be classified as Transitional (76).

9. All local, state, and Federal government buildings and adjacent grounds will be placed in category 12.

10. Large grain elevators will be placed in category 12.

13 Industrial

1. A minimum density of one gas or oil well per ha (2.5 acres), or four wells per 4 ha (10 acres) will be used.

2. Salt evaportation ponds will be shown in this category.

3. All integral parts that are associated with an industrial area, such as water treatment or wastewater areas, tailing ponds, waste dumps, or overburden waste dumps, are to be included in category 13.

14 Transportation, Communications, and Utilities

1. Large compressor stations will be delineated as category 14, but gas recycling plants are classified as category 13.

2. The determination of normal minimum width (660 feet) in delineation could include a combination of the following features: road, rail lines, and their rights-of-way. If several transportation types are closely associated, they can be grouped to meet minimum width requirements.

3. All limited access highways will be delineated if they meet a minimum width of 92 meters (300 feet); other transportation routes must be 200 meters (660 feet) in width. Expand the highways to meet the 92-meter (300-foot) minimum width requirement if necessary to maintain continuity.

4. Airports and airfields that are 4 ha (10 acres) or more in area will be delineated. Airfields do not have to be active to be delineated. Intrusions of other land uses stop at the boundary, usually a fence or buffer area. If there is no boundary, other uses of the land continue up to the airfield and auxiliary facilities. It is not required that airfields have a hard-surface runway.

5. Water purification plants, as well as sewage plants, will be category 14.

16 Mixed Urban or Built-up

This category is used when more than one-third, but less than two-thirds, intermixture of another use or uses occurs. Note that this category is to be used in the urban context only.

17 Other Urban or Built-up

1. Sanitary landfills will be identified as Transitional (76).

2. Non-built-up land less than 16 ha (40 acres) in extent that is surrounded by built-up land in an urban setting is delineated as Other Urban or Built-up Land (17). If the vacant land is more than 40 acres, classify it according to the appropriate land use or land cover category.

3. Spillways and the large earthen faces of dams are to be shown as category 17 if they meet the 4-ha (10-acre) minimum area requirement.

Agricultural Land

21 Cropland and Pasture

Rice paddies and cranberry bogs should be included under this category.

24 Other Agricultural Land

1. The Other Agricultural Land category will include fish farms and hatcheries.

2. If a farmstead is delineated, the following facilities will be included with it: holding areas for livestock, small farm ponds, breeding and training facilities, storage facilities, and any other associated built-up features adjacent to and closely associated with the farmstead.

Rangeland

No change from Professional Paper 964.

Forest Land

No change from Professional Paper 964.

Water

The following specifications apply to all Rivers, Lakes, Reservoirs, Bays and Estuaries, i.e., categories 51, 52, 53, and 54.

1. All water bodies will be delineated as they exist at the time of the imagery, except when the areas are shown in an obvious state of flood.

2. If a river or canal is entering a bay or estuary and the width of the river or canal exceeds 1 nautical mile, a line will be drawn indicating the terminus of the river and the start of the bay or estuary.

3. Double line rivers shown on the 1:250,000-scale base map will be delineated on the Land Use and Land Cover Map, with a minimum width of 92 meters (300 feet).

Wetland

No change from Professional Paper 964.

Barren Land

72 Beaches

Beaches may occur on oceans, bays and estuaries, lakes, and reservoirs. The size limitation of 16 ha (40 acres) is to be maintained.

75 Strip Mines, Quarries, and Gravel Pits

1. Unused pits or quarries that contain water are to be shown in the Reservoir category (53), if the water area meets the minimum mapping unit specifications.

2. If the land has not returned to another use or to a natural state, inactive strip mines will be placed in category 75.

3. Facilities and other structures associated with category 75 that have an area of 4 ha (10 acres) or greater should be delineated as category 13.

76 Transitional Areas

1. Sanitary landfills or other land being altered by filling are to be placed in category 76.

2. Land which is in transition, e.g., forest to agriculture, will have a minimum area delineation of 16 ha (40 acres). Land which is in transition to an urban or built-up use will have a minimum area delineation of 4 ha (10 acres).

3. Areas which have had road patterns established for the purpose of recreational, second home, or primary home development and which have not shown sufficient density of building to be delineated as an urban category will be placed in the Transitional (76) category. If development had started and then was abandoned and vegetation is growing in the roads, the area will not be placed in category 76 but rather in the appropriate land cover category, such as 32, 41, 42, etc.

Tundra

No change from Professional Paper 964.

Perennial Snow or Ice

No change from Professional Paper 964.

6.--Line Weights and Type Styles

To obtain uniformity for compilation of this map, all features will be scribed and the following line weights will be used for publication scales of 1:250,000 or 1:100,000. The specified line weights should be proportionally enlarged or reduced when the map is compiled at a scale other than publication scale.

1. Land use and land cover polygon delineations and identifiers ---------- 0.004"

2. Neatline and Geographic Reference Ticks (full neatline required for each overlay) ---------- 0.003"

The category identifiers for land use and land cover polygons will be hand-scribed. There should be sufficient identifiers in the larger polygons to insure ease of identification, but discretion must be used not to clutter the map with identifiers. They should be placed centrally in simple polygons and used only as necessary for clarity in identifying polygons with complicated configurations. Polygons too small to hold a number should have the number placed in close proximity with a leader line pointing to, but not touching, the polygon boundary. Leader lines should not be closer than 0.015" from the polygon boundary. All number identifiers should be positioned parallel to the southern projection line of the map sheet. If numbers must be placed diagonally, they should read from left to right regardless of the angle. If numbers must be placed vertically and parallel to the meridian, the number will proceed from south to north and be read from the east side of the map. The numbers can be sized in accordance with the size of the polygon being numbered, but in no case should the number exceed one-fourth inch in height. Numbers must be clear and legible.

Before the map is edited, it must be joined to the surrounding maps. It will be the responsibility of the Topographic Division Mapping Center personnel to insure that the join has been made before editing the map. The Regional Center which completes the sheet for which a join is required will forward a full sheet format as the required data for the join to the Regional Center compiling the adjoining map or maps. The following guidelines will be used for the joining process:

1. Join smaller scale to larger scale maps.

2. Reduce larger scale to smaller scale and force smaller scale to fit reduced larger scale.

3. If scales are the same and open-file maps adjoin the map in compilation, join the map in compilation to the open-file map, unless there is 3 years or more difference in dates of source material.

Editing practices are covered in Section G. Once the map has been edited, all source materials used in compilation, along with the problems list and other information used by the compiler during compilation, will be submitted to the Geography Program liaison staff for quality control.

Section B

POLITICAL UNIT MAP

1.--General Explanation

The purpose of this map is to provide a graphic portrayal of county and state boundaries. The Political Unit Map provides the administrative boundaries in order to permit compilation of statistics by counties and states.

2.--Source Material

The source material to be used for compilation of this map will consist of:

1. The topographic map to be used as a compilation base.

2. Bureau of the Census maps showing County Subdivisions - Townships and Places (same as source to be used for the Census County Subdivision Map) (figure 4).

3. Bureau of the Census (1972b) publications entitled Geographic Identification Code Scheme (figure 5).

4. Bureau of the Census (1972a) publication entitled County and City Data Book.

3.--Compilation

The compilation scale of this map will be the release scale. The manuscript scribecoat will be on a 30" x 42" sheet at 1:250,000 or appropriate size at 1:100,000 as indicated in Section A, figure 2. The full neatline and intermediate geographic reference ticks are to be provided as shown in figure 13. The county boundaries to be shown on this map will be scribed utilizing the boundaries as shown on the topographic base map used for compilation. These delineations must be exact duplications of the lines shown on the base, except as indicated in the following paragraph. Since these same boundaries will be used as a basis for the delineation of census county subdivisions or census tracts, these boundaries must be verified with the Bureau of the Census maps showing County Subdivisions - Townships and Places.

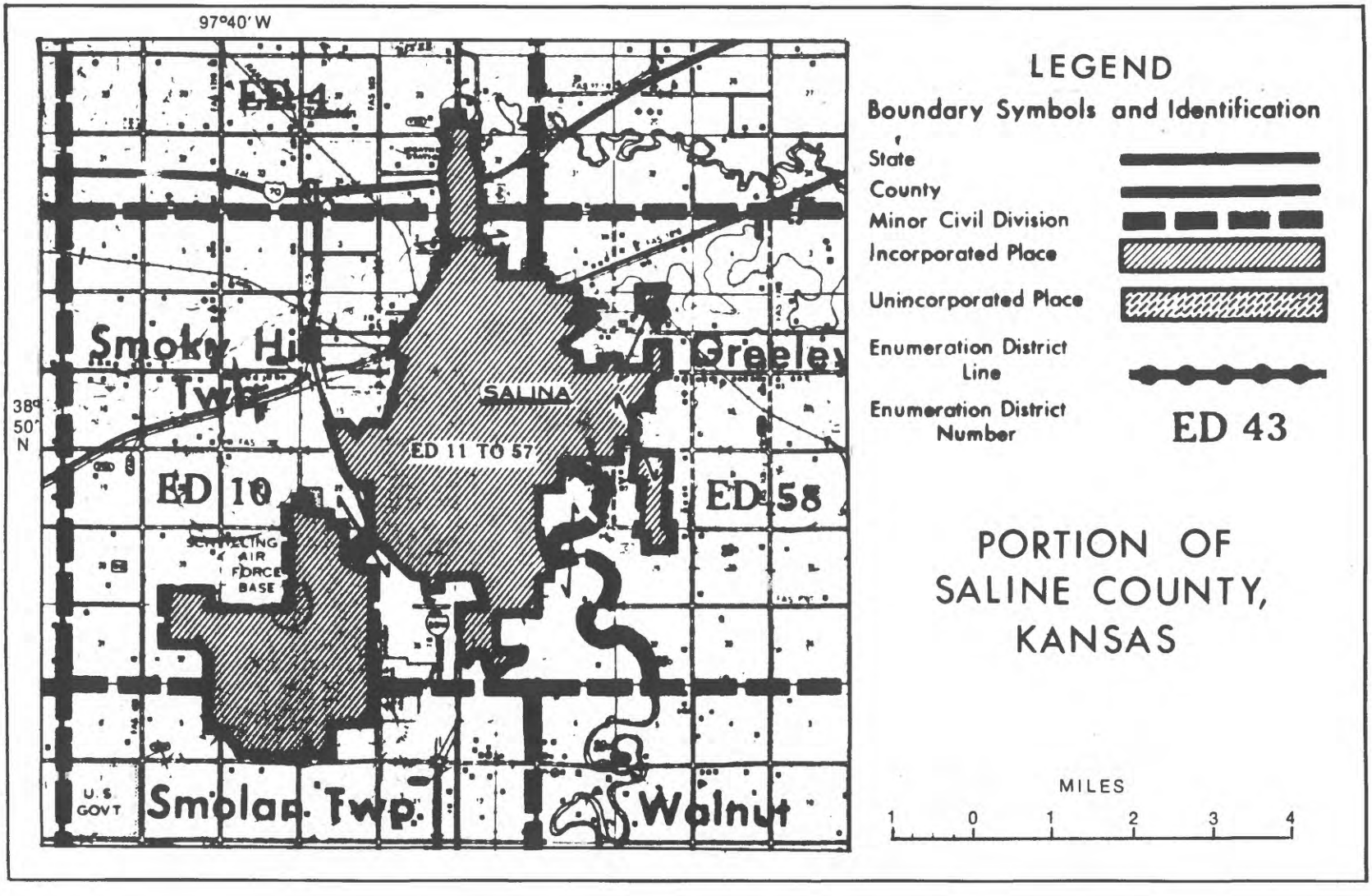


Figure 4.--Portion of Census Map Showing County Subdivisions, Townships, and Places. (Original compiled by U.S. Bureau of the Census on State Highway Department Maps.)

TABLE 1. **COUNTIES, COUNTY SUBDIVISIONS AND PLACES**—Continued **FLORIDA**

GEOGRAPHIC CODES									NAME
STATE	COUNTY	SMSA	ESR	SEA	MCD	PLACE	PLACE DESC.	PLACE SIZE	
12	085		039	06					MARTIN
12	085		039	06	005				HOBE SOUND DIV
12	085		039	06	005	0905	5	05	HOBE SOUND (U)
12	085		039	06	005	1045	4	01	JUPITER ISLAND
12	085		039	06	005	1907	5	03	SALERNO (U)
12	085		039	06	010				INDIANTOWN DIV
12	085		039	06	010	0975	5	05	INDIANTOWN (U)
12	085		039	06	015				STUART DIV
12	085		039	06	015	1548	4	02	OCEAN BREEZE
12	085		039	06	015	1807	4	01	PORT ST LUCIE (PART)
12	085		039	06	015	1960	4	01	SEWALLS POINT
12	085		039	06	015	2035	4	06	STUART
12	087		039	06					MONROE
12	087		039	06	005				CAPE SABLE DIV
12	087		039	06	010				KEY WEST DIV
12	087		039	06	010	1070	4	10	KEY WEST
12	087		039	06	015				LOWER KEYS DIV
12	087		039	06	015	0176	5	06	BOCA CHICA (U)
12	087		039	06	017				MIDDLE KEYS DIV
12	087		039	06	017	1060	4	01	KEY COLONY BEACH
12	087		039	06	017	1203	4	00	LAYTON
12	087		039	06	017	1298	5	06	MARATHON (U)
12	087		039	06	020				UPPER KEYS DIV
12	087		039	06	020	0995	5	03	ISLAMORADA (U)
12	087		039	06	020	1063	5	06	KEY LARGO (U)
12	089		040	02					NASSAU
12	089		040	02	005				CALLAHAN-HILLIARD DIV
12	089		040	02	005	0190	4	00	BOULOGNE
12	089		040	02	005	0275	4	02	CALLAHAN
12	089		040	02	005	0895	4	03	HILLIARD
12	089		040	02	010				FERNANDINA BEACH DIV
12	089		040	02	010	0620	4	07	FERNANDINA BEACH
12	089		040	02	015				YULEE DIV
12	091		040	01					OKALOOSA
12	091		040	01	005				BAKER DIV
12	091		040	01	010				CRESTVIEW DIV
12	091		040	01	010	0440	4	07	CRESTVIEW
12	091		040	01	015				EGLIN DIV
12	091		040	01	015	0573	5	07	EGLIN (U)
12	091		040	01	015	0938	5	05	HURLBURT (U)
12	091		040	01	025				FORT WALTON BEACH DIV
12	091		040	01	025	0370	4	01	CINCO BAYOU
12	091		040	01	025	0517	5	04	DESTIN (U)
12	091		040	01	025	0670	4	08	FORT WALTON BEACH
12	091		040	01	025	1320	4	06	MARY ESTHER
12	091		040	01	025	1549	5	07	OCEAN CITY (U)
12	091		040	01	025	1965	4	02	SHALIMAR
12	091		040	01	030				LAUREL HILL DIV
12	091		040	01	030	1195	4	01	LAUREL HILL
12	091		040	01	035				NICEVILLE-VALPARAISO DIV
12	091		040	01	035	1485	4	06	NICEVILLE
12	091		040	01	035	2135	4	07	VALPARAISO
12	093		039	06					OKEECHOBEE
12	093		039	06	002				EAST OKEECHOBEE DIV
12	093		039	06	002	0462	5	03	CYPRESS QUARTERS (U)
12	093		039	06	002	1565	4	06	OKEECHOBEE
12	093		039	06	010				WEST OKEECHOBEE DIV
12	095	5960	039	E					ORANGE
12	095	5960	039	E	005				APOPKA DIV
12	095	5960	039	E	005	0035	4	06	APOPKA
12	095	5960	039	E	005	1985	5	05	SOUTH APOPKA (U)
12	095	5960	039	E	010				AZALEA PARK DIV
12	095	5960	039	E	010	0069	5	07	AZALEA PARK (U)
12	095	5960	039	E	010	2126	5	06	UNION PARK (U) (PART)
12	095	5960	039	E	015				EAST ORANGE DIV
12	095	5960	039	E	015	0170	4	02	BITHLO
12	095	5960	039	E	015	2126	5	06	UNION PARK (U) (PART)
12	095	5960	039	E	020				KILLARNEY-FAIRVIEW SHORES DIV
12	095	5960	039	E	025				LAKE MAITLAND DIV
12	095	5960	039	E	025	0555	4	05	EATONVILLE
12	095	5960	039	E	025	1280	4	07	MAITLAND
12	095	5960	039	E	030				LOCKHART DIV
12	095	5960	039	E	090				WINTER PARK DIV
12	095	5960	039	E	090	2290	4	09	WINTER PARK
12	097		039	05					OSCEOLA
12	097		039	05	005				KISSIMMEE DIV
12	097		039	05	005	1075	4	07	KISSIMMEE
12	097		039	05	005	1842	4	00	REEDY CREEK (PART)
12	097		039	05	015				ST CLOUD DIV
12	097		039	05	015	1890	4	07	ST CLOUD
12	097		039	05	020				SOUTH AND EAST OSCEOLA DIV
12	099	8960	039	F					PALM BEACH
12	099	8960	039	F	010				BELLE GLADE-PAHOKEE DIV
12	099	8960	039	F	010	0129	5	04	BELLE GLADE CAMP (U)
12	099	8960	039	F	010	0130	4	08	BELLE GLADE
12	099	8960	039	F	010	1625	4	07	PAHOKEE
12	099	8960	039	F	010	1990	4	06	SOUTH BAY
12	099	8960	039	F	015				BOCA RATON DIV
12	099	8960	039	F	015	0180	4	10	BOCA RATON
12	099	8960	039	F	015	0870	4	00	HIGHLAND BEACH
12	099	8960	039	F	015	2130	4	03	UNIVERSITY PARK
12	099	8960	039	F	020				BOYNTON BEACH-DELRAY BEACH DIV
12	099	8960	039	F	020	0200	4	08	BOYNTON BEACH
12	099	8960	039	F	020	0237	4	01	BRINY BREEZES
12	099	8960	039	F	020	0510	4	08	DELRAY BEACH
12	099	8960	039	F	020	0751	4	00	GOLF
12	099	8960	039	F	020	0800	4	01	GULF STREAM
12	099	8960	039	F	020	0940	4	01	HYPOLUXO
12	099	8960	039	F	020	1170	4	07	LANTANA
12	099	8960	039	F	020	1290	4	01	MANALAPAN
12	099	8960	039	F	020	1550	4	03	OCEAN RIDGE
12	099	8960	039	F	020	2010	4	00	SOUTH PALM BEACH
12	099	8960	039	F	035				GLADES DIV
12	099	8960	039	F	050				LAKE WORTH DIV
12	099	8960	039	F	050	0060	4	01	ATLANTIS
12	099	8960	039	F	050	0390	4	00	CLOUD LAKE
12	099	8960	039	F	050	0740	4	01	GLEN RIDGE
12	099	8960	039	F	050	0765	4	04	GREENACRES CITY
12	099	8960	039	F	050	1115	4	05	LAKE CLARKE SHORES
12	099	8960	039	F	050	1165	4	09	LAKE WORTH
12	099	8960	039	F	050	1670	4	06	PALM SPRINGS
12	099	8960	039	F	075				RIVIERA BEACH-JUPITER DIV
12	099	8960	039	F	075	1030	4	02	JUNO BEACH
12	099	8960	039	F	075	1040	4	01	JUPITER INLET BEACH COLONY
12	099	8960	039	F	075	1046	4	06	JUPITER
12	099	8960	039	F	075	1145	4	07	LAKE PARK
12	099	8960	039	F	075	1295	4	02	MANGONIA PARK
12	099	8960	039	F	075	1510	4	07	NORTH PALM BEACH
12	099	8960	039	F	075	1650	4	07	PALM BEACH GARDENS
12	099	8960	039	F	075	1655	4	03	PALM BEACH SHORES
12	099	8960	039	F	075	1855	4	09	RIVIERA BEACH
12	099	8960	039	F	075	2095	4	06	TEQUESTA
12	099	8960	039	F	078				SUNSHINE PARKWAY DIV
12	099	8960	039	F	078	1870	4	01	ROYAL PALM BEACH
12	099	8960	039	F	080				WEST PALM BEACH DIV
12	099	8960	039	F	080	0750	4	01	GOLFVIEW
12	099	8960	039	F	080	0840	4	03	HAVERHILL
12	099	8960	039	F	080	1656	4	07	PALM BEACH
12	099	8960	039	F	080	2215	3	11	WEST PALM BEACH
12	101		039	05					PASCO
12	101		039	05	005				CENTRAL PASCO DIV
12	101		039	05	005	1895	4	03	ST LEO
12	101		039	05	005	1915	4	01	SAN ANTONIO
12	101		039	05	010				DADE CITY DIV
12	101		039	05	010	0465	4	06	DADE CITY
12	101		039	05	010	0467	5	03	DADE CITY EAST (U)
12	101		039	05	010	0468	5	04	DADE CITY NORTH (U)
12	101		039	05	015				LACOOCHEE DIV
12	101		039	05	015	1085	5	03	LACOOCHEE (U)
12	101		039	05	020				NEW PORT RICHEY DIV
12	101		039	05	020	0103	5	06	BEACON SQUIER (U)
12	101		039	05	020	0263	5	06	BUENA VISTA (U)
12	101		039	05	020	0413	5	05	COLONIAL HILLS (U)
12	101		039	05	020	0433	5	04	COUNTRY ESTATES (U)
12	101		039	05	020	0643	5	03	FOREST HILLS (U)
12	101		039	05	020	0794	5	03	GULF HARBORS (U)
12	101		039	05	020	0907	5	05	HOLIDAY GARDENS (U)
12	101		039	05	020	0908	5	04	HOLIDAY HILLS (U)
12	101		039	05	020	1475	4	07	NEW PORT RICHEY

Figure 5.--Page from Bureau of the Census Geographic Identification Code Scheme, 1972.

There are two cases when the political unit lines may not agree with the boundaries shown on the topographic base map and which will require verification from other source material. These are:

1. When boundaries which appear on the base map disagree with the boundaries shown on the County Subdivisions - Townships and Places maps from the Bureau of the Census.

2. When a discrepancy occurs between the county lines at the join of two map sheets.

In either of these cases where a discrepancy occurs, the correction procedures for each are the same. Acquire the 7.5-minute or 15-minute topographic maps for the area of difference. These maps will be used as a basis for solution of both of these problems. If such maps are not available, the maps showing County Subdivisions - Townships and Places from the Bureau of the Census will be used for correction. County lines that run along rivers and streams should be carefully checked for discrepancies.

In addition to the county boundaries shown on the topographic base map, independent cities also must be delineated. Independent cities are cities located within a county but functioning administratively independent of the county. Such "cities" are found in four States: Maryland (Baltimore city - distinct from Baltimore County), Missouri (St. Louis city - distinct from St. Louis County), Nevada (Carson City city - distinct from Carson County), and 38 cities in Virginia. The District of Columbia is also included as the equivalent of a county. The source material for these delineations will be the Bureau of the Census publication entitled County and City Data Book, 1972.

Since we are mapping certain categories of "water" on the Land Use and Land Cover Map, the problem becomes one of relating "water" category boundaries with the county boundaries in those bay and estuarine situations which include both "inland water" and "other than inland water" as defined by the Bureau of the Census.

The county boundary delineations of the Political Unit Map are used as the mechanism in bays and estuaries that will determine the separation of "inland water" from "other than inland water." Since by definition "inland water" is the only water area which is included by the Bureau of the Census in the total statistical area of a county, neither county boundaries nor census subdivision boundaries can enter into "other than inland water." In the cases when the two Census documents (Appendix B) are used, we know that a bay or river is indicated as "inland water," and such water, in turn, enters into a larger bay or estuary marked as "other than inland water," the county boundary would, in fact, follow

the shoreline and be coincident with the line crossing the mouth of the embayment or estuary which is the division between "inland water" and "other than inland water" (see Section A). By doing this, we have effectively separated the "inland water" category for use in development of statistics for the counties involved. If a state boundary extends into "other than inland water," the line will be extended until it is terminated at the line which is the seaward extension of the "other than inland water." The seaward boundary of the Land Use and Land Cover Map will be delineated on the Political Unit Map. Those areas within this boundary which are "other than inland water" will be delineated and annotated with the state code and 000. The utilization of the two-digit state code and 000 on the Political Unit Map would eliminate unnumbered polygons on the map. Then, by compositing the Land Use and Land Cover and the Political Unit Maps, we can develop statistics which will permit us to determine the amount of land use and land cover for each of the counties as well as to determine the extent of "other than inland water" under the jurisdiction of the individual state. The relationship of land use and land cover to the Political Unit Map is covered in Section A.

The source material for the determination of the political unit codes is the Geographic Identification Code Scheme, Bureau of the Census, 1972. This publication will have the codes used for identification of census information for the 1970 census. A sample page is shown as figure 5. This document has been furnished to all Mapping Centers. The Geographic Identification Code Scheme has the states listed in alphabetical sequence, and each state is assigned a number in accordance with this sequence. The counties, parishes, or other similar state administrative areas are listed in the same manner for each state. The numeric code used to identify each political unit will therefore consist of five (5) numbers. The first two are the state number and the next three are the county number. These code numbers must be obtained at the start of compilation. When the codes of units are being obtained, an explanation should be made to accompany the map through following steps of the compilation procedure. The following is a sample listing:

Florida (12)

Reference Number	County
12035	Flagler
12069	Lake

This explanation will be forwarded along with the complete source package when the sheet is submitted for editing and quality control. The explanation will be verified during quality control and used to order the type for the collar as well as providing input for quality control of the digitizing of the maps. A copy of this list will be used to order both the internal number type as well as the complete explanation type for the Political Unit Map. This type order should be placed as soon as the list is completed and verified at the start of compilation.

4.--Line Weights and Type Styles

The following line weights are to exist at publication scale of 1:250,000 and 1:100,000 on the Political Unit Map:

1. County, parish, and other such boundaries ---------- 0.004"
2. State boundaries ---------- 0.004"
3. Neatline and intermediate Geographic Reference Ticks (full neatline for sheet frame) ---------- 0.003"

The political unit numbers to be used on the internal area of the map should be prepared as stick-up type. The internal numbers will be Univers 45 type, 24-point size. The explanation type will be Souvenir Medium, 9-point size.

The placement of these code numbers will depend on the size of the county or other administrative areas to be delineated. Every area will have at least one complete number, and large or elongated areas should have a minimum of two political unit code numbers positioned for easy reading by the user. If an area is too small to contain the code number, the number will be placed close to the area with a leader line pointing to the polygon to which the number refers. The leader line should end no closer than 0.015" to the polygon boundary.

All final compilation manuscripts will be scribed. This will include the internal area delineations, the neatline, and tick marks. Before the map is edited, it must be joined to surrounding sheets in compilation. For guidelines to aid in this join, see Section A. It will be the responsibility of the Topographic Division Mapping Center personnel to insure that the join has been made before editing the map. Editing practices are covered in Section G.

At the completion of the editing of the Political Unit Map, the scribed manuscript, explanation layout, source material, and final number placement overlay (if used) should be forwarded to the Geography Program liaison person for the quality-control check.

Section C

HYDROLOGIC UNIT MAP

1.--General Explanation

The purpose of this map is to show hydrologic units and to provide a basis for development of statistics related to the hydrologic units. This map will allow the user to relate hydrologic and other data pertaining to any unit of the map to the remaining parts of the Map Set.

2.--Source Material

Source materials required for the compilation of this map are:

1. The composite mapping base;

2. Water Resources Division Hydrologic Unit Map for the states appearing on the base map (see figure 6);

3. Published 1:250,000- or 1:100,000-scale standard quadrangle map;

4. List titled "Boundary Descriptions and Name of Regions, Subregions, Accounting Units, and Cataloging Units," prepared by USGS Water Resources Division (figure 7).

3.--Compilation

The compilation scale for this map will be the release scale. The method of transfer from the Hydrologic Unit Map to the compilation base, whether by direct-detail transfer or by projection, is to be determined by the compiling Center. The base manuscript is to be prepared for compilation on a 30" x 42" sheet of scribecoat at 1:250,000 scale or appropriate size at 1:100,000 scale. The full neatline and intermediate geographic reference ticks are to be provided as shown in figures 13 and 14. Because the Hydrologic Unit Map may have a minimum of background detail for positioning of the unit boundary, and because the unit boundary is a rather thick line on the source maps, an intermediate transfer of the boundaries to the lithographic copy of the base map will be required to insure that the unit boundaries, do, in fact, follow stream divides. This intermediate transfer should be used to resolve any questions which may arise during delineation of the boundaries. The intermediate transfer to the base map will insure accurate delineation of the hydrologic units.

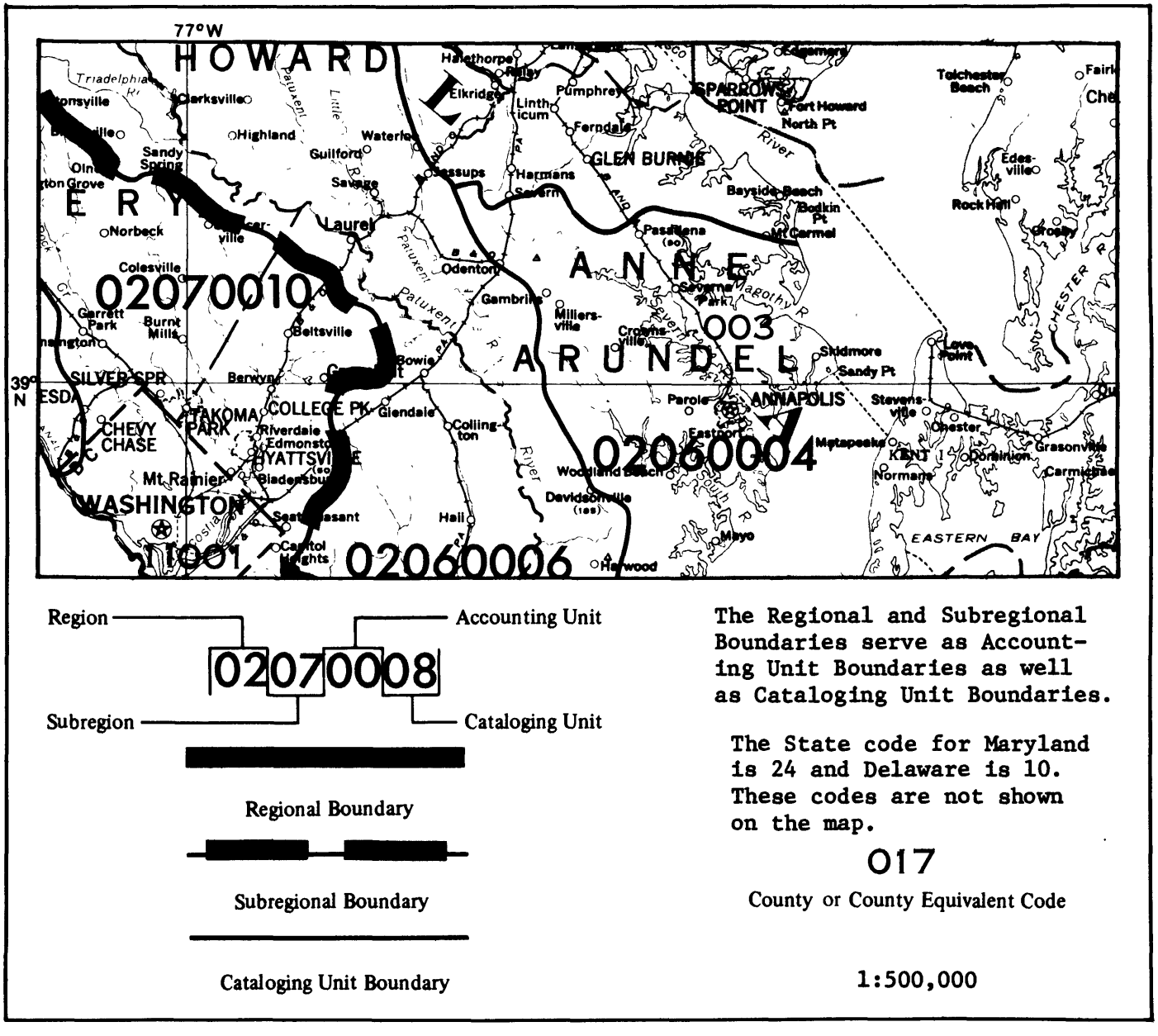


Figure 6.--Hydrologic Unit Map, Portion of Maryland and Delaware

Arkansas-White-Red Region--11

Regions, Subregions, Accounting Units, and Cataloging Units

Region 11 Arkansas-White-Red Region--The drainage of the Arkansas, White, and Red River basins above the points of highest backwater effects of the Mississippi River. Includes all of the State of Oklahoma and parts of the States of Arkansas, Colorado, Kansas, Louisiana, Missouri, New Mexico, and Texas.

Subregion 1101--White: The White River basin above and including the Little Red River basin to the point of highest backwater effect of the Mississippi River. Arkansas, Missouri.

Accounting Unit. 110100--White. Arkansas, Missouri

Cataloging Units.
11010001--Upper White. Arkansas, Missouri
11010002--James. Missouri
11010003--Bull Shoals Lake. Arkansas, Missouri
11010004--Middle White. Arkansas
11010005--Buffalo. Arkansas
11010006--North Fork White. Arkansas, Missouri
11010007--Upper Black. Arkansas, Missouri
11010008--Current. Arkansas, Missouri
11010009--Lower Black. Arkansas, Missouri
11010010--Spring. Arkansas, Missouri
11010011--Eleven Point. Arkansas, Missouri
11010012--Strawberry. Arkansas
11010013--Little Red. Arkansas

1102--Upper Arkansas: The Arkansas River basin above its intersect with the Colorado-Kansas State line. Colorado, Kansas, New Mexico.

Accounting Unit. 110200--Upper Arkansas. Colorado, Kansas, New Mexico

Cataloging Units.
11020001--Arkansas Headwaters. Colorado
11020002--Upper Arkansas. Colorado
11020003--Fountain. Colorado
11020004--Chico. Colorado
11020005--Middle Upper Arkansas. Colorado
11020006--Huerfano. Colorado
11020007--Apishapa. Colorado
11020008--Horse. Colorado
11020009--Lower Upper Arkansas. Colorado, Kansas
11020010--Purgatoire. Colorado, New Mexico
11020011--Big Sandy. Colorado
11020012--Rush. Colorado
11020013--Two Butte. Colorado

Figure 7.--Sample page of boundary descriptions and names of regions, subregions, accounting units and cataloging units.

Since we are mapping several categories of water in our land use and land cover mapping program, the problem becomes one of relating water categories (and the related parts of the accompanying maps) to those bay and estuarine situations which include both "inland water" and "other than inland water" as defined by the Bureau of the Census.

The Hydrologic Unit Maps prepared by the Water Resources Division show areas which enter into "other than inland water." Therefore, the drainage areas are special cases which should be delineated exactly as shown on the Hydrologic Unit Map. For those drainage areas which terminate at a shoreline in a bay or estuary and the bay or estuary is a separate drainage area, the drainage-area boundary should follow the shoreline to where it will be connected with the delimiting line of the opposite side of the drainage area to produce a closed polygon. This, then, will permit development of statistics for drainage areas composited with the Political Unit and the Land Use and Land Cover Maps for both "inland water" and "other than inland water."

For further clarification of this problem, see Section A for Land Use and Land Cover Map specifications.

The codes for the hydrologic units will be taken directly from the Hydrologic Unit Map and will consist of eight (8) numbers. An explanation should be made during the coding of the hydrologic units which reflects both the reference number and the name of the unit. The format for the explanation is:

Reference Number	Unit
03080101	Upper St. Johns, Florida
03080102	Oklawaha, Florida

This explanation should be made at the initiation of compilation, and the type for the required hydrologic unit numbers and explanation should be ordered at that time. This list will be used for both visual and digital quality control and should follow the sheet through subsequent compilation steps. It can also be used for verification of the explanation on the open-file copy.

4.--Line Weights and Type Styles

The following line weights are to exist at publication scale of either 1:250,000 or 1:100,000:

1. Hydrologic unit boundaries ---------- 0.004"
2. Neatline and intermediate Geographic Reference Ticks (full neatine required on all overlays) ---------- 0.003"

All the type for the code numbers of hydrologic units should be ordered in accordance with the list prepared at initiation of compilation. These numbers will be Univers 45, 24-point type numbers and should, where possible, read left to right and be parallel with the horizontal axis of the map sheet. If numbers are required to be alined vertically, they should be read from the east side of the map (see Section A, paragraph 5). The type for the explanation is Souvenir Medium, 9-point type.

Sufficient identification numbers should be placed in the larger polygons to insure ease of identification. They should be centrally located in simple polygons and as dense as needed for clarity in complex polygons. Polygons too small to hold a number should have the number placed close to the polygon, with a leader line pointing to, but ending no closer than 0.015" from the polygon boundary.

All final compilation manuscripts will be scribed. This will include the internal area delineations, the neatline, and geographic ticks. Before the map is edited, it must be joined to surrounding sheets. For guidelines for this join, see Section A. It will be the responsibility of the Topographic Division Mapping Center personnel to insure that these joins have been made before editing the map. Editing practices are covered in Section G. At the completion of the editing of the Hydrologic Unit Map, the scribed manuscript and final number overlay should be forwarded, along with the source material utilized, to the Geography Program liaison person for quality control.

Section D

CENSUS COUNTY SUBDIVISION MAP

1.--General Explanation

This map provides a graphic portrayal of census county subdivisions, which are the census county divisions in non-metropolitan counties and census tracts in Standard Metropolitan Statistical Area (SMSA) counties. This map permits the user to interface census data collected from the 1970 census with the Land Use and Land Cover Map and other maps of the Map Set as well as with other maps and data.

2.--Source Material

The source material to be utilized for the compilation of this map consists of:

1. The topographic map base;

2. Copy of the Political Unit Map;

3. Bureau of the Census maps showing County Subdivisions - Townships and Places (figure 4);

4. Bureau of the Census publication titled Census Tracts: SMSA. A separate report for each SMSA has been published by the Bureau of the Census. The publication for the SMSA's covered by the sheet being compiled will be used.

5. Bureau of the Census publication titled Geographic Identification Code Scheme (figure 5);

6. Bureau of the Census publication titled "County and City Data Book, 1972."

3.--Compilation

The compilation scale of this map will be the release scale. The manuscript will be prepared on a 30" x 42" scribecoat at 1:250,000 scale or appropriate size at 1:100,000 scale. The full neatline and intermediate geographic reference ticks are to be provided as shown in figures 13 and 14. Since the political unit boundaries as delineated on the Political Unit Map form the framework for the delineation of the census county subdivisions and since these census lines must be in agreement, compilation will be more easily accomplished if the scales

of the two maps are the same. Two types of census areas will be delineated:

1. Census tracts within the Standard Metropolitan Statistical Areas (SMSA's), or

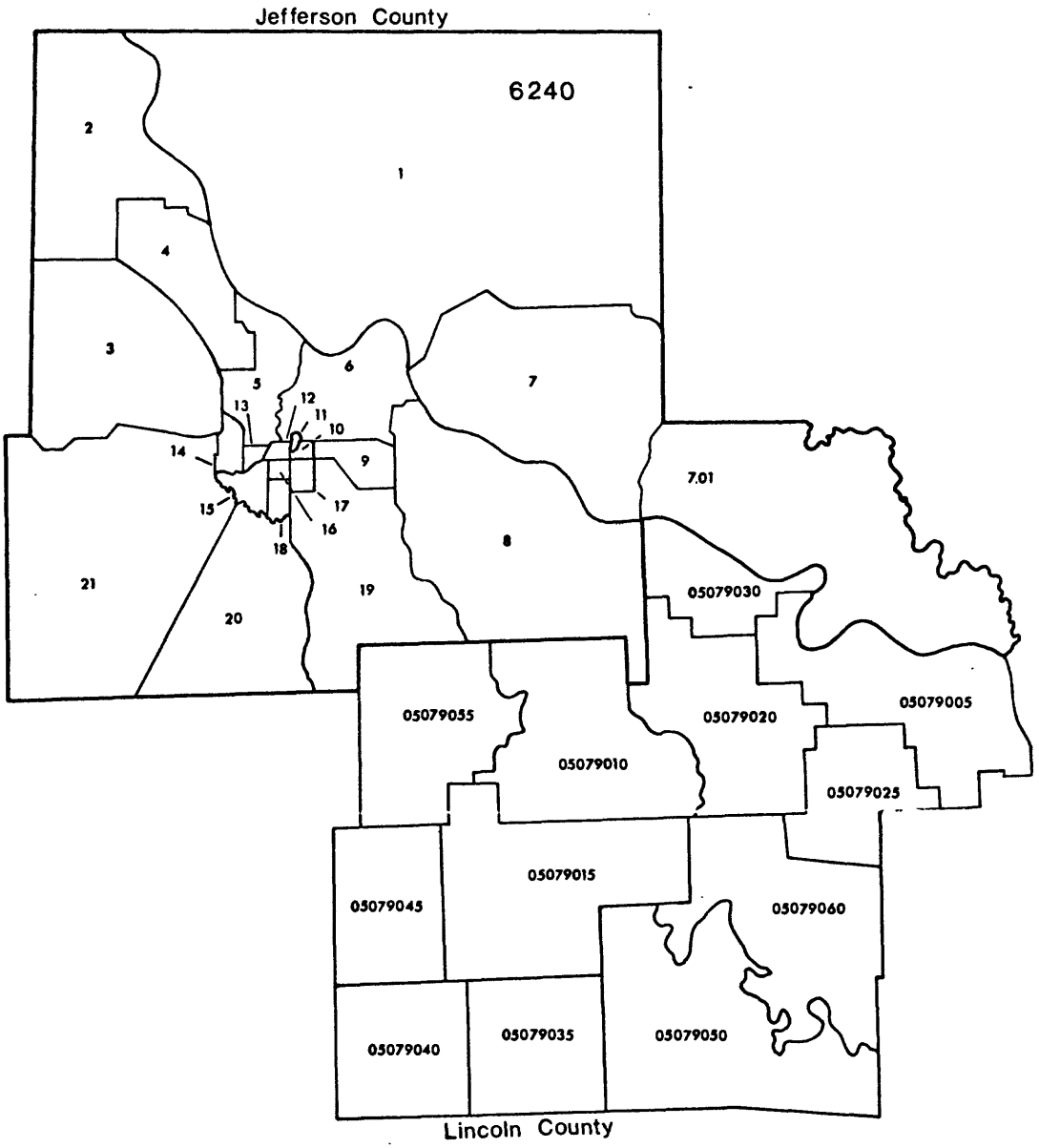
2. Census county divisions or their equivalents in the non-metropolitan counties.

SMSA's are designated by the Bureau of the Census. Each of the SMSA's is given a unique name and number. Each SMSA may contain one or more counties and is subdivided into census tracts. The numbering system for the SMSA's and the census tracts will be identical to that utilized by the Bureau of the Census numbering system. In an effort to facilitate compilation, only the appropriate census tract identifier will be placed within the tract boundaries. The SMSA number can be displayed one time and placed within the county or county grouping for which it applies.

The census county subdivisions (CCS's) are referred to in Census data by a number of different names: Townships in Arkansas, Wards in Louisiana; and Census County Divisions in Florida. The numbering system of the CCS's will not change regardless of what they are called.

To uniquely identify each CCS on the base, there must be eight (8) numbers of reference. The first two numbers are the state code, the next three numbers are the county code, and the last three are the CCS identifier itself. A sample drawing of SMSA and non-SMSA counties is shown as figure 8.

All of the codes for the various subdivisions of the census units can be found in the Geographic Identification Code Scheme, published by the Bureau of the Census. In preparation for coding of both SMSA tracts and CCS's, an explanation should be made reflecting the names and code numbers of those census data which appear for the map.



	REFERENCE NUMBER	NAME
SMSA	6240	Pine Bluff
CENSUS TRACT	1	
MINOR CIVIL DIVISION	05079005	Listed Below

State Code County Code MCD

MINOR CIVIL DIVISIONS

05079005	AUBURN TWP.	05079035	LONE PINE TWP.
05079010	BARTHOLOMEW TWP.	05079040	MILL CREEK TWP.
05079015	CANE CREEK TWP.	05079045	OWEN TWP.
05079020	CHOCTAW TWP.	05079050	SMITH TWP.
05079025	GOULD TWP.	05079055	SPRING TWP.
05079030	KIMBROUGH TWP.	05079060	WELLS BAYOU TWP.

Figure 8.--Sample drawing of SMSA (Pine Bluff SMSA) and non-SMSA (Lincoln County).

The format for this explanation should be:

FLORIDA (12)
NON-METROPOLITAN COUNTIES

Reference Number	Census County Subdivision
FLAGLER COUNTY (035)	
12035010	East Flagler
12035015	West Flagler

STANDARD METROPOLITAN
STATISTICAL AREAS (SMSA)

SMSA	Reference Number	County	Census Tract Numbers
Daytona Beach	2020	Volusia	1.00 - 67.00
		Kleckner	68.00 - 99.00
		Anderson	100.00 - 150.00

This explanation should be prepared before or during the initial phases of compilation. Stick-up type for the numbers as well as type for the explanation should be ordered in accordance with specifications for line weights and type sizes shown in this section in anticipation of compilation of the final overlay. The explanation should be sent along with other source material to editing and quality control.

Sixteen independent cities located in Virginia have an SMSA code and can be treated as an urban area in the same way as any other city on both the Political Unit and Census County Subdivision Maps. They are: Alexandria, Chesapeake, Colonial Heights, Fairfax, Falls Church, Hampton, Hopewell, Lynchburg, Newport News, Norfolk, Petersburg, Portsmouth, Richmond, Roanoke, Salem, and Virginia Beach. In addition, there are 22 independent cities, namely Bedford, Bristol, Buena Vista, Charlottesville, Clifton Forge, Covington, Danville, Emporia, Franklin, Fredericksburg, Galax, Harrisonburg, Lexington, Martinsville, Norton, Radford, South Boston, Staunton, Suffolk, Waynesboro, Williamsburg, and Winchester, which do not have an SMSA designator. These cities are all located in Virginia.

Nontracted independent cities will be handled in the following manner:

1. The first two digits will designate the state code as found in the U.S. Bureau of the Census publication County and City Data Book, 1972. In the case of Virginia, the number would be (51).

2. The next three digits will designate the city code. In the case of Virginia, the information can be found in table 2, p. 498 of the County and City Data Book, 1972. Bedford would be 51515; Bristol would be 51520.

3. The last three digits will be assigned as 005, thus making up the eight digits necessary to be consistent with all other information portrayed on the Census County Subdivision Map.

Independent cities that are part of an SMSA will be tracted. In this case, all tracts will be shown as usual. The Bureau of the Census encodes the independent city tracts by using different groupings than the other SMSA numbers. For example:

Arlington county = 1000 series
Arlington city = 2000 series
Fairfax city = 3100 series
Fairfax county = 4000 series
Falls Church city = 5000 series

No exceptions have to be made in displaying the independent city on the Census overlay, but mention should be made on the collar showing the tracts involved.

The compilation base map at appropriate scale will be used in conjunction with the County Subdivisions - Townships and Places maps. These census maps can be photographically reduced or enlarged to the appropriate scale. The census county subdivison lines must be accurately transferred from the Census maps to the Census County Subdivision Map.

There have been compilation problems within certain SMSA's in terms of fitting the high-density tract numbers within the SMSA area. Nevertheless, the compilation procedure for the high-density SMSA's will be basically the same. The major change in the transfer of census tract data will involve an enlargement in scale of the 1:250,000 blue-line map base utilized in the normal compilation. The scale change will only involve those counties or parts of counties that are included in the SMSA. This enlargement will allow the compiler to label the census tract with the appropriate number within the tract boundaries where practical. The SMSA area is photographically enlarged to a workable scale (1:125,000 or, in extreme cases, to 1:50,000) on stable-base material.

When the transfer of the census data is complete, the enlarged SMSA area is reduced to fit the original SMSA county (political) boundaries at the 1:250,000 scale. Positional accuracy and drafting clarity will be maintained if this procedural change is followed in the compilation of densely populated SMSA's.

Since the Political Unit Map is used as a guide, and the political boundary will define the areas that will be divided into both SMSA's and CCS's, the compiler should read the Political Unit Map specifications on shoreline delineation.

The Census County Subdivision Map will be scribed in accordance with line-weight specifications for the particular items, as listed in the next section. The type for the number, as ordered from the explanation previously prepared, will be affixed to an overlay keyed to the final manuscript that is prepared for editing and quality control.

4.--Line Weights and Type Styles

The following line weights are to exist at publication scale of 1:250,000 or 1:100,000. The line weights specified for the Census County Subdivision Map are:

1. Census County Subdivision ---------- 0.004"
2. Standard Metropolitan Statistical Area ---------- 0.004"
3. Census tracts ---------- 0.003"
4. Neatline and intermediate Geographic Reference Ticks (full neatline required on all overlays) ---------- 0.003"

The Census County Subdivision explanation and code numbers should be prepared and ordered as stick-up type.

Explanation - Souvenir Medium, 9-point type
SMSA numbers - Univers 45, 30-point type
Census tracts and MCD/CCS - Univers 45 type (Type sizes will vary from 6-point to 18-point, depending upon polygon size.) Where possible, uniformity of sizes should be maintained. (In such special cases where a photographic reduction technique is used to portray census tracts, these type sizes will not apply.)

There should be sufficient codes in the larger polygons to insure ease of identification, and as many as needed should be used for clarity in polygons with complicated configurations. Polygons too small to hold a number should have the number placed close to the polygon with a leader line pointing to, but ending no closer than 0.015" from the polygon.

All final compilation manuscripts will be scribed. This scribing will include the internal area delineations, the full neatline, and geographic reference ticks.

Before the map is edited, it must be joined to the surrounding sheets in compilation. For guidelines for this join, see Section A. It will be the responsibility of the Topographic Division Mapping Center personnel to insure that all edge-joins have been made before editing the map. Editing practices are covered in Section G.

At the completion of the Census County Subdivision Map, the scribed manuscript, explanation, and final number overlay, along with the source material utilized, should be forwarded to the Geography Program liaison person for quality control.

Section E

FEDERAL LAND OWNERSHIP MAP

1.--General Explanation

This map provides a graphic presentation of the Federally owned land of the United States and permits statistics to be developed for Federal land. At this time, the Federal Land Ownership Map will be prepared only for states with which the Geography Program has cooperative agreements. Special cases, however, may exist for which a Federal Land Ownership Map will be required. These cases will be separately identified at the time of authorization.

2.--Source Material

Source materials required for the compilation of the Federal Land Ownership Map are:

1. Topographic base map

2. Federal land ownership data in the form of maps, plats, and other descriptive data. It is the responsibility of the Information Services Section, Branch of Technical Support, Special Mapping Center, Topographic Division, to research, obtain, and format the land ownership data so that it can be delineated on the base map.

3. The code numbers used for Federal land ownership compilations will be those shown on the Federal Land Ownership explanation (figure 9).

It should be noted that only Federal land administered by a Federal agency will be delineated. No leased land will be shown. Minimum size for delineation will be 16 ha (40 acres). This minimum size will also apply to private holdings completely surrounded by Federal holdings. As in the specifications for Land Use and Land Cover Maps, there must be a minimum width of 400 meters (1320 feet) before the 16-ha area is to be delineated. The administrative (proclamation) boundaries shown on the map bases will be used only if all the land encompassed by the boundary is Federally owned. In the case of National Forest land, the most recent Forest Service map should be used to determine which land is private and which is Federal.

DEPARTMENT OF AGRICULTURE

11 Agricultural Research Service
12 Forest Service (National Forest)
13 Forest Service (National Grassland)

DEPARTMENT OF COMMERCE

21 National Oceanic and Atmospheric Administration

DEPARTMENT OF DEFENSE

31 Air Force
32 Army
33 Army (Corps of Engineers-Civil Works)
34 Navy

DEPARTMENT OF THE INTERIOR

41 Bonneville Power Administration
42 Bureau of Indian Affairs (does not include Indian lands held in trust)
43 Bureau of Land Management
44 Bureau of Mines
45 Bureau of Reclamation
46 Fish and Wildlife Service (National Wildlife Refuge)
47 National Park Service (National Monument, Seashore and Recreation Area)
48 National Park Service (National Park)

DEPARTMENT OF JUSTICE

51 Bureau of Prisons

DEPARTMENT OF STATE

61 International Boundary and Water Commission, U.S. and Mexico

DEPARTMENT OF TRANSPORTATION

71 Federal Aviation Administration
72 Federal Railroad Administration
73 U.S. Coast Guard

OTHER AGENCIES

81 Energy Research and Development Administration
82 General Services Administration
83 National Aeronautics and Space Administration
84 Tennessee Valley Authority
85 Veterans' Administration

Compiled from latest available materials furnished by the individual agencies listed in the explanation.

Those lands actually owned by principal Federal land-owning and managing agencies and which meet minimum mapping unit size of 16 hectares (40 acres) are shown.

Figure 9.--Explanation for Federal Land Ownership Map

3.--Compilation

The delineation of Federally owned land should be carefully examined in relation to two other maps--Land Use and Land Cover and State Land Ownership Maps--if the latter is being compiled. The compilation scale of this map will be the release scale. Techniques used to delineate the various Federally owned lands on the base manuscript will be the responsibility of the compiling Mapping Center. The manuscript scribe-coat sheet will be 30" x 42" at 1:250,000 scale or appropriate size at 1:100,000 scale as shown in Section A, figure 2, and will be punch-registered. The full neatline and intermediate geographic reference ticks are to be provided as shown in figures 13 and 14. There are many Federal land ownership types which also appear as delineations on the Land Use and Land Cover Map as categories of land use and land cover. The lines of delineation of the boundaries must be carefully examined for coincidence between these two maps when the Federal Land Ownership Map is compiled as part of the original Map Set. There is, at times, land that is Federally owned and leased to a state agency. If a State Land Ownership Map is being prepared, then the State and Federal Ownership Maps must be examined carefully to insure correct ownership designation.

Code numbers shall be in agreement with the standard Federal Land Ownership explanation. Code numbers should be placed for easy viewing. Large or meandering areas shall have a minimum of two codes and additional numbers as required for convenient visual interpretation of the map.

4.--Line Weights and Type Styles

To obtain uniformity for compilation, the following line weights are to be used for the production of 1:250,000 or 1:100,000 scale Map Sets:

1. Federal Land Ownership ---------- 0.004"

2. Neatline and Intermediate Geographic Reference Ticks (full neatline required on all overlays) ---------- 0.003"

The code numbers for this map should be prepared using stick-up type. These will be Univers 45, 10-point type. The required code numbers will be those as listed on the standard explanation (figure 9). There should be enough code numbers in the larger polygons to insure ease of identification. They should be centrally located in simple polygons, and as many as needed should be used for clarity in polygons with complicated configurations. Polygons too small to hold a number should have the number placed close to the polygon with a leader line pointing to, but ending no closer than 0.015" to the polygon boundary. Information on placement of code numbers is in Section A.

All final compilation manuscripts will be scribed. This scribing will include the internal area delineations, the full neatline, and intermediate geographic tick marks.

Before the map is edited, it must be joined to surrounding sheets in compilation. For guidelines for this join, see Section A. It will be the responsibility of the Topographic Division Mapping Centers to insure that all joins have been made before editing the map. Editing practices are given in Section G.

At the completion of the Federal Land Ownership Map, the scribed manuscript and final code number overlay, along with the source material utilized, should be forwarded to the Geography Program liaison person for quality control.

Section F

STATE LAND OWNERSHIP MAP

1.--General Explanation

This map provides an inventory of state-owned land that can be used with other parts of the Map Set, as required, for visual interpretation and statistical data development. This map option will be available only for those states with which the Geography Program has a cooperative agreement.

2.--Source Material

Source materials required for the compilation of the State Land Ownership Map are:

1. Topographic base map

2. Data for this map compilation, to be furnished directly by the state, must be in map format and at a scale compatible to the compilation. Explanations will be designed for each state, depending upon the referencing system used by the state.

3.--Compilation

All material will be compiled on the same base map as the other parts of the Map Set and at release scale. The manuscript will be prepared on scribecoat 30" x 42" at 1:250,000 scale, or appropriate size at 1:100,000 scale as shown in Section A, figure 2, and will be punch-registered. The full neatline and intermediate geographic reference ticks are to be provided as shown in figures 13 and 14. Code numbers will be established at the time the source material is received from the state and will be shown within each polygon.

4.--Line Weights and Type Styles

To obtain uniformity for compilation of the Map Set, the following line weights are to exist at publication scale of the map, either 1:250,000 or 1:100,000:

1. State land areas ---------- 0.004"

2. Neatline and Intermediate Geographic Reference Ticks (full neatline required on all overlays) --- 0.003"

State-ownership coding will be prepared using stick-up type. This will be Univers 45, 10-point type. The explanation for the State Land Ownership Map will be type set with Souvenir Medium, 9-point type.

There should be sufficient codes in the larger polygons to insure ease of identification. They should be centrally located in simple polygons, and as many as needed should be used for clarity in polygons with complicated configurations. Polygons too small to hold a number should have the number placed close to the polygon, with a leader line pointing to, but no closer than 0.015" to the polygon boundary.

All final compilation manuscripts will be scribed. This will include the internal area delineations, the full neatline, and intermediate geographic reference ticks. Before the map is edited, it must be joined to the surrounding sheets. For guidelines for this join, see Section A. It will be the responsibility of the Topographic Division Mapping Center to insure that all joins have been made before editing the map. Editing practices are given in Section G.

At the completion of the State Land Ownership Map, the edit of the scribed manuscript and final code number overlay should be forwarded, along with the source material utilized, to Geography Program liaison person for quality control.

Section G

EDITING AND QUALITY CONTROL

1.-- General Explanation

The responsibility for editing all maps rests with the Topographic Division. Final quality control is the responsibility of the Geography Program.

The following editing procedures have been used by the Geography Program in the past and will prove useful to the editors.

2.--Compilation Editing Procedures

The purpose of map editing is to prepare a final product that is free of discernible error, consistent in presentation, and clear to the map user. The editor should have an extensive knowledge of photointerpretation and standard mapping practices, combined with a broad knowledge of cartography.

The editing procedure will provide a critical review of the compiled maps for general conformance to established map policies and standards. The editor will inspect each map for errors, omissions, clarity, legibility, compliance with specification requirements, and accuracy of content and format. Each map must be reviewed to insure that the edges have been properly joined to each adjacent map and that explanations are complete.

If any corrections are necessary, the maps are to be returned to the compiler, corrected, and then returned to the editor for additional review. If an orderly sequence of editing operations is followed, many omissions and errors will be prevented.

The editing phase will begin with the collection of all the land use and land cover maps, the base maps, and the source materials utilized to complete the compilation phase. It will consist of editing each map of the Map Set, i.e., Land Use and Land Cover, Hydrologic Units, Political Units, etc. Once this part of the editing has been completed, a composite edit will be performed to insure agreement among all maps in the Map Set. In the editing phase, all Land Use and Land Cover Maps will be corrected and prepared for quality control, final reproduction, and for digitizing. The Topographic Division Mapping Centers will be responsible for editing the Map Sets. All copies of maps and data, or sections thereof, submitted for quality control should contain the following: a) date of source materials (year); b) join information (sheet name, month/year); c) joins required (month/year); and d) credit legend (along each sheet edge) - "Edited by" (name/month/year).

Land Use and Land Cover Map

The Land Use and Land Cover Map will consume much of the time required in the editing phase. The editing of this map is accomplished in a sequence of tasks.

The first task will be to collect source materials that were utilized in the compilation phase. Usually, the source materials are aerial photographs, 7.5-minute quadrangles, definitions from Professional Paper 964 (Anderson and others, 1976), and any other source materials used in the compilation phase. The information on the Land Use and Land Cover Map will be checked against the original compilation source materials. To accomplish this check, the Land Use and Land Cover Map is now overlaid with a sheet of mylar film. The mylar film is punched on the top border and is then registered to the Land Use and Land Cover Map with registration pins. Next, each corner and selected internal areas of the mylar film are marked with geographic reference ticks. The geographic ticks must be on the mylar sheet to register the border frame. Another method is to produce a paper diazo of the Land Use and Land Cover Map and use this rather than the mylar overlay.

The editing of the Land Use and Land Cover Map will be accomplished in two steps. The first step will be to check for mechanical and drafting errors. The second step will be to review the interpretation for correct identification of the land use and land cover. All notes or corrections on this map will be made along the border of the overlay.

A 4- x 4-inch template can be used to focus the editor's attention on one small area of the map. The procedure for using the template is as follows: The editor should mark each polygon within the area of the template with a check mark placed on the editing overlay or diazo. The purpose of marking each polygon is to insure that no polygons are missed. With the template, begin in the corner of the map and, as each 4- x 4-inch square is checked, move the template in one of the cardinal directions. This procedure is then repeated until the entire map has been reviewed. Again, check each 4- by 4-inch square for the following mechanical or drafting errors: (1) land use and land cover polygons without numbers; (2) lines not connected; (3) numbers not legible; (4) areas not meeting minimum size requirements; (5) any other obvious discrepancy. Each recognized discrepancy will have a leader line drawn from that location to the border of the mylar overlay or diazo where a note will explain the error.

Once the editor has checked the map for drafting errors, he must review the accuracy of the interpretation. Obviously the editor must be a competent photointerpreter. The following items are needed for editing the Land Use and Land Cover Map: referencing photos, viewing photography, other Land Use and Land Cover Maps, viewer, definitions from Professional Paper 964 (Anderson and others, 1976), and a set of specifications for

compilation. The editor sets up the photographic source material on the manuscript of the Land Use and Land Cover Map in the same manner as previously described in the compilation phase.

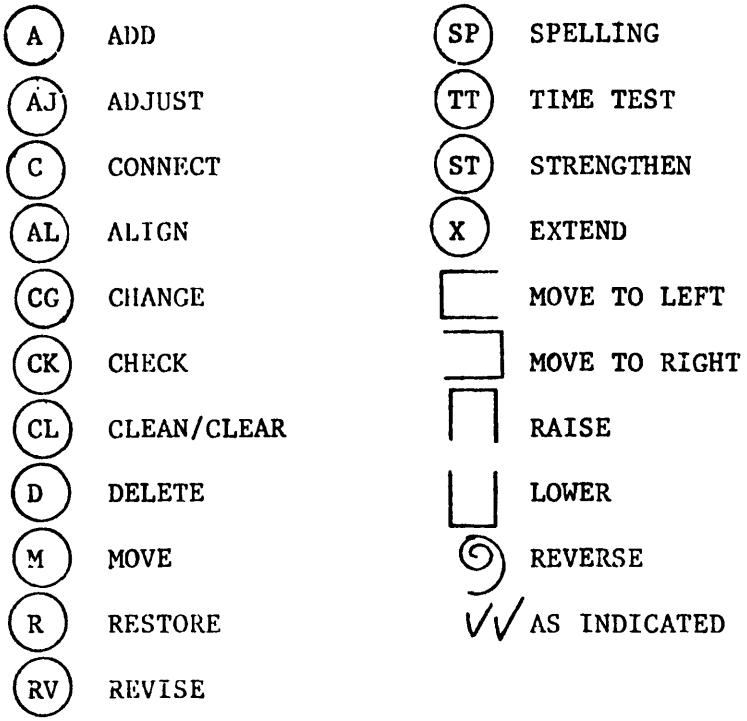
Editing the land use and land cover polygons with the photographic source material is accomplished in the following manner: The Land Use and Land Cover Map and mylar overlay or paper diazo are positioned over the referencing film and brought into coincidence with like features. The viewing film is placed in the viewer so that the accuracy of the land use interpretation can be checked visually. The editor must be able to combine his knowledge of photointerpretation with the classification system in Professional Paper 964 (Anderson and others, 1976). Using the 4-inch square template, the editor checks and marks selected polygons for corrections, using the editing correction codes on figure 10. Special care must be taken to review those problem areas indicated by the compiler. If interpretation and classification of the problem area still exists after editing, the problem must be so noted for further clarification during quality control or field check.

The editor has now reviewed the compilation and noted where drafting and interpretation errors occur on the map. If there are any adjoining maps, the borders must be reviewed to insure that every polygon extending from one map to the other has the same land use or land cover category. Usually, the joining requires polygon adjustment from map to map. Some of the adjustments are due to differences in delineation of the same category by different compilers. Another reason for adjustment from map to map may be differing category interpretations of the same area. When the editor has noted the corrections that must be made for a proper join, the Land Use and Land Cover Map is ready to be returned to the compiler for correction. The map is subsequently returned to an editor for a final composite edit. The Mapping Center editor has the responsibility of determining if the land use and land cover interpretation and drafting are accurate.

Geography Program personnel will make quality control checks on the Land Use and Land Cover Maps, covering a variety of conditions such as urban, vegetative areas or areas of environmental concern. Field checking is covered in Section H. If a need still exists for an extensive check on a map sheet because of poor quality source material or outdated source materials, the field check will be performed by utilizing some sampling procedure.

Upon completion of the individual edit review of the maps, a composite edit procedure will be covered.

Instructions



NOTES

1. Instructions shall be circled - Examples: (A) DIA (M) RR
2. Use quotation marks to indicate words, letters, and numbers affected by call - Examples: (SP) "PARIS" (CC) to "56"
3. On type calls specify the case number and whether caps or lower case, or both

Figure 10.--Editing correction codes

Political Unit Map

The base manuscript will be the primary source of political unit information. The latest 1:250,000- or 1:100,000-scale topographic map sheet will be used for orientation and verification of the Political Unit Map. Finally, the Bureau of the Census publication, Geographic Identification Code Scheme, will furnish the necessary identification information for the political units. The explanation will be in final format at this time.

The Political Unit Map will be annotated in the same manner as the Land Use and Land Cover Map. The editor can readily review this map by simply overlaying it on a stable-base transparency. The editor must check to see that all geographic ticks have been added to the Political Unit Map and that county boundary lines on the compilation map conform to the lines on the compilation base. Boundary lines should not differ from the blue line base unless updated source materials show a boundary change (see Section B). Finally, the editor must check each adjoining Political Unit Map sheet and make sure the boundaries, names, and numbers agree.

The Political Unit Map is then returned to the compiler for any needed corrections. The corrected Political Unit Map is returned to the editing unit for the composite edit.

Hydrologic Unit Map

To edit the Hydrologic Unit Map, the following source materials will be utilized: the compiled map, the 1:250,000- or 1:100,000-scale topographic map sheet for the work area, and published Water Resources Division map that outlines the hydrologic units and their identification numbers and names. The explanation should be completed at this time. The editor can begin his review of the Hydrologic Unit Map when the aforementioned items have been obtained from the Compilation Unit.

The editor will utilize the source materials to review the following items on the map:

1. Each map must have geographic ticks for reference.

2. The boundaries of the units should conform to ridge lines on the high points between units; if not, the boundary lines must be adjusted to conform to the ridge lines shown on the 1:250,000- or 1:100,000-scale bases. When this procedure causes extreme differences of character between the hydrologic lines shown on the state map and on our compilation, Water Resources Division will be contacted for clarification.

3. Each unit must have an identification number, and it should now be verified.

4. The editor must also match the Hydrologic Unit Map to that for any adjoining sheet; the sheet edges must match in number, boundary lines, and unit name.

Upon completion of the edit, the map is returned to the compiler for correction, then the map is returned to the editor for the composite edit.

Census County Subdivision Map

To edit the Census County Subdivision Map, the following source materials will be needed for reference:

1. The County Subdivision - Townships and Places maps
2. 1:250,000- or 1:100,000-scale topographic map sheet
3. Census tract books
4. The Political Unit Map

The Census County Subdivision Map is now ready for editing.

The editor will register the Census County Subdivision Map to the map base. The editor can now match the Census County Subdivision Map to the Political Unit Map. The county boundaries formed by the census county subdivisions must match the county boundaries on the Political Unit Map. Since the Political Unit Map forms the basis for internal delineation of the Census County Subdivision Map, the boundaries shown on the Political Unit Map will be used as shown in the quality controlled copy of the Political Unit Map (see Section B).

The editor must also check to see that the full neatline and all geographic ticks have been added to the Census County Subdivision Map. All county subdivision lines must be closed, and each census county subdivision must have an identification number. The editor must carefully check any adjoining Census County Subdivision sheet and make sure the boundaries, numbers, and names are in agreement.

When all the mentioned items have been checked by the editor, the Census County Subdivision Map is returned to the compiler for corrections. The corrected Census County Subdivision Map is returned to the editing unit for the composite edit.

Federal Land Ownership Map

The editing of the Federal Land Ownership Map will begin with the acquisition of the source materials utilized in the compilation phase:

1. blue line map at compilation scale;

2. the published 1:250,000- or 1:100,000-scale standard quad map;

3. the land ownership code list;

4. all sources used to delineate the ownership boundaries.

Editing of the Federal Land Ownership Map should include a check of the following items: Each land ownership polygon must be at least 40 acres in size and have an identification number; all polygon boundary lines must be closed; and land ownership lines cannot overlap. If there are adjoining Federal Land Ownership Maps, the borders must be joined. The land ownership polygons along the border must match up positionally and have the same identification number. Discrepancies are corrected by consulting the source material used to compile the Federal Land Ownership Map.

When the editor has completed his review of the Federal Land Ownership Map, it is returned to the compilation unit. The compilation unit corrects the discrepancies. The Federal Land Ownership Map is then returned to the editor for the composite edit.

State Land Ownership Map

This map editing will be conducted in the same manner as for the Federal Land Ownership Map, utilizing the source material furnished by the state, and the State Land Ownership explanation.

3.--Composite Editing

The composite editing commences once the complete Map Set for a particular 1:250,000- or 1:100,000-scale topographic sheet has been compiled, edited, and corrected. The composite editing is the responsibility of the Topographic Division.

The procedure for the composite editing will differ from that followed in the editing of the individual sheets. Once the map in the Set has been edited and corrected and is in the composite editing phase, the editor will inspect each individual map for obvious errors, spelling, omissions, geographic ticks, closed lines, correct title, and cartographic format. The editor will then overlay each sheet in the Map Set and match up the geographic corner ticks. The geographic corner ticks must be registered in order to relate information from map to map.

The composite edit is principally concerned with the interrelationships of the various overlays of the Map Set. The product must be uniform and be in conformance with specifications. Table 2 shows some, but not all, of the types of correspondence which must be achieved during this editing. If, during this editing, there are areas which the editor indicates need additional research, the sheet will be completed except for the special areas and returned to the compiler for finishing.

When the composite editing is complete, and if no changes are necessary, the Map Set is ready for quality control, digitizing, and final reproduction.

4.--Deliverable Items for Quality Control

The following materials should be forwarded to Geography Program for the quality control check:

1. Base manuscript of the Land Use and Land Cover Map (paper diazo may also be submitted, if desired);

2. All source materials used during the compilation;

3. Maps other than the Land Use and Land Cover Map, i.e., Political Units, Hydrologic Units, etc., should be a manuscript with all detail shown exactly as it will appear on the final copy, plus all source materials used to compile the individual overlays.

5.--Quality Control

The quality control function will be performed by the Geography Program Compilation and Interpretation Branch liaison personnel assigned to the Topographic Division Regional Mapping Centers. The quality control function concerns itself with the following:

1. Uniformity of final Geography Program products regardless of compiling Mapping Center or method of compilation.

2. Determination of the interrelationship of unique regional anomalies of land use and land cover and the classification categories of Professional Paper 964 (Anderson and others, 1976).

3. Adherence to specifications for all Land Use and Land Cover and Associated Maps compiled for the Geography Program.

Table 2.--Composite editing overlay registration checklist

	LAND USE AND LAND COVER	HYDROLOGIC UNITS	FEDERAL LAND OWNERSHIP	POLITICAL UNITS	CENSUS COUNTY SUBDIVISIONS
LAND USE AND LAND COVER	Check joins with surrounding map compilations.	Map sheets along coastlines must comply with compilation specifications.	Those boundaries for ownership should encompass Category 12. Where delineated boundaries are same, lines must coincide.	Map sheets along coast boundaries must be in compliance with compilation specifications.	Map sheets along coastlines must be in compilance with compilation specifications.
HYDROLOGIC UNITS	No set pattern. Check unit boundaries to insure lines only cross large rivers. Close units along shore lines.		No set pattern.	Be sure all areas of other than inland water have been properly coded.	No set pattern.
FEDERAL LAND OWNERSHIP	Check Category 12 Occurrence within Federal land ownership boundaries.	No set pattern.		Many times county and state lines are used for Federal land ownership.	No set pattern.
POLITICAL UNITS	For map sheets along coastline, check compilation for specification compliance.	No set pattern.	Many times county and state lines are used for Federal land ownership.		All common lines must coincide: county-state CCS-county SMSA-county CCS-state SMSA-state
CENSUS COUNTY SUBDIVISIONS	No set pattern.	No set pattern.	No set pattern, except where political units form boundaries.	All common lines must coincide: county-state CCS-county SMSA-county CCS-state SMSA-state	

Section H

FIELD CHECK INSTRUCTIONS

1.--General Explanation

The purpose of field checking is to help insure that the interpretation quality of the Land Use and Land Cover Maps is the highest that can be achieved within our time and budget limitations. These limitations preclude the applications to each map of many of the sophisticated approaches such as random sampling techniques, etc. During the field check phase, the specific sites listed as problem areas by the photo-interpreter during the compilation and editing phases will be resolved. In addition, polygons along air traverses between problem points will be checked. The field crew is encouraged to take 35mm photographs, to add to those secured by the Compilation and Interpretation Branch of the Geography Program in its precompilation reconnaissance of the area. These photographs will greatly aid in the final editing, as well as in the interpretation of other sheets being compiled in the region. Selected 35mm frames obtained during this phase will become part of a photointerpretation reference file for use by all regional centers.

2.--Implementation Procedures

After the compilation and initial editing are completed, the Mapping Center will provide a paper diazo copy of the edited Land Use and Land Cover Map to the Geography Program Compilation and Interpretation Branch Office in the center responsible for compilation. This diazo will be at a scale suitable for field check activities. If compilation has been accomplished at 1:250,000 scale, an enlargement must be made to approximately 1:125,000 scale. The copy must show the base map as a visible beckground, but in tones light enough to permit the land use and land cover polygons to be easily discernible from the background material. Otherwise, small polygons in urban areas may be obscured by underlying roads and other cultural features.

The problem areas listed by the compiler should be clearly marked as field-check points on this diazo copy. This is very important, for without problem points there is no need for conducting a field check, unless it is a random check for accuracy. This annotation should show the interpreter's call as well as possible alternative calls. The diazo base with the field-check points should be coded with their corresponding numbers as recorded on the compiler's problem sheets (figure 3) and, along with the problem sheets themselves, forwarded to the Geography Program Compilation and Interpretation Branch liaison office for review at the same time the diazo copy of the Land Use and Land Cover Map is sent for traverse delineation before the field check.

The Geography Program will select a route for the air traverse and will mark this route on the Land Use and Land Cover Map. The selection of the traverse will be based on the locations of the problem points needing field checking, the complexity of the map, the degree of spatial variation in land use and land cover, and such additional factors as areas of particular intrest or concern. The map showing the traverses and problem sheets are then returned to the Mapping Center to be forwarded to the field checking crew.

Before beginning its air traverse, the field crew should obtain, in addition to the Land Use and Land Cover Map and problem sheets, a published copy of the standard 1:250,000-scale topographic sheet and state and city roadmaps. The traverses shown on the diazo copy should be transferred to the published copy and to the roadmaps. Careful planning of the itinerary will result in more efficient and economical fieldwork.

A record must be kept of each 35mm photo taken and of each problem point visited during the field check. A sample copy of a field-check record sheet which has been used effectively in the Geography Program is shown in figure 11. The number of the field-check point is written in the row opposite SITE. The roll and frame number of each 35mm photo taken during the traverse is recorded on the sheet as well as on the ozalid copy of the Land Use and Land Cover Map. The location of the 35mm photo is indicated as precisely as possible on the map by drawing a short arrow to the point at which the picture was taken. The orientation of the arrow will show the direction the camera was pointed. All of the field-check and photo-opportunity points of unusual land use or those that may pose problems in interpretation should be listed consecutively on the sheets, even though each field-check point need not necessarily be photographed. Unphotographed sites that present special problems will also be listed.

While the plane is proceeding along the traverse between field-check points, each land use or land cover polygon which borders the traverse or which can be readily identified from the plane should be checked for accuracy. This check need only be a visual check of classification and of general size and shape. A small blue check in the polygon would indicate agreement with the interpretation shown on the Land Use and Land Cover Map. Where an interpretation error is indicated, the correct classification should be written in a contrasting color, such as red. The map should not be changed to reflect present conditions, i.e., polygons which have undergone changes since the date of the source material should not be recoded. If the field crew is not able to determine whether or not classification variation is the result of a change in land use since the date of the photographs used for classification, they should mark the polygon with the test-time code plus a label such as "CK" to flag the polygon for a check against the source photographs. Possible omissions will be handled in the same manner.

SITE								
MAP SHEET 1:250,000								
PRELIM. LAND USE								
CONFIRMED LAND USE								
FIELD PHOTO ROLL								
FIELD PHOTO EXP.								
FIELD PHOTO DIRECTION								
NOTES								

Figure 11.--Field check record sheet.

The field crew should annotate the map with any other appropriate observations or explanations; i.e., polygon boundary changes should be marked with a "D" for deletions or "RV" for revisions in accordance with figure 10. When weather or other conditions preclude the use of an air traverse or if problem points cannot be identified from the air, a ground traverse will be substituted. Ground traverses should be kept to a minimum.

In addition to being thoroughly familiar with specifications and definitions for land use and land cover mapping, the field crew must, at all times, keep in mind the problems inherent in adhering to minimum size restrictions and in making generalizations in outlining polygons. For example, is a field masked from the road by a buffer zone of trees? How large is the field? Do the other uses within a residential polygon actually cover less than 1/3 of the area? Is the ground observer aware that the evergreen trees that are seen mixed in the decidious woodland may be limited to the forest periphery and do not extend back away from the roadway or field edge? Because of cartographic generalizations or errors on the base map, land use or land cover polygons may be shown stradling a railroad or even on the opposite side of a linear feature from where the observer sees it in the field. If the field crew feels that a locational error has been made in the compilation of the Land Use and Land Cover Map, they should note this as a source check.

In cases where ground 35mm photographs are taken during the field check, the color prints must be properly coded with the roll and frame number. These numbers must correspond with those on the Land Use and Land Cover Map which show location of the photographs. The annotated Land Use and Land Cover Map, compiler's problem sheets, photographs, field-note sheets, and other written observations, if any, are then returned to the Mapping Center. This material will be used as a supplemental source during final editing, and when this operation is completed, all material will be forwarded to the Geography Program Compilation and Interpretation Branch liaison office in the Center where quality control is being conducted.

Section I

INSTRUCTIONS FOR CARTOGRAPHIC PREPARATION OF MATERIALS FOR OPEN FILING

1.--General Explanation

These instructions apply to the final preparation of map collar materials for reproduction of the 1:250,000- and 1:100,000-scale Land Use and Land Cover Map series. The format described in these instructions has been approved by the Director's Office for open-file products at 1:250,000 and 1:100,000 scale. The open filing of these products will be through the Topographic Division's Regional Mapping Centers. Each Mapping Center will be the repository for those 1:250,000- or 1:100,000-scale sheets which fall within each Center's specific geographic area of responsibility. In the case where a quadrangle lies across a boundary between two Centers, the map will be open filed in the Mapping Center which has responsibility for the major portion of the quadrangle.

The approved open-file format style is illustrated in Appendix C. The collar content is minimal, and standard data can be type set once and used for all maps in a set. This procedure will reduce the time required before final reproduction.

2.--Base Preparation

The compilation manuscript for all maps must be copied to 1:250,000- or 1:100,000-scale as a positive transparency with full neatline and intermediate geographic reference ticks. This process will normally be accomplished by the Mapping Centers during preparation for collaring. When all corrections and additions have been made, geographic referencing ticks are checked for legibility on the neatline base manuscript prior to final copy. The intermediate ticks will be 0.25" in length and will have the same line weight as the neatline. Neatline weights have been previously furnished under each set of map preparation specifications. The placement of the neatline on the sheet of film is shown in figures 13 and 14. The film size to be used for reproduction of the Land Use and Land Cover Map series will be 30" x 42" for the 1:250,000 scale and appropriate size for 1:100,000 scale.

When the bases have been prepared as described, the collar data can be affixed to the sheets as described in the following paragraphs.

3.--Land Use and Land Cover Map Collar

Once the base transparency has been produced with neatline, reference ticks, and internal data, the sheet is ready for final collaring. The geographic coordinates should be placed at the four corners of the sheet as shown in Appendix C-1. The size and style of type is shown in table 3. UTM grids will not be shown on this material. Four bar scales will be positioned as shown in Appendix C-1 at a scale of 1:250,000 or 1:100,000. The style of the bar scales for both the 1:250,000 and 1:100,000 scales is shown as figure 12.

The explanation for the Land Use and Land Cover Map is standard, with only a minimum of data to be added prior to reproduction. With the standard land use and land cover explanation properly attached to the base map transparency as shown in Appendix C-1, the type needed to complete the explanation should be added to make it complete and ready for the photo laboratory. Starting at the top of the explanation, type will be added as follows: The date of the photographic source material will be shown at the end of the title. For an example of photographic source materials for which more than 1 year is to be used, then the earliest and latest years of the photographs should be recorded, i.e., 1973-1975. The name of the sheet must be added directly beneath the title. The name will consist of both the title of the sheet and the state or states in which the sheet lies, i.e., Kansas City, Missouri; Kansas. The state names will be shown exactly as shown on the topographic map used as a base (spelled out where spelled out; abbreviated where abbreviated). The date of source material will be added in the lower body of the explanation and will correspond to the date added to the title at the top of the sheet. The note "Compilation verified by field check" will be retained only when the map has been field checked by USGS personnel. The name and number of the 1:250,000- or 1:100,000-scale sheet will be added. If a cooperative agreement statement is required, it will be placed in the lower body of the explanation. If no requirement for a cooperative agreement statement exists, the space will be closed by moving the remaining explanation up. The last item to be added to the explanation is the open-file number. The name of the base map sheet will be added to this map beneath the explanation and positioned as shown in Appendix C-1. The type will be Souvenir Medium, 9-point.

Appendix C-7 is an ozalid copy of all standard explanation information. This same attachment is being furnished to each Mapping Center as a positive transparency on stable-base material. The Mapping Centers will use these transparencies for making copies or as a guide to type order one set of data to be used repeatedly, thus eliminating the need for extensive type orders for each map.

The type styles and sizes required for all information to be added is listed in table 3. This completes the Land Use and Land Cover Map, and it can be forwarded to the photo laboratory for negative preparation.

Table 3.--Type data for completion of standard explanations for final reproduction

HYDROLOGIC UNITS, 1974 DAYTONA BEACH FLORIDA	Univers 63 Bold Extended Roman
Land use and land cover information compiled from source materials dated 1972.	Souvenir Medium
This map is keyed to U.S. Geological Survey 1:250 000-scale topographic map, *Daytona Beach* (NH 17-8).	Souvenir Medium Souvenir Medium Italic
Prepared in cooperation with the State of Florida, Department of Administration, Division of State Planning, Bureau of Comprehensive Planning.	Souvenir Medium
OPEN FILE 76-234-1 LAND USE SERIES	Souvenir Medium
Hydrologic unit boundaries and reference numbers compiled from *Hydrologic Unit Map, Edition 1974*, U.S. Department of the Interior, Geological Survey, Office of Water Data Coordination.	Souvenir Medium Italic
82°00'	Univers 55
43 Bureau of Land Management 1974 or None	Souvenir Medium

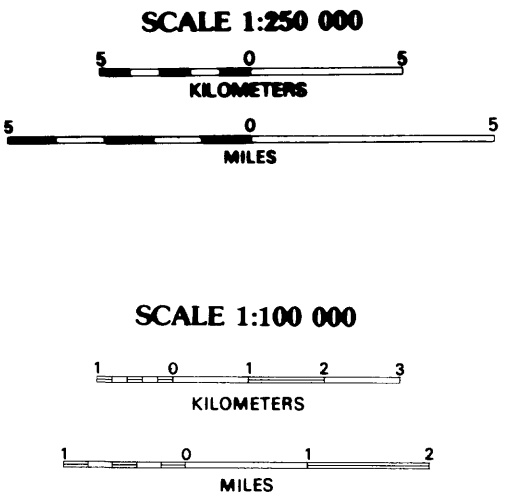


Figure 12.--Bar scales for 1:250,000-scale and 1:100,000-scale maps

4.--Federal Land Ownership Map Collar

The explanation for the Federal Land Ownership Map has been standardized in much the same manner as the Land Use and Land Cover Map. Appendix C-2 shows the explanation and its placement on the base. The same types of information must be added to the explanation as was added to the Land Use and Land Cover Map. First, the date or dates next to the title will be the inclusive dates of the information furnished. Normally, this will be a single date, since the material furnished will be updated to the time of acquisition by the administrative agencies. The type sizes and styles will be the same as those used for the Land Use and Land Cover Map, as shown in table 3. For those agencies shown in the explanation for which there are no polygons shown, the word "None" will be type ordered as Souvenir Medium, 9-point. The name and number of the 1:250,000- or 1:100,000-scale sheet will be added. If no requirement for a cooperative agreement statement exists, the space will be closed by moving the remaining explanation up. The next item which must be affixed is the open-file number. The name of the base map sheet will be added to this map beneath the explanation and positioned as shown in Appendix C-2. The type will be Souvenir Medium, 9-point. The map is now ready for negative preparation.

5.--Political Unit, Hydrologic Unit, and Census County Subdivision Map Collars

The explanation for these maps will consist of both a standard-type portion and a portion that will be prepared as Souvenir Medium, 9-point type. The addition of data to the standard portion of the explanation is the same for these sheets as for the Land Use and Land Cover and Federal Land Ownership Maps. The dates of the data will be added to the title line. The sheet name, just as on the Land Use and Land Cover Map, will be added below the title and date. The sheet name and number of the 1:250,000- and 1:100,000-scale sheet will be added, as well as the open-file number. The layout and instructions for ordering type for the data for bodies of these explanations are shown in tables 4-6. The information necessary for the combining of these three types of explanations is illustrated in Appendix C-3 through C-5. The name of the base map will be added to these maps beneath the explanation and positioned as shown in Appendix C-3 through C-5. The type will be Souvenir Medium, 9-point.

6.--State Land Ownership Map Collars

This collar will be prepared only when specified. The explanation for this map will be prepared as described in previous sections. The standard explanation, as furnished, will be used, and the type-set data will be added as is prescribed for the other overlays. The date in the title will be specified. The sheet name will be added below the title,

Table 4.--Ordering type for Political Unit Map explanation

FLORIDA (12)

Reference Number	County
12035	Flagler
12069	Lake
12083	Marion
12107	Putnam
12127	Volusia

Type requirements: 24-point line feed; all caps main heading; cap and lower case sub-headings and columns; center main headings;center columns under sub-headings; use Souvenir Medium 9-point type; columns spaced as shown on style sheet.

Table 5.--Ordering type for Hydrologic Unit Map explanation

Reference Number	Unit
03080101	Upper St. Johns, Florida
03080102	Oklawaha, Florida
03080103	Lower St. Johns, Florida
03080201	Daytona-St. Augustine, Florida

Type requirements: 24-point line feed; cap and lower case headings and columns; center columns under headings; use Souvenir Medium 9-point; use column spacing as shown on style sheet.

Table 6.--Ordering type for Census County Subdivision Map explanation

Reference Number	Census County Subdivision
FLAGLER COUNTY (035)	
12035010	East Flagler
12035015	West Flagler
LAKE COUNTY (069)	
12069050	Umatilla
MARION COUNTY (083)	
12083005	Belleview
12083015	East Marion
12083020	Fort McCoy-Anthony
PUTNAM COUNTY (107)	
12107005	Crescent City
12107010	East Palatka
12107020	Interlachen
VOLUSIA COUNTY (127)	
12127001	Central Volusia
12127006	Daytona Beach
12127010	De Land
12127016	De Land Rural
12127020	New Smyrna
12127025	North Peninsula
12127030	Orange City-Be Bary
12127035	Ormond Beach
12127040	Pierson-Seville
12127045	Port Orange
12127050	South Peninsula

The first two digits of the reference numbers refer to States; the next three digits to counties; and the last three digits to census county subdivisions.

STANDARD METROPOLITAN STATISTICAL AREAS (SMSA)

SMSA	Reference Number	County	Census Tract Number
Daytona Beach	2020	Volusia	1.00-67.00
		Kleckner	68.00-99.00
		Anderson	100.00-150.00
Gotham City	9999	Ward	1.00-49.00

Type requirements: 24-point line feed between headings, county names, and text; 12-point line feed columns and text; all caps main headings and county names; cap and lower case sub-headings, text, and columns; center main headings and county names; center columns under sub-headings; use Souvenir Medium 9-point type; use column spacing as shown on style sheet.

followed by the remaining explanation. The sheet name and number of the 1:250,000- or 1:100,000-scale sheet will be added. Generally, the cooperative agreement statement will be added, and then the open file number. The type set data will be as shown in table 7. The combination of the furnished and type set explanation is shown in Appendix C-6. The name of the base map will be added beneath the explanation and positioned as shown in Appendix C-6. The type will be Souvenir Medium, 9-point.

It should be noted that the numbering system and agency names will change from state to state. To insure the correctness of the explanation, the Geography Program liaison personnel should be contacted prior to typing.

7.--Partial Sheet Collaring

There are two conditions which will be covered under these instructions. There are those maps which are produced as a result of a state cooperative agreement for which data is only produced to the state line and which have large blank areas remaining on the sheet. The collaring instructions will be the same as for standard Land Use and Land Cover Maps with the exception that, beneath the title and before the body of the explanation, there will be inserted the area for which the sheet is complete. Figure 15 shows the placement of this information. The type style and size shall be Univers 63 Bold Extended Roman 14-point. This notation will appear on all maps of the Map Set.

Partial sheets also refers to those 1:250,000-scale sheets for which one or more quarters are mapped at 1:100,000 scale. The collaring instructions will be the same as for standard Land Use and Land Cover Maps, with the exception of the internal format. The area of the 1:250,000-scale sheet for which a 1:100,000-scale map has been published will be left blank and the following notation made in each quarter for which a 1:100,000-scale sheet has been open filed.

"For information on this area, see open-file map _____."

Where more than one quarter of the 1:250,000-scale sheet has been mapped at 1:100,000 scale, the internal boundaries will show on the final 1:250,000-scale sheet. The placement of boundaries and description data will be as shown in figure 16.

8.--Open-File Numbers

The open-file numbers for the Map Sets in production are to be requested by the Geography Program liaison person assigned to the Mapping Center preparing the open-file reproductions. The request should be made to the Chief, Compilation and Interpretation Branch at such time to insure the open-file number reflects the calendar year of open filing.

Table 7.--Ordering type for State Land Ownership Map explanation

Reference Number	Agency
001	State
434	Forestry
550	Department of Transportation
740	Department of Natural Resources
745	Recreation and Parks
750	Board of Trustees 0
752	Board of Trustees 2
753	Board of Trustees 3

Type requirements: 24-point line feed; cap and lower case headings and columns; center columns under headings; use Souvenir Medium 9-point; use column spacing as shown on Appendix C-6.

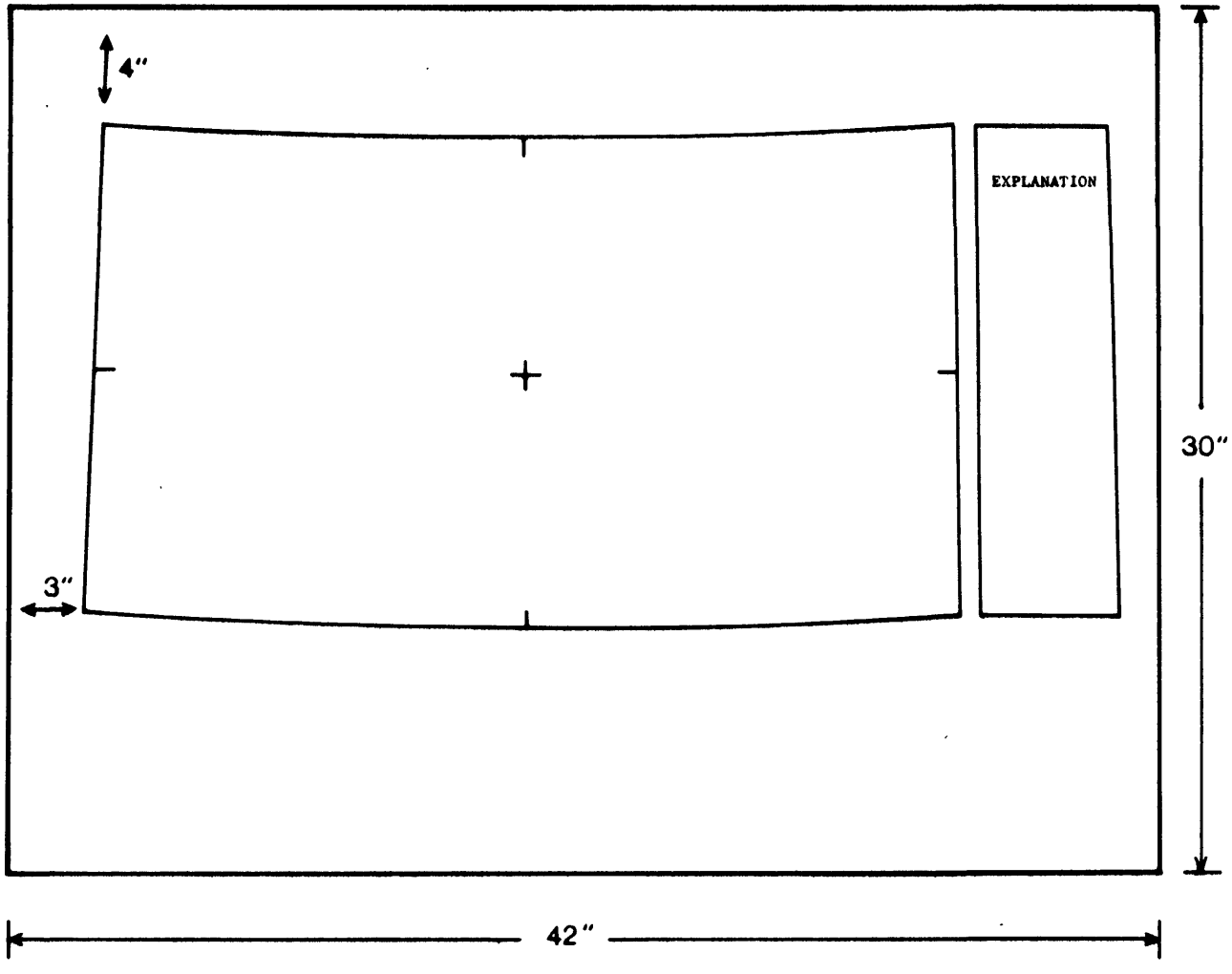


Figure 13.--Placement of neatline and internal data for 1:250,000-scale sheet collar preparation.

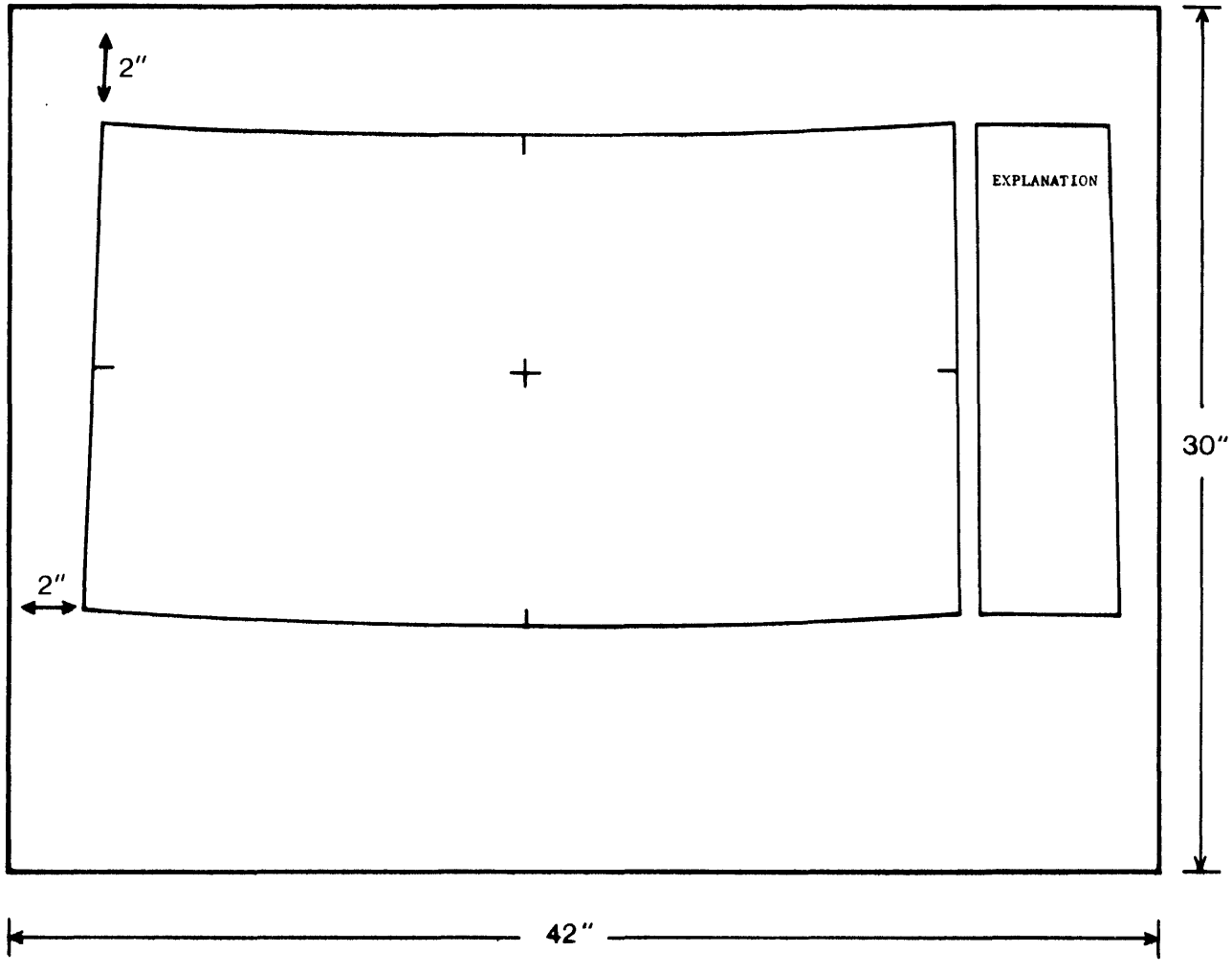


Figure 14.--Placement of neatline and internal data for 1:100,000-scale sheet collar preparation

CENSUS COUNTY SUBDIVISIONS, 1970
BLUEFIELD, W. VA.-VA.-KY.
(WEST VIRGINIA PORTION ONLY)

WEST VIRGINIA(54)
NON-METROPOLITAN COUNTIES

Reference Number	Census County Subdivision
BOONE COUNTY(005)	
54005005	Crook
54005020	Sherman
54005025	Washington
FAYETTE COUNTY(019)	
54019010	Fayetteville
54019015	Kanawha
54019030	Quinnimont
54019035	Sewell Mountain
GREENBRIER COUNTY(025)	
54025005	Anthony Creek
54025010	Blue Sulphur
54025015	Falling Springs
54025020	Fort Spring
54025025	Frankford
54025030	Irish Corner
54025035	Lewisburg
54025040	Meadow Bluff
54025045	White Sulphur
54025050	Williamsburg
LOGAN COUNTY(045)	
54045007	Guyan
54045009	Island Creek
54045010	Logan
54045015	Triadelphia
MC DOWELL COUNTY(047)	
54047005	Adkin
54047010	Big Creek
54047015	Browns Creek
54047020	Elkhorn
54047025	North Fork
54047030	Sandy River

Figure 15.--Partial sheet title placement

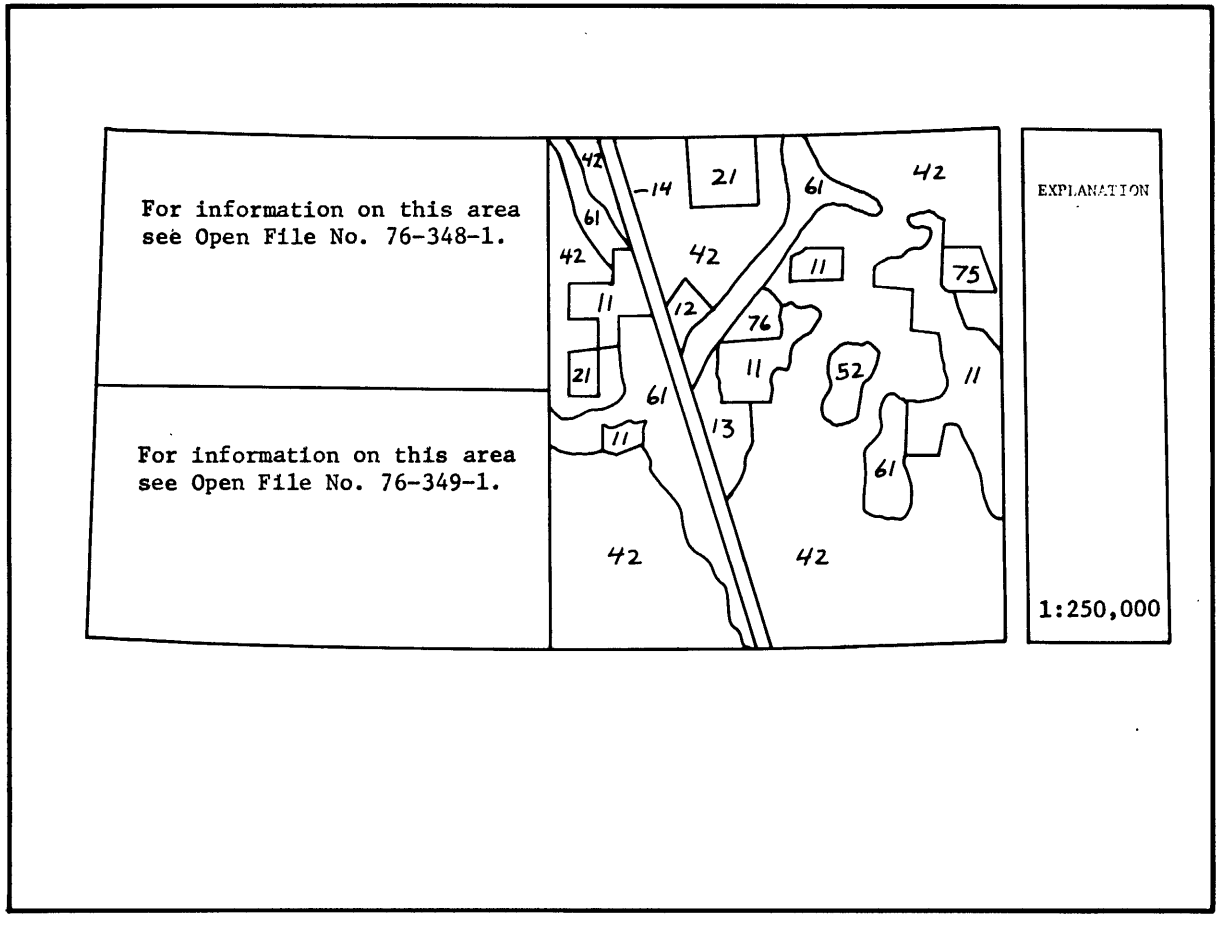


Figure 16.--Partial sheet open file format.

9.--Type for Explanations

Since a minimal amount of type is required for completion of the explanation, it is suggested that a type order be prepared as soon as possible after receipt of the source material, and be available for final reproduction at time of completion of compilation. The type styles and sizes for all required type are shown in table 3.

10.--Reproduction of Open-File Copies

Upon completion of type stick-up for all collared sheets, a quality control check is to be performed by the Geography Program liaison person. At the completion of this quality control check, a positive transparency will be produced. When the final quality control check has been accomplished on the material prior to final reproduction, the following procedures will be followed:

1. One positive transparency of the Map Set will be reproduced.

2. Forward this set to the Geography Program Compilation and Interpretation Branch for final quality control check.

3. The Geography Program Compilation and Interpretation Branch will perform a quality control check on the Map Set for open file.

4. If the sheet passes the final quality control check, a written notification will be given to the Mapping Center liaison person to proceed with open file procedures.

5. Upon receipt of the written notification from Geography Program Compilation and Interpretation Branch, the negatives of the maps will be forwarded to the photo laboratory for the number of copies as specified by the Geography Program liaison person.

6. Sheets prepared under a cooperative agreement require three copies; other sheets require two copies.

The following is a guide for reproduction of open-file positives:

1. Use stable-base material, 0.007" thickness.

2. Make reverse reading positive.

3. Use clear finish (open-file copy).

4. Punch-register data set.

To complete the open-file package to be sent to the Centers for distribution, a positive transparency of the 1:250,000- or 1:100,000-scale topographic base map must be included. This transparency will be prepared from the map used as a compilation base. Examples of open-file maps are shown in Appendix D-1 through D-5.

11.--Replacement of Data Sets Containing Partial Maps with Full Quadrangle

Several of the state cooperative agreements have been completed through the delivery of the graphical data sets. With these cooperative agreements, the only area to be mapped is the area of the state. This causes maps to be completed and put on open file with large blank areas within the format of the sheet. When these sheets are completed for all the area within the sheet format, it is necessary to replace the partial sheet on open file with the completed sheet. This presents problems, such as: What open-file number to use for the new sheet; does cooperative agreement still apply to the whole sheet; etc. The following steps should be taken when the completed sheet is placed on open file:

1. Land Use and Land Cover Maps:

   a) When these maps are completed, a new open-file number must be requested and the collars changed to replace the original number with a replacement open-file number.

   b) On the completed sheets, the cooperative note will apply only to that portion of the sheet completed under the cooperative agreement; i.e., "Florida portion of this map prepared in cooperation with the State of Florida, Department of Administration, Division of State Planning, ..."

   c) On the completed sheets, if the map was field checked only to the state boundary, the field check note must read: "Compilation verified by field check, Florida portion only." Use the same type style and size as "Note two."

2. Political Units, Hydrologic Units, and Census County Sub-Divisions Maps:

   a) When these maps are completed, the collars must be changed to show the deletion of the old open-file number and replacement by the new number.

   b) On all open-file copies of partial sheets, the state boundary is shown on all map overlays. When these open-file partial sheets are replaced with full sheets, the state boundary must be deleted on all maps.

   c) On completed sheets, the cooperative note will apply only to that portion of the sheet completed under the cooperative agreement (see #1.b., above).

3. Federal Land Ownership Map:

In many cases, the Federal Ownership Map does not lend itself to the above procedures because the Federal Land Ownership Map is researched and compiled only to the state line for the cooperative agreement, and source material is not available to extend the Federal Land Ownership Map beyond the state boundary. The following procedures must be followed for this map:

a) The original open-file number must be changed to show the new open-file number of the completed quadrangle.

b) A note must be added to the explanation explaining that the Federal Land Ownership is not compiled for the entire quadrangle; e.g., "Federal Land Ownership not completed for the Georgia portion of the map."

c) In cases where the Federal Land Ownership is compiled on a map that includes two state cooperatives and has different source material dates, the dates of the source material must be shown in "Note one" of the explanation; i.e., 1975, 1976 (see Appendix C-2). Use the same type style and size as "Note one." Also, the following notes must be added to the explanation--
"Date of Federal Land Ownership for Georgia, 1975."
"Date of Federal Land Ownership for Alabama, 1976."

Use the same type style and size as "Note two."

d) On completed sheets, the cooperative note will apply only to that portion of the sheet completed under the cooperative agreement.

4. State Land Ownership Map will not be supplied with the completed maps.

5. NCIC must be notified by memorandum that open-file number _____ is superseded by open-file number _____. This will be the responsibility of the Compilation and Interpretation Branch Office.

References

1. Anderson, J. R., Hardy, E. E., Roach, J. T., and Witmer, R. E., 1976, A land use and land cover classification system for use with remote sensor data: U.S. Geol. Survey Prof. Paper 964, 28 p., refs.

2. Official airline guide -- North American Edition: Reuben H. Donnelley Corp., Oak Brook, Ill. [monthly].

3. Proudfoot, M. J., 1940, Measurement of geographic area: U.S. Dept. of Commerce, Bureau of the Census, p. 37-51, figs.

4. U.S. Bureau of the Census, 1970a, Areas of the United States: U.S. Dept. of Commerce, Bureau of the Census, Area Measurement Rept. Nos. 1-52.

5. _____, 1970b, Census tracts--1970 census of population and housing: U.S. Dept. of Commerce, Bureau of the Census Final Rept. Nos. PHC(1)-1-241.

6. U.S. Bureau of the Census, 1972a, County and city data book: U.S. Dept. of Commerce, Bureau of the Census, 1020 p.

7. _____, 1972b, Geographic identification code scheme: U.S. Dept. of Commerce, Bureau of the Census Final Rept. Nos. PHC(R)-1-4.

APPENDIX A

Professional Paper 964

To be used with this document; can be purchased at the same time this document is purchased.

APPENDIX B

A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

GE-20, No. 1
May 1970

AREA MEASUREMENT REPORTS

U.S. DEPARTMENT OF COMMERCE / Bureau of the Census

AREAS OF THE UNITED STATES

INTRODUCTION

This report summarizes the Area Measurement Reports for the individual States that were prepared and published during 1964 through 1967

The separate State reports present measurements of surface area for States, counties, minor civil divisions or census county divisions, and incorporated and unincorporated places with 1,000 or more inhabitants in 1960. This report presents the summary data for States and counties, including the land, inland water, and total areas in square miles, as of April 1, 1960. In addition, 1960 population totals and population per square mile of land area are included. Table 1 presents the data for the United States and each State, and includes the rank of each State for each type of data. Table 2 presents the data for each State and each county or its equivalent.

The total area of each county (land plus water) is based on the area measurement work performed at the time of the 1940 census, with subsequent adjustments to reflect changes in county boundaries. Where possible, the 1940 work has been relied upon to reduce costs and to assure comparability of the data in these reports with the earlier publication, Areas of the United States: 1940.

SELECTION OF MAPS

The maps and boundaries used for the measurements given in this series of reports are those used for the 1960 censuses. Most maps of incorporated places were supplied by municipal officials, although other sources--State, county, Federal, and commercial--were used in instances where city officials did not supply maps that were suitable for census uses. Maps supplied by the Highway Departments of the States were used for most rural areas, although for unincorporated places and some other areas, maps were compiled by the Bureau of the Census from a broad variety of source materials.

LIMITS OF THE UNITED STATES

Before area measurement work could proceed, it was necessary to define the outer boundary of the areas to be included in the measurement processes. In general, the limits followed the shore line of the United States; however, specific rules were required to define the limits for measurement purposes where there were indentations in the coast or offshore islands. In the interests of economy and comparability, the specifications used in the 1940 measurement work were adopted without change. These specifications follow:

(1) Where the coast line is regular, it was followed directly unless there were offshore islands within 10 nautical miles;

(2) Where embayments occur having headlands of less than 10 and more than 1 nautical mile in width, straight lines connecting the headlands set the limits; however, the coast line was followed if the indentation of the embayment was so shallow that its water area was less than the area of a semicircle drawn using the said straight line as a diameter;

(3) In cases where there are two or more islands less than 10 and more than 1 nautical mile from shore, they were connected by a straight line or lines and other straight lines drawn to the shore from the nearest point on each island.

Problems pertaining to the treatment of inland water required solutions in harmony with those for coastal and Great Lakes water and for land. This was necessary since the outer limits of inland water are either conterminous with the inner limits of coastal or Great Lakes water, with outer limits of the United States, or with the limits of land. To meet these problems for inland water, the same rules were used. However, a limit of 1 rather than 10 nautical miles was substituted.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 or any of the field offices of the Department of Commerce. Price 25 cents.

DEFINITION OF LAND AND WATER AREA

The 1940 definitions of land and water areas were used. Stated briefly, ponds, lakes, or similar areas are counted as inland water if their areas are 40 acres or more; streams and canals must be 1/8-mile or more in width to be counted. All other areas were tabulated as land with the exception of "water other than inland water" as described below. Note especially that the definitions were based on maps, not on an inspection of the surface of the earth. Accordingly, features such as new reservoirs which were not shown in the maps used in the measurement work are reported as land rather than water. The classification "water other than inland water" established for the 1940 measurement work has been retained, and the water areas in this group have not been remeasured. The 1940 description and tabulation of these areas is reproduced in table IV below.

The methods of preparing area measurement data described above were not followed for Alaska, Hawaii, and North Carolina. In the case of Alaska, the recognition of a new set of primary statistical divisions within the State and the availability of more dependable larger-scale maps made a complete recalculation of the area of the State desirable. Similarly for Hawaii, the availability of better maps than those used in the 1940 work led to a complete remeasurement of the State. In the course of the measurement work for North Carolina, the 1940 county areas were found to have been incorrectly computed in a number of instances. The gross area of each county was therefore recalculated, and these new county totals were used as control totals in the same way that the 1940 county areas were used in other States.

ACCURACY OF DATA

Measurements of area can be no more accurate than the maps upon which they are based and the maps are certainly the weakest link in the processes used in preparing the measurements for this report.

Numerous discrepancies were discovered and corrected to the extent feasible, but other map errors were undetected. Examples of map discrepancies include the exaggeration of stream widths, apparently to provide space for the stream name; erroneous scales, especially on maps of cities; and failure to revise maps to reflect sizeable new reservoirs, including one that has existed since the late 1940's. Errors of these types came to light when adjoining maps failed to agree, where the sums of small areas deviated substantially from the expected county total, and where comparisons with earlier measurement work revealed substantial discrepancies.

The work involved in using the maps is believed to have been accurately performed. In the process of cutting the map sections, close adherence to boundary lines was required and all work was

TABLE IV.--Water Area, Other Than Inland Water, For States by Primary Bodies of Water: 1940

(Areas are in square miles)

State	Total water area other than inland water	Atlantic coastal water	Chesapeake Bay	Delaware Bay	Lake Erie	Straits of Georgia and Juan de Fuca	Lake Huron	Long Island Sound	Gulf of Mexico coastal water	Lake Michigan	New York Harbor	Lake Ontario	Pacific coastal water	Puget Sound	Lake St. Clair	Lake Superior
United States	74,364	2,298	3,237	665	5,002	1,610	8,975	1,299	3,837	22,178	92	3,033	343	561	116	21,118
Alabama	560	-	-	-	-	-	-	-	560	-	-	-	-	-	-	-
California	69	-	-	-	-	-	-	-	-	-	-	-	69	-	-	-
Connecticut	573	-	-	-	-	-	-	573	-	-	-	-	-	-	-	-
Delaware	350	-	-	350	-	-	-	-	-	-	-	-	-	-	-	-
Florida	1,735	37	-	-	-	-	-	-	1,698	-	-	-	-	-	-	-
Georgia	48	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Illinois	1,526	-	-	-	-	-	-	-	-	1,526	-	-	-	-	-	-
Indiana	228	-	-	-	-	-	-	-	-	228	-	-	-	-	-	-
Louisiana	1,016	-	-	-	-	-	-	-	1,016	-	-	-	-	-	-	-
Maine	1,102	1,102	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maryland	1,726	-	1,726	-	-	-	-	-	-	-	-	-	-	-	-	-
Massachusetts	959	959	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Michigan	38,575	-	-	-	216	-	8,975	-	-	13,037	-	-	-	-	116	16,231
Minnesota	2,212	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,212
Mississippi	556	-	-	-	-	-	-	-	556	-	-	-	-	-	-	-
New Jersey	384	-	-	315	-	-	-	-	-	-	69	-	-	-	-	-
New York	4,376	-	-	-	594	-	-	726	-	-	23	3,033	-	-	-	-
Ohio	3,457	-	-	-	3,457	-	-	-	-	-	-	-	-	-	-	-
Oregon	48	-	-	-	-	-	-	-	-	-	-	-	48	-	-	-
Pennsylvania	735	-	-	-	735	-	-	-	-	-	-	-	-	-	-	-
Rhode Island	14	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Carolina	138	138	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Texas	7	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-
Virginia	1,511	-	1,511	-	-	-	-	-	-	-	-	-	-	-	-	-
Washington	2,397	-	-	-	-	1,610	-	-	-	-	-	-	226	561	-	-
Wisconsin	10,062	-	-	-	-	-	-	-	-	7,387	-	-	-	-	-	2,675

verified. The Map Area Computer has been demonstrated to be accurate within a fraction of 1 percent for all but the smallest map sections. The recording of information and all computations were performed by machines so that the chance of transposition of numbers and similar errors have been virtually eliminated. Although the possibility of erroneous results for a sprinkling of areas through faulty processing cannot be ruled out, it is believed that such errors cannot be reduced without the expenditure of an amount of money that would be inordinately high in view of the benefits to be derived. In general, it is believed that an overwhelming proportion of all area figures come within 1 percent of accurately reflecting the information on the maps upon which they are based.

All area computations, except for county totals, have been carried to tenths of square miles. Density computations also have been uniformly carried to tenths of persons to ease computation processes, although it was recognized that the final digit or digits may not be significant for many areas.

COMPARISON WITH PRIOR AREA MEASUREMENTS

Users will note instances in which the area data in this report differ from information for the same areas in the 1960 Census of Population publications. Such apparent changes in area for the same geographic unit, at the same point in time, result from differences in method of measuring or from different maps used in measurement. The areas of places that are shown in the 1960 census publications were supplied by local officials in most instances, and were based, presumably, on a variety of measurement methods of varying degrees of dependability. On the other hand, the areas reported here were determined by a uniform method and are understandably different in many instances, but are believed on the whole to be more dependable.

DIFFERENCES BETWEEN THE U.S. SUMMARY AND THE STATE REPORT

There are numerous instances in which the areas in this report differ by one- or two-tenths of a square mile from the values in the individual State reports. These variations are due to the use of different rounding techniques at different times in the production of these reports. In a few instances the population density values have been changed by one-tenth as a result.

Corrections of greater magnitude are shown in the table on the following page. These corrections have been incorporated into the tables in this report, and are summarized below with the corresponding data from the respective State chapters.

U. S. DEPARTMENT OF COMMERCE
W. AVERELL HARRIMAN, *Secretary*
BUREAU OF THE CENSUS
J. C. CAPT, *Director*

SIXTEENTH CENSUS OF THE UNITED STATES : 1940

MEASUREMENT OF GEOGRAPHIC AREA

By
MALCOLM J. PROUDFOOT
Assistant Geographer
United States Bureau of the Census

Figure 8

THE OUTER LIMITS OF THE UNITED STATES AS ESTABLISHED FOR "THE AREAS OF THE UNITED STATES: 1940"

This multisectional strip map, consisting of Plates I to XIV, traces the outer limits of the United States. These limits were established by definition for the remeasurement of the "Areas of the United States: 1940," a special publication of the Sixteenth Decennial Census. The limits may be followed from match line to match line from the Canadian-Maine border to the Texas-Mexican border; from the Washington-Canadian border to the Mexican-California border; and then again along the Great Lakes boundary line between Canada and the several adjoining States. The cross-hatched area was defined as "state water" and credited to the several adjoining States (appendix H). The water area inland from the State water was defined as "inland water." Not only was the inland water credited to the adjoining States, but it was further subdivided among the adjoining counties and the minor civil divisions of the counties.

Thus by following a prescribed set of definitions for State and inland water, the limits established could be used again, or duplicated for a check of the results. The application of a uniform set of definitions, if they were accorded international acceptance, might result in desirable uniformity in the future measurement of geographic area.

Plate I

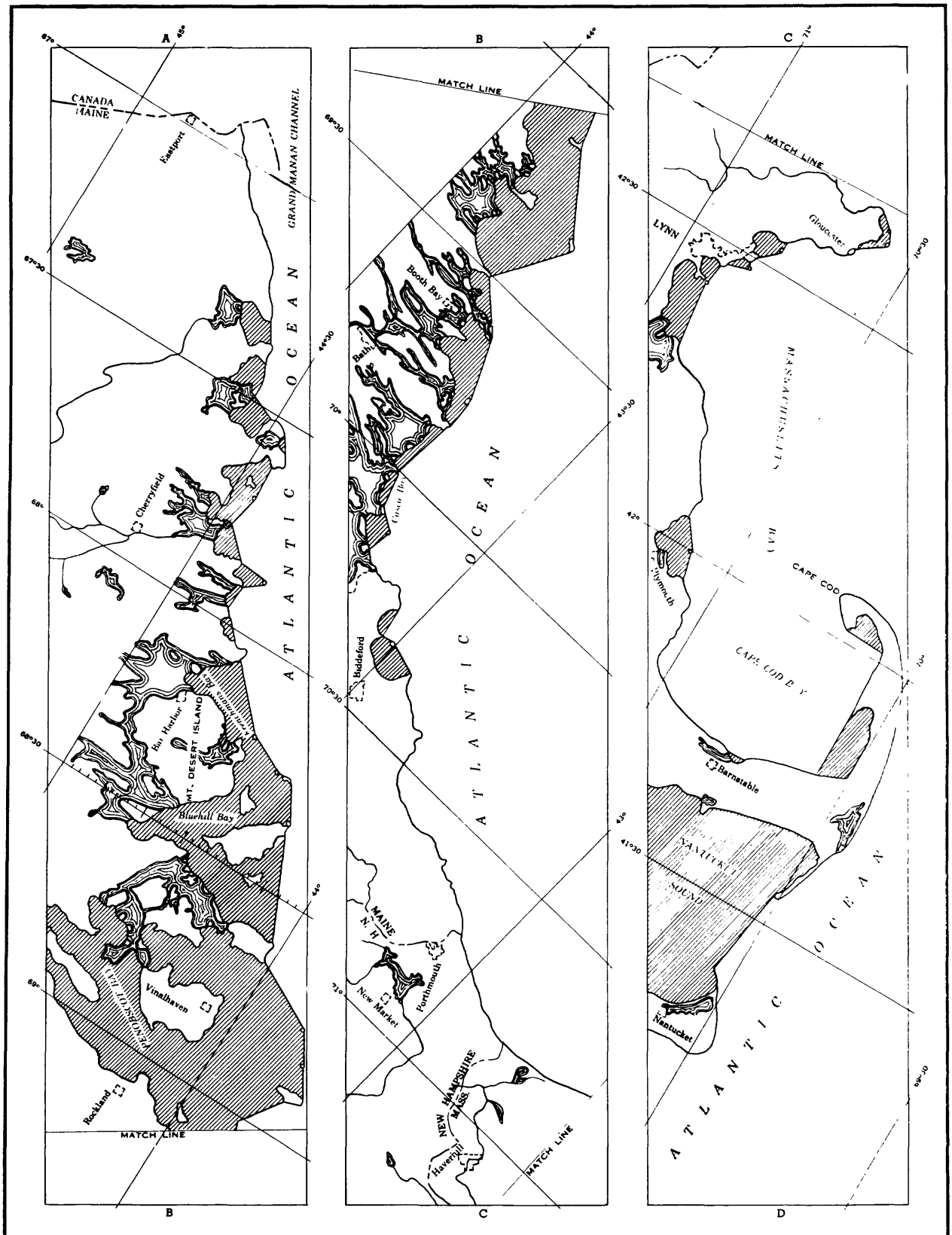

A
B
C
CANADA
MAINE
Eastport
GRAND MANAN CHANNEL
ATLANTIC OCEAN
Cherryfield
MT. DESERT ISLAND
Bar Harbor
Bluehill Bay
Vinalhaven
PENOBSCOT BAY
Rockland
MATCH LINE
MATCH LINE
Booth Bay
Bath
Biddeford
MAINE
N. H.
Portsmouth
New Market
NEW HAMPSHIRE
MASS.
Haverhill
MATCH LINE
MATCH LINE
LYNN
Gloucester
MASSACHUSETTS BAY
Plymouth
CAPE COD
CAPE COD BAY
Barnstable
NANTUCKET SOUND
Nantucket
B
C
D

Plate II

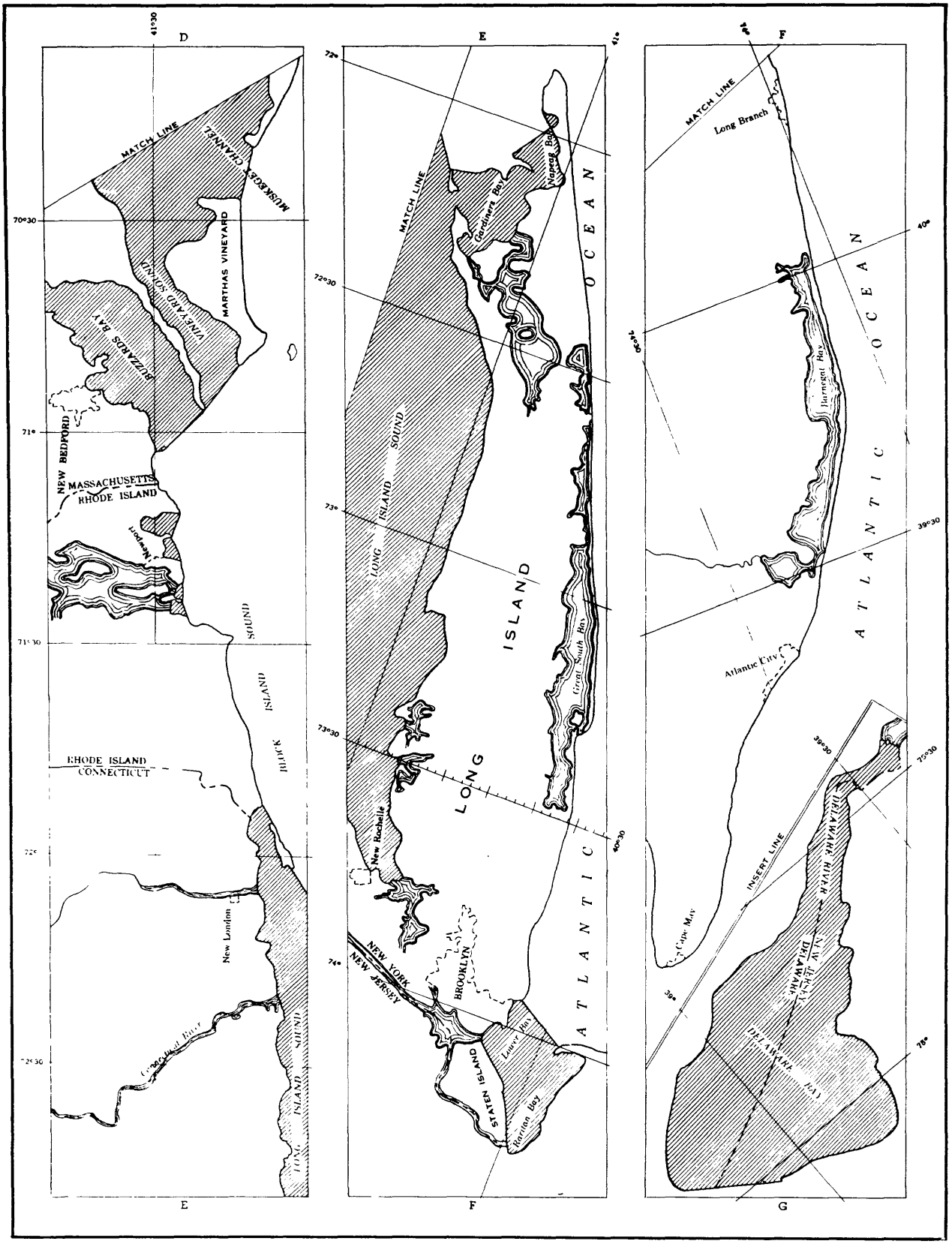

D
E
F
G
MATCH LINE
MUSKEGET CHANNEL
MARTHAS VINEYARD
VINEYARD SOUND
BUZZARDS BAY
NEW BEDFORD
MASSACHUSETTS
RHODE ISLAND
Newport
SOUND
ISLAND
BLOCK
RHODE ISLAND
CONNECTICUT
New London
Connecticut River
LONG ISLAND SOUND
Gardiners Bay
Napeag Bay
LONG ISLAND
Great South Bay
New Rochelle
NEW YORK
NEW JERSEY
BROOKLYN
STATEN ISLAND
Lower Bay
Raritan Bay
ATLANTIC OCEAN
Long Branch
Barnegat Bay
Atlantic City
INSERT LINE
Cape May
DELAWARE BAY
NEW JERSEY
DELAWARE
70°30
71°
71°30
72°
72°30
73°
73°30
74°
74°30
75°
75°30
76°
78°
39°
39°30
40°
40°30
41°

Plate III

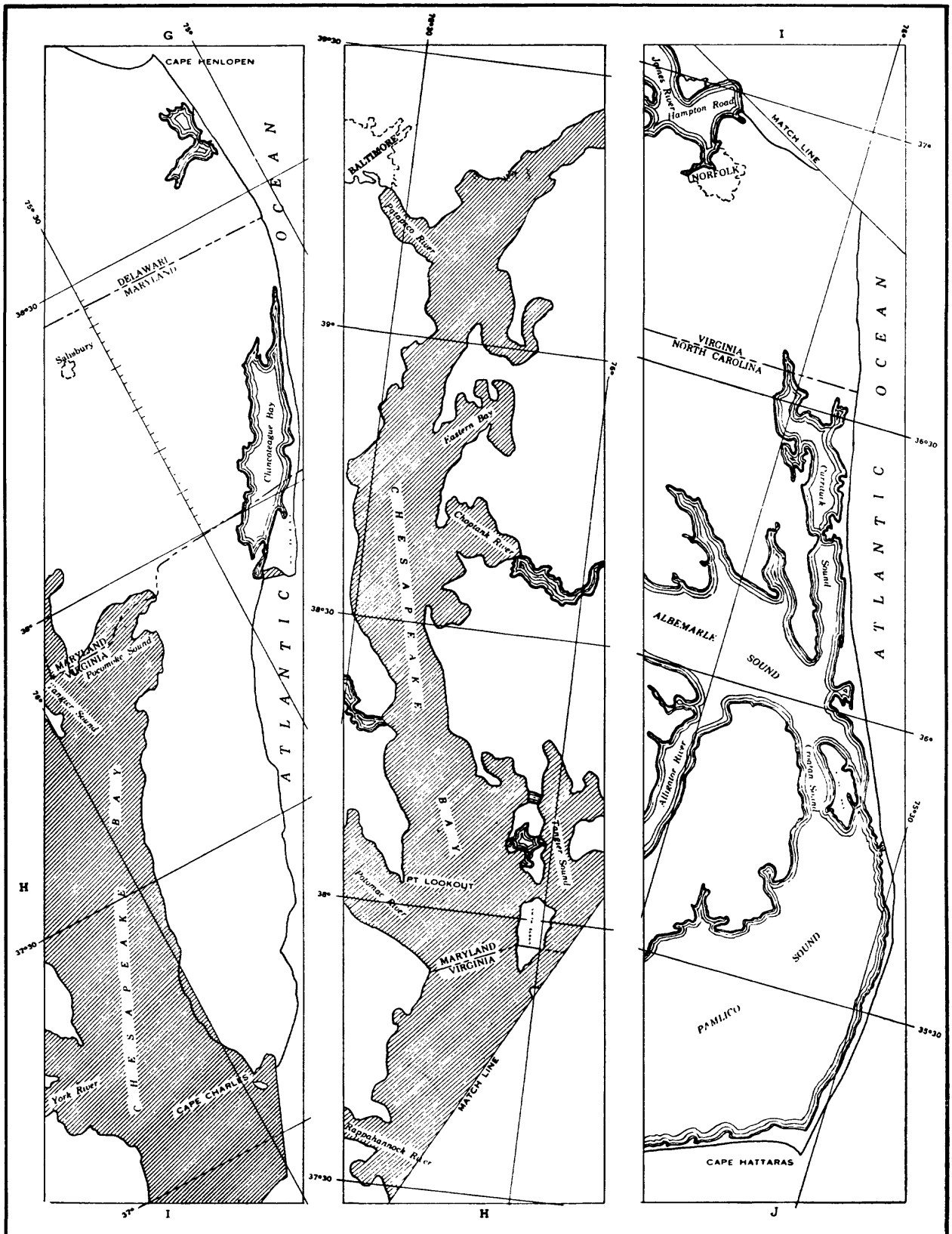

G
CAPE HENLOPEN
ATLANTIC OCEAN
DELAWARE
MARYLAND
Salisbury
Chincoteague Bay
MARYLAND
VIRGINIA
Pocomoke Sound
Tangier Sound
CHESAPEAKE BAY
York River
CAPE CHARLES
H
I
BALTIMORE
Patapsco River
Eastern Bay
Choptank River
PT LOOKOUT
Potomac River
MARYLAND
VIRGINIA
Tangier Sound
MATCH LINE
Rappahannock River
H
I
James River
Hampton Road
MATCH LINE
NORFOLK
VIRGINIA
NORTH CAROLINA
Currituck Sound
ALBEMARLE SOUND
Alligator River
Croatan Sound
PAMLICO SOUND
CAPE HATTERAS
ATLANTIC OCEAN
J

Plate IV

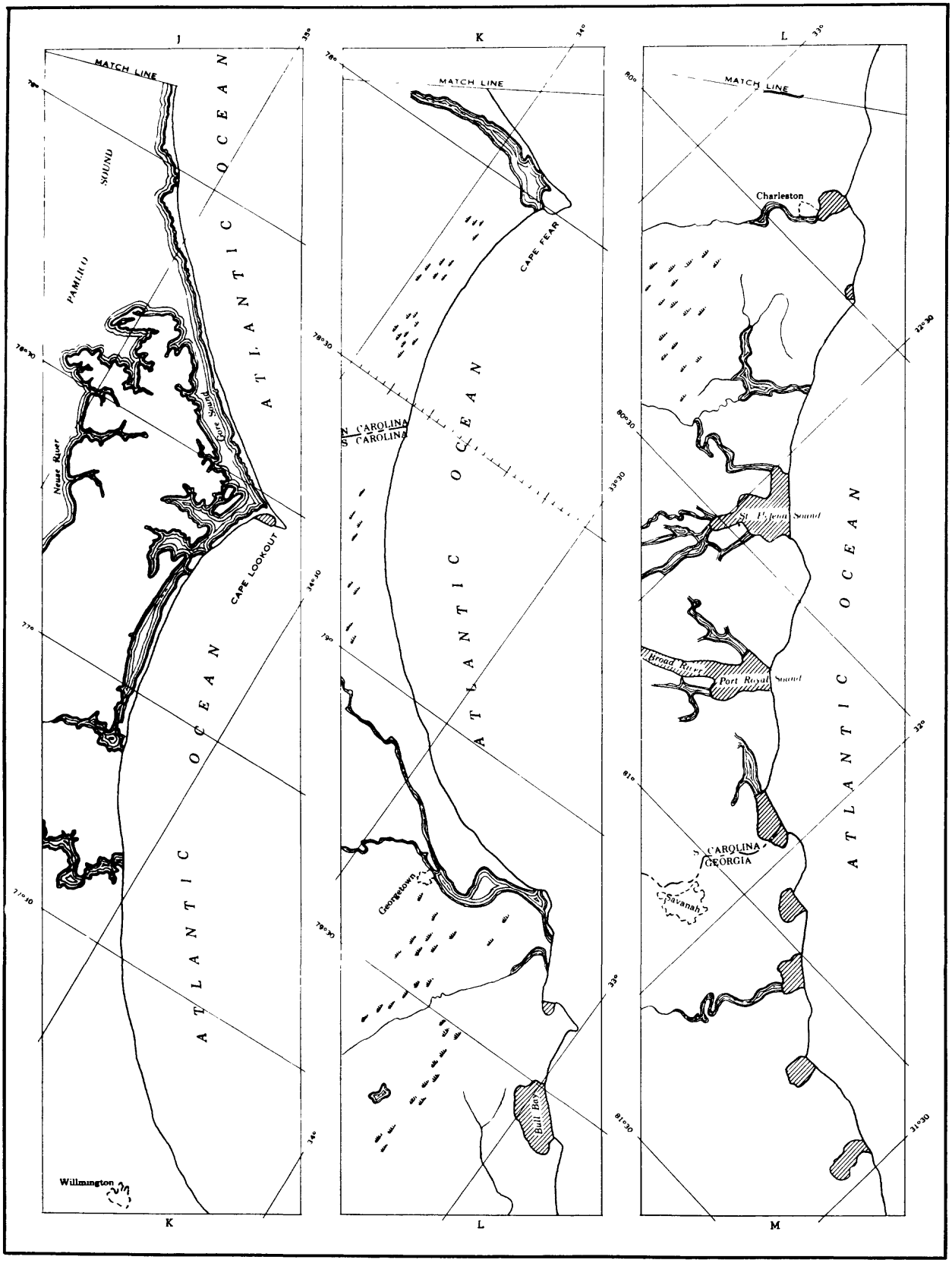

J
K
L
M
MATCH LINE
SOUND
PAMLICO
ATLANTIC OCEAN
Neuse River
CAPE LOOKOUT
Willmington
CAPE FEAR
N CAROLINA
S CAROLINA
Georgetown
Bull Bay
Charleston
St. Helena Sound
Broad River
Port Royal Sound
CAROLINA
GEORGIA
Savanah

Plate V

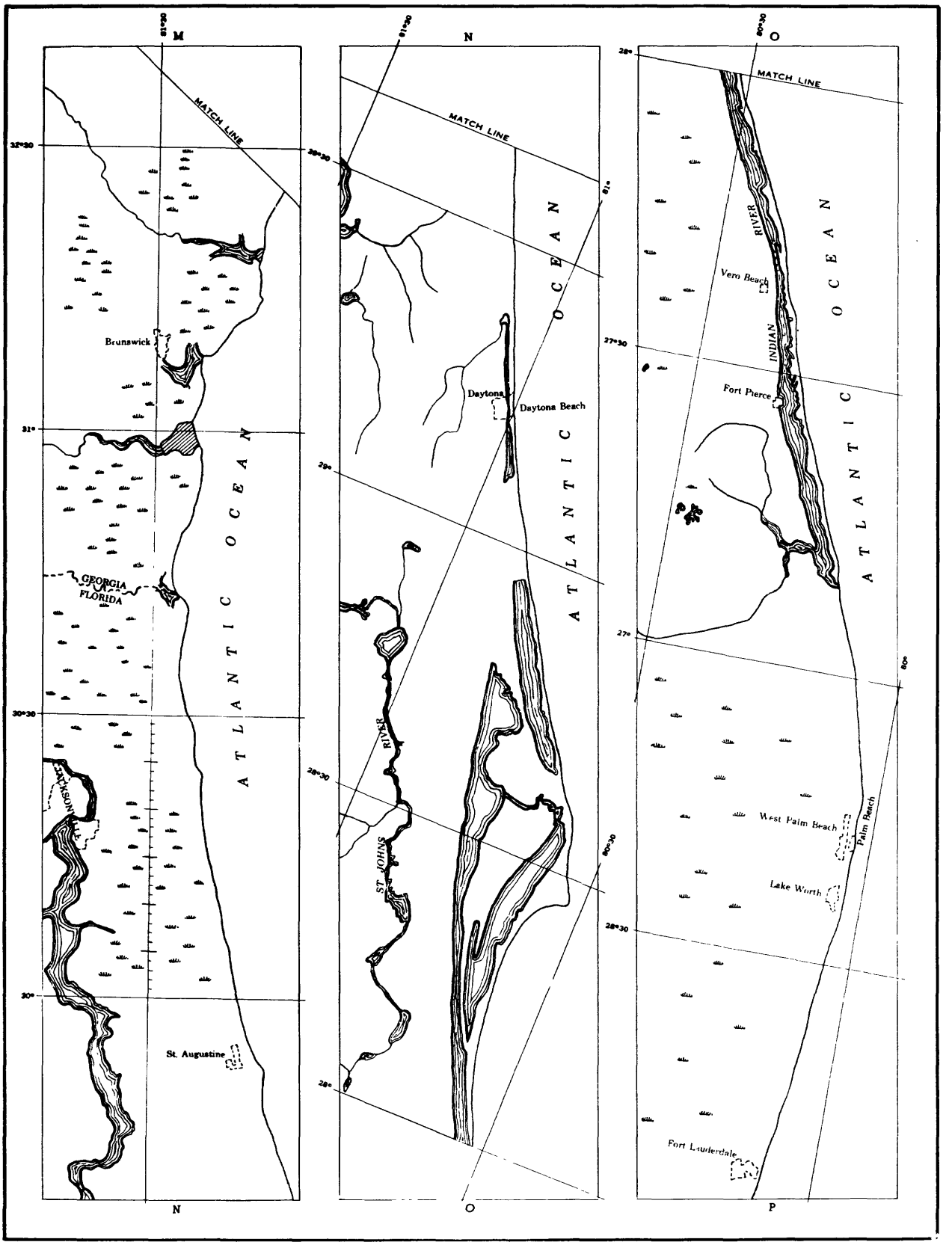

M
N
O
P
MATCH LINE
MATCH LINE
MATCH LINE
ATLANTIC OCEAN
ATLANTIC OCEAN
ATLANTIC OCEAN
Brunswick
GEORGIA
FLORIDA
JACKSONVILLE
St. Augustine
Daytona
Daytona Beach
RIVER
ST. JOHNS
Vero Beach
INDIAN
RIVER
Fort Pierce
West Palm Beach
Palm Beach
Lake Worth
Fort Lauderdale
31°30
31°
30°30
30°
29°
28°30
28°
27°30
27°
81°30
81°
80°30
80°
28°
N
O
P

Plate VI

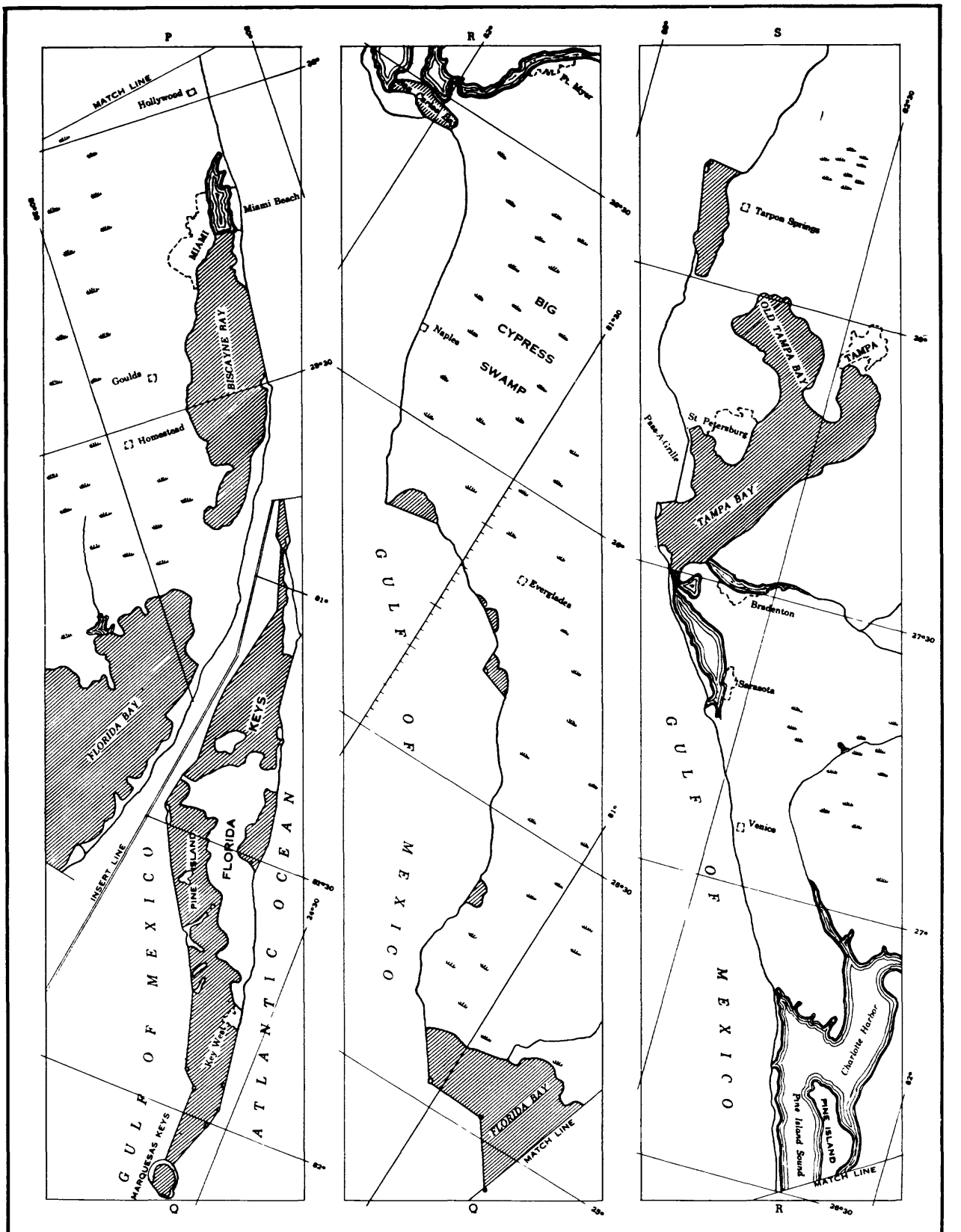

P
R
S
MATCH LINE
Hollywood
Miami Beach
MIAMI
BISCAYNE BAY
Goulds
Homestead
FLORIDA BAY
KEYS
INSERT LINE
PINE ISLAND
FLORIDA
GULF OF MEXICO
ATLANTIC OCEAN
Key West
MARQUESAS KEYS
Q
Ft. Myer
Naples
BIG CYPRESS SWAMP
Everglades
GULF OF MEXICO
FLORIDA BAY
MATCH LINE
Q
Tarpon Springs
OLD TAMPA BAY
TAMPA
St Petersburg
Pass-A-Grille
TAMPA BAY
Bradenton
Sarasota
GULF OF MEXICO
Venice
Charlotte Harbor
Pine Island Sound
PINE ISLAND
MATCH LINE
R
82°30
28°30
27°30
27°
26°30
26°

Plate VII

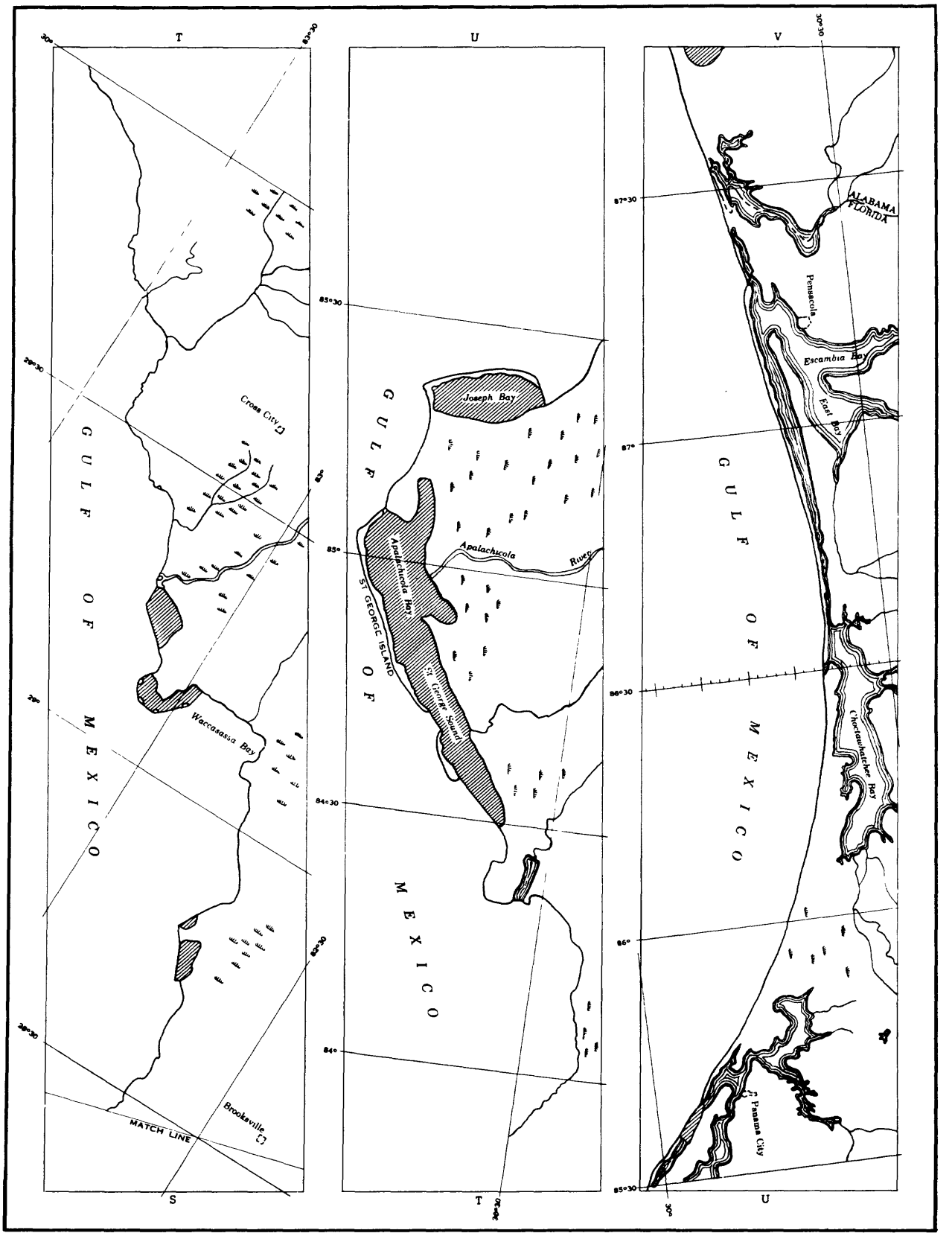

T
U
V
S
T
U
GULF OF MEXICO
Cross City
Waccasassa Bay
Brooksville
MATCH LINE
Joseph Bay
Apalachicola Bay
St George Island
St George Sound
Apalachicola River
ALABAMA
FLORIDA
Pensacola
Escambia Bay
East Bay
Choctawhatchee Bay
Panama City
30°30
87°30
87°
86°30
86°
85°30
85°30
85°
84°30
84°
83°30
83°
82°30
82°30
30°
30°

Plate VIII

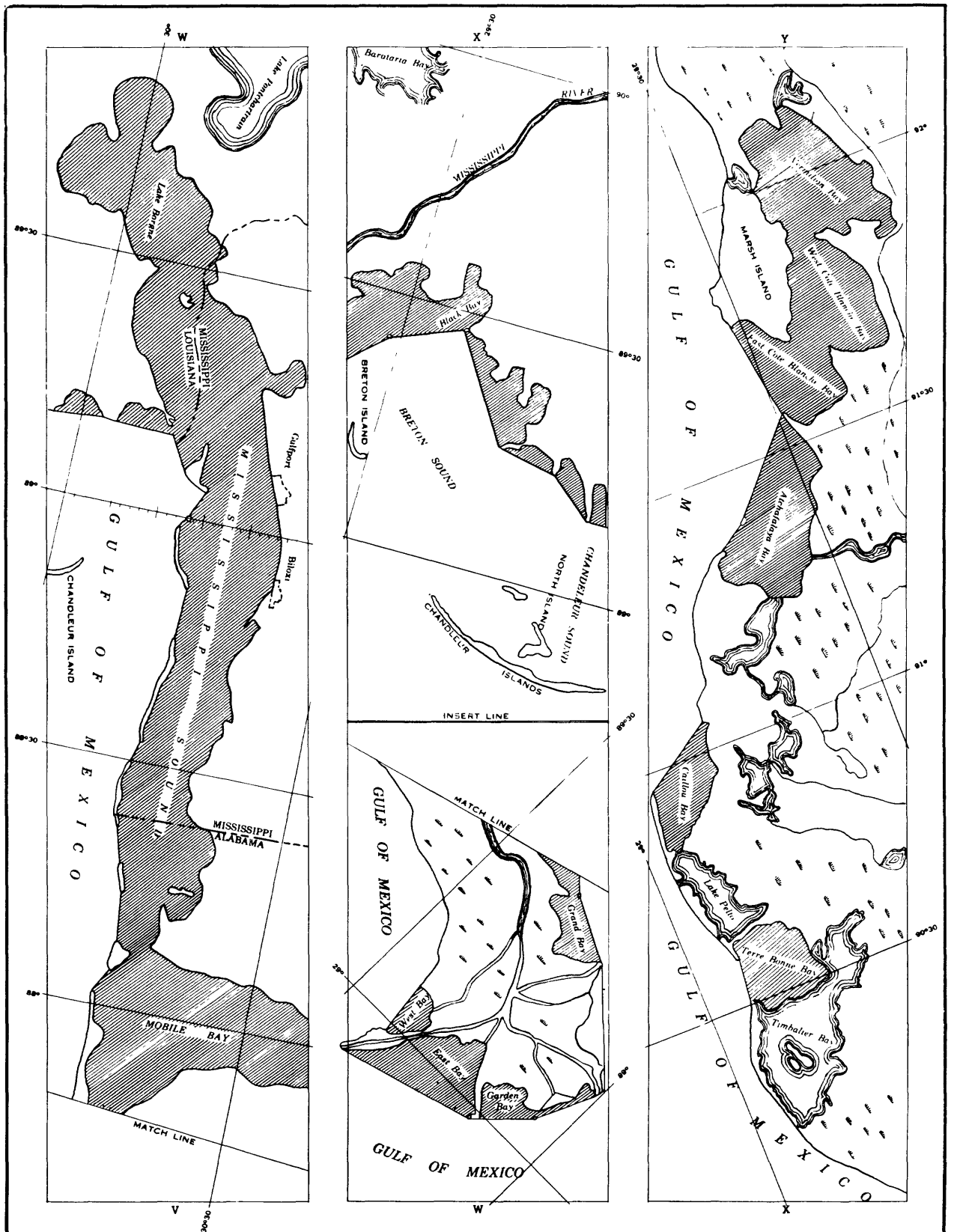

W
Lake Pontchartrain
Lake Borgne
MISSISSIPPI
LOUISIANA
Gulfport
Biloxi
MISSISSIPPI SOUND
CHANDELEUR ISLAND
GULF OF MEXICO
MISSISSIPPI
ALABAMA
MOBILE BAY
MATCH LINE
V
X
Barataria Bay
MISSISSIPPI RIVER
Black Bay
BRETON ISLAND
BRETON SOUND
CHANDELEUR SOUND
NORTH ISLAND
CHANDELEUR ISLANDS
INSERT LINE
GULF OF MEXICO
MATCH LINE
West Bay
East Bay
Grand Bay
Garden Bay
GULF OF MEXICO
W
Y
MARSH ISLAND
Caillou Bay
Lake Pelto
Terre Bonne Bay
Timbalier Bay
GULF OF MEXICO
X

Plate IX

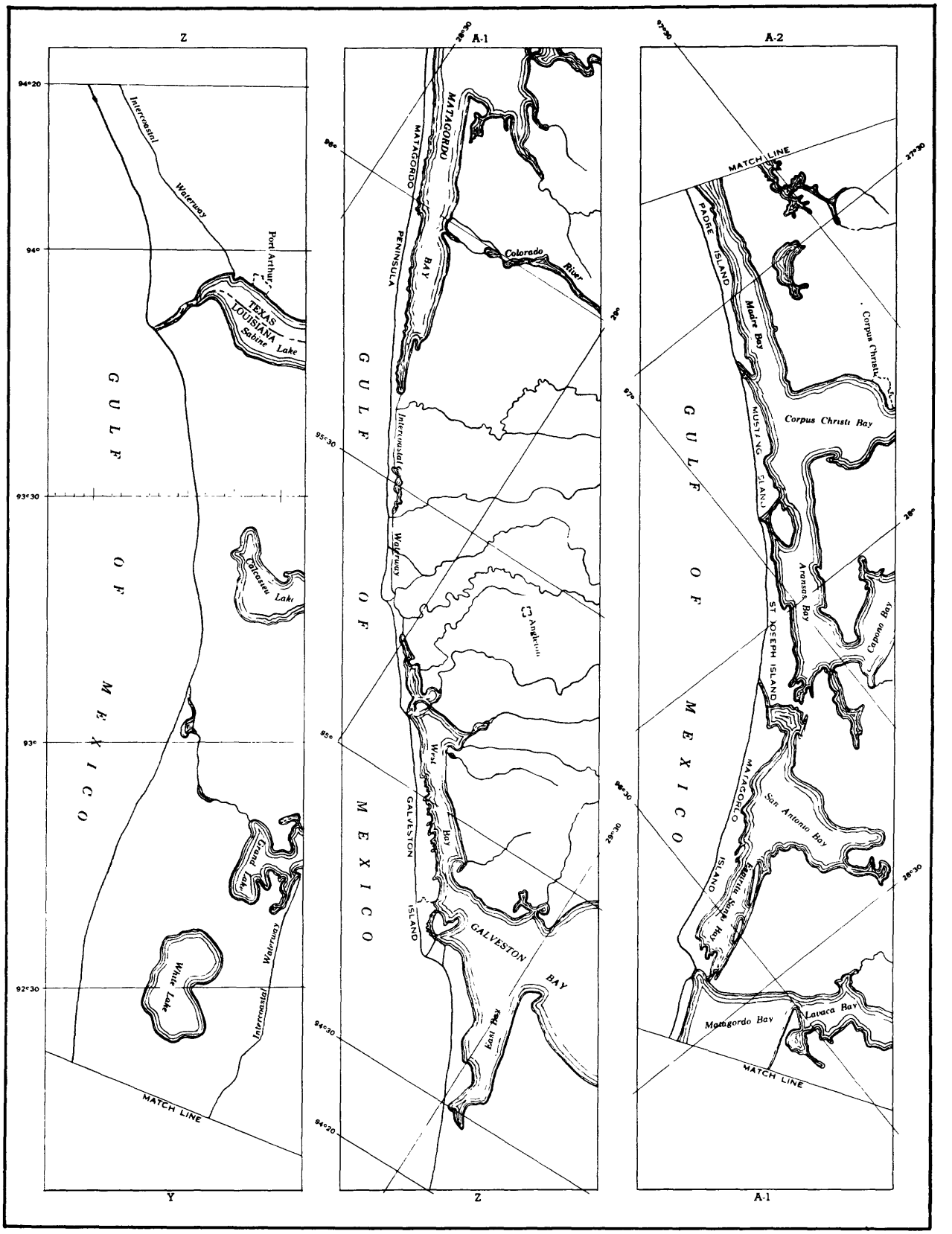

Z
A-1
A-2
94°20
94°
93°30
93°
92°30
Intercoastal Waterway
Port Arthur
TEXAS
LOUISIANA
Sabine Lake
GULF OF MEXICO
Calcasieu Lake
Grand Lake
White Lake
Intercoastal Waterway
MATCH LINE
Y
MATAGORDO PENINSULA
BAY
Colorado River
Intercoastal Waterway
Anahuac
West Bay
GALVESTON ISLAND
GALVESTON BAY
East Bay
Z
MATCH LINE
PADRE ISLAND
Mustang Bay
Corpus Christi
Corpus Christi Bay
MUSTANG ISLAND
Aransas Bay
Copano Bay
ST JOSEPH ISLAND
MATAGORDO ISLAND
San Antonio Bay
Intercoastal Waterway
Matagorda Bay
Lavaca Bay
MATCH LINE
A-1

Plate X

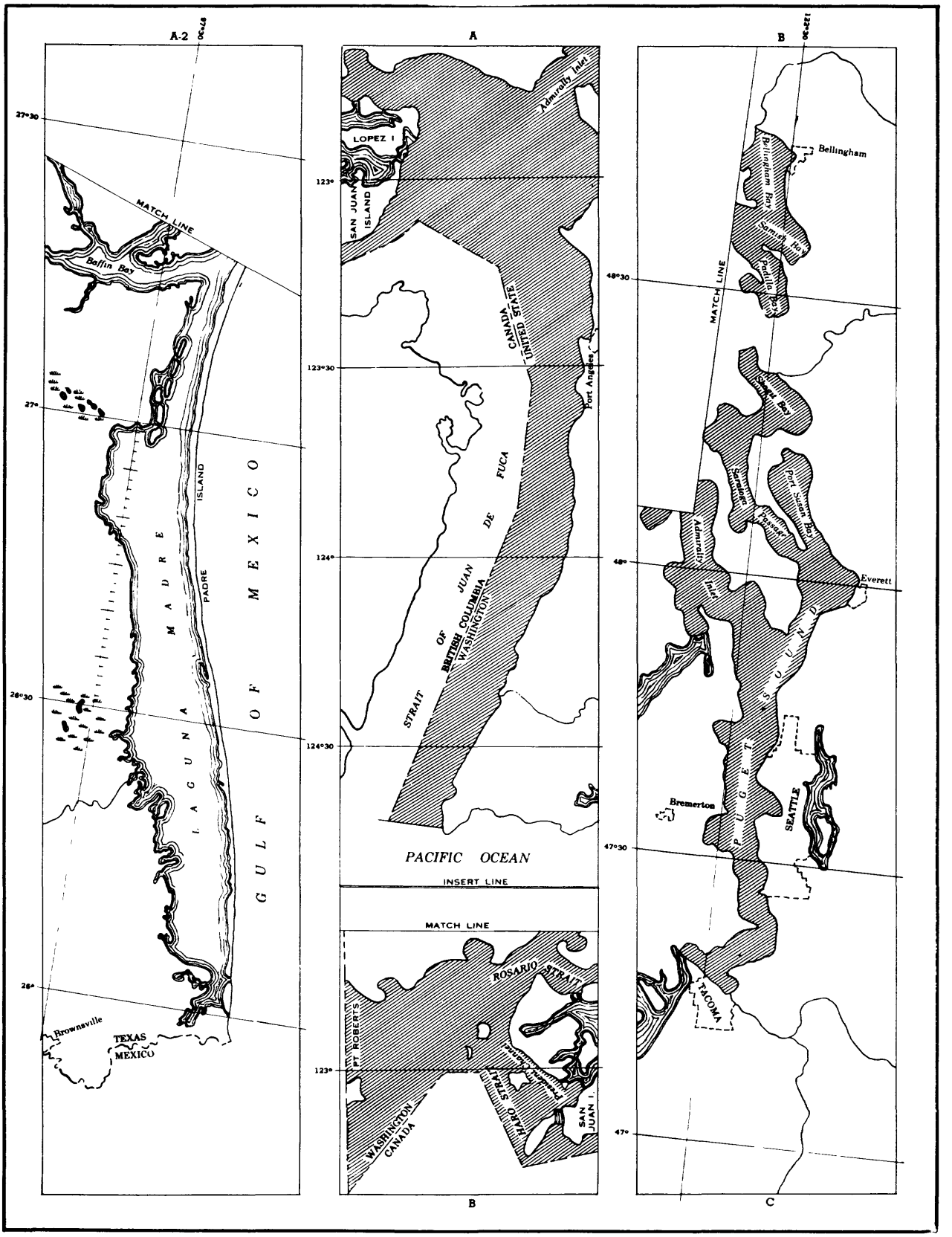

A-2
A
B
MATCH LINE
Baffin Bay
LAGUNA MADRE
PADRE ISLAND
GULF OF MEXICO
Brownsville
TEXAS
MEXICO
LOPEZ I
SAN JUAN ISLAND
Admiralty Inlet
CANADA
UNITED STATES
Port Angeles
STRAIT OF JUAN DE FUCA
BRITISH COLUMBIA
WASHINGTON
PACIFIC OCEAN
INSERT LINE
MATCH LINE
ROSARIO STRAIT
PT ROBERTS
WASHINGTON
CANADA
HARO STRAIT
SAN J.
Bellingham
Bellingham Bay
Samish Bay
Padilla Bay
MATCH LINE
Skagit Bay
Saratoga Passage
Port Susan Bay
Camano Island
Everett
PUGET SOUND
Bremerton
SEATTLE
TACOMA
B
C

Plate XI

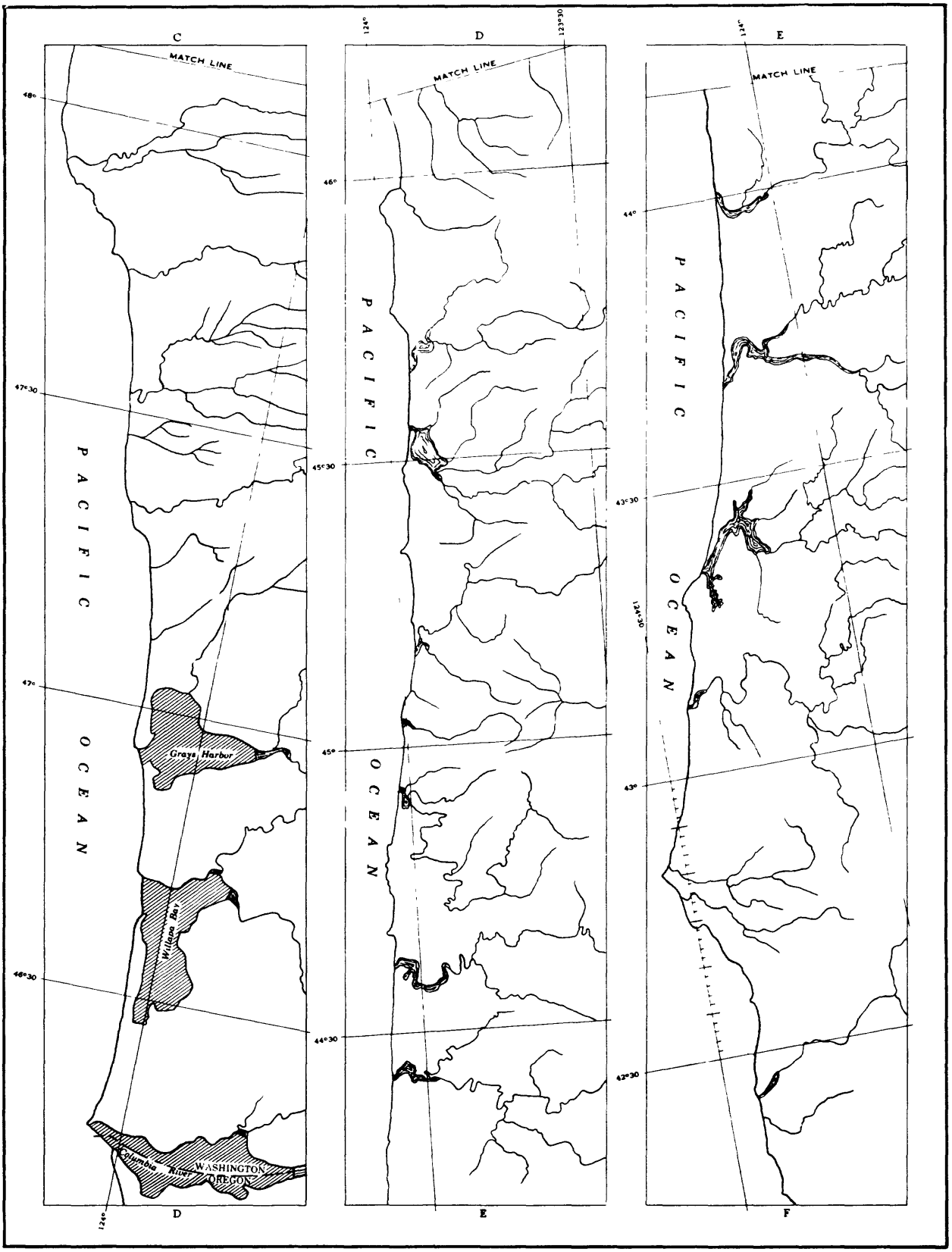

C
D
E
MATCH LINE
MATCH LINE
MATCH LINE
48°
47°30
47°
46°30
46°
45°30
45°
44°30
44°
43°30
43°
42°30
124°30'
124°
123°30
PACIFIC OCEAN
Grays Harbor
Willapa Bay
Columbia River
WASHINGTON
OREGON
D
E
F

Plate XII

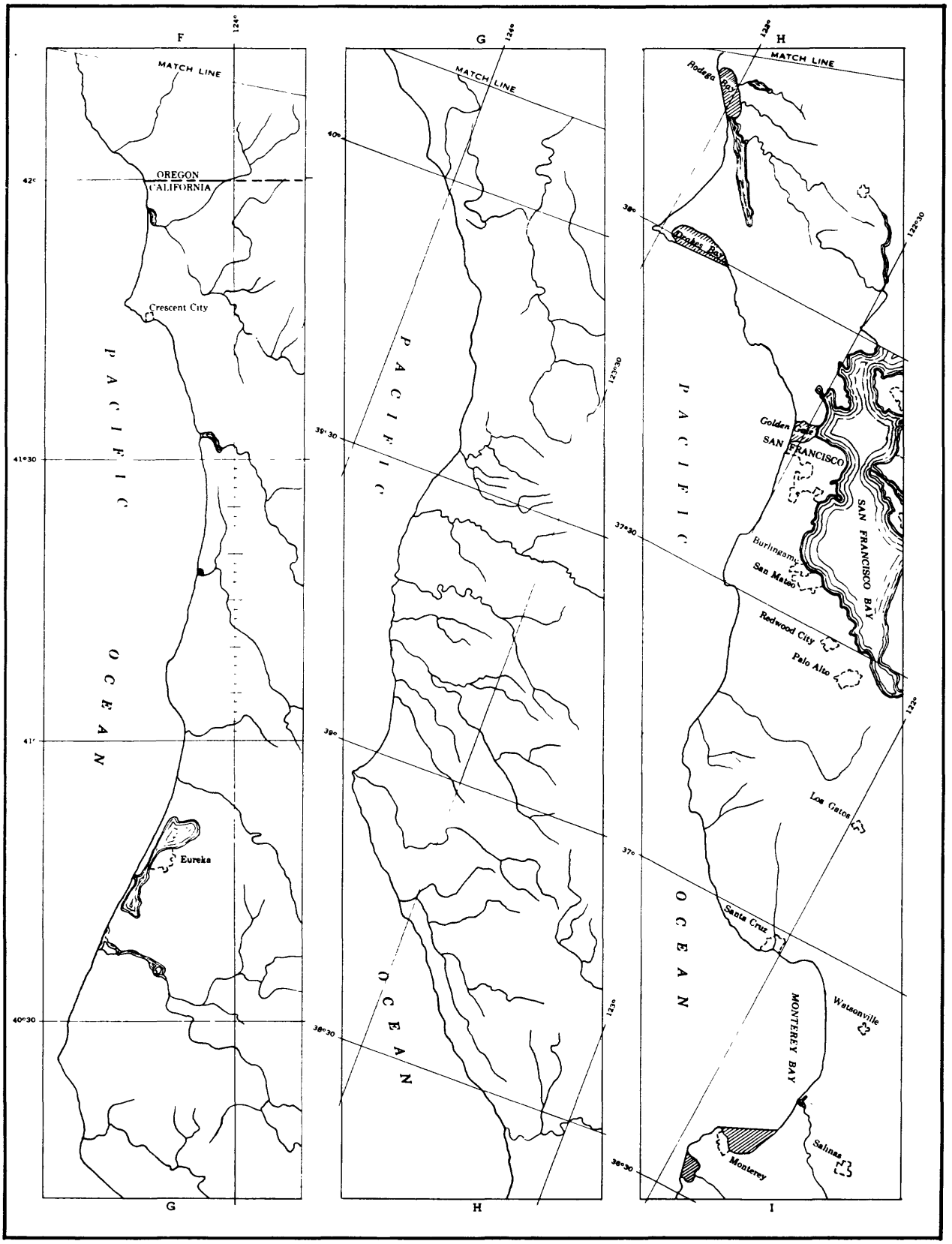

F
G
H
I
MATCH LINE
OREGON
CALIFORNIA
Crescent City
Eureka
Rodeo Bay
Drakes Bay
Golden Gate
SAN FRANCISCO
SAN FRANCISCO BAY
Burlingame
San Mateo
Redwood City
Palo Alto
Los Gatos
Santa Cruz
Watsonville
MONTEREY BAY
Salinas
Monterey
PACIFIC
OCEAN
42°
41°30
41°
40°30
40°
39°30
39°
38°30
38°
37°30
37°
124°
123°30
123°
122°30
122°

Plate XIII

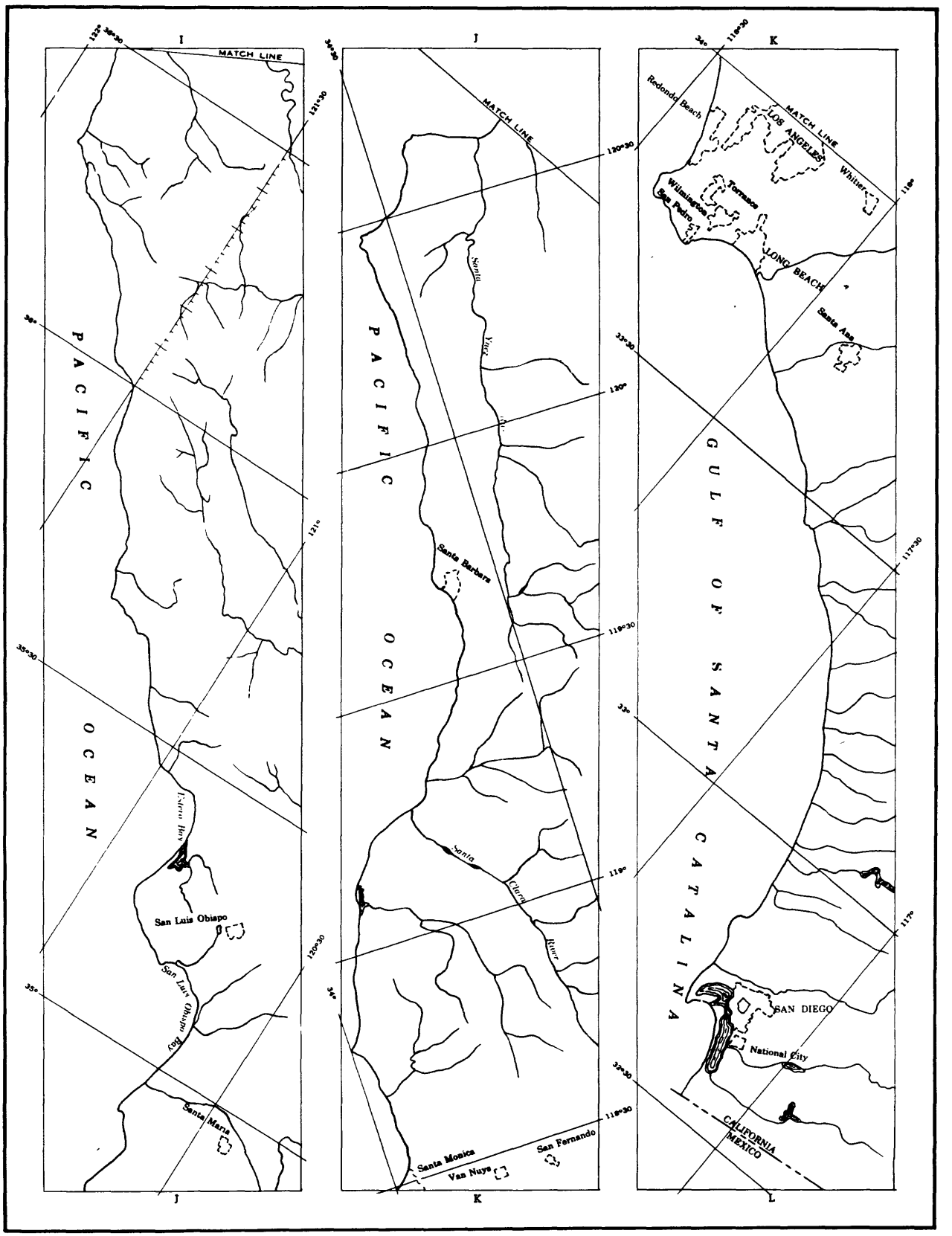
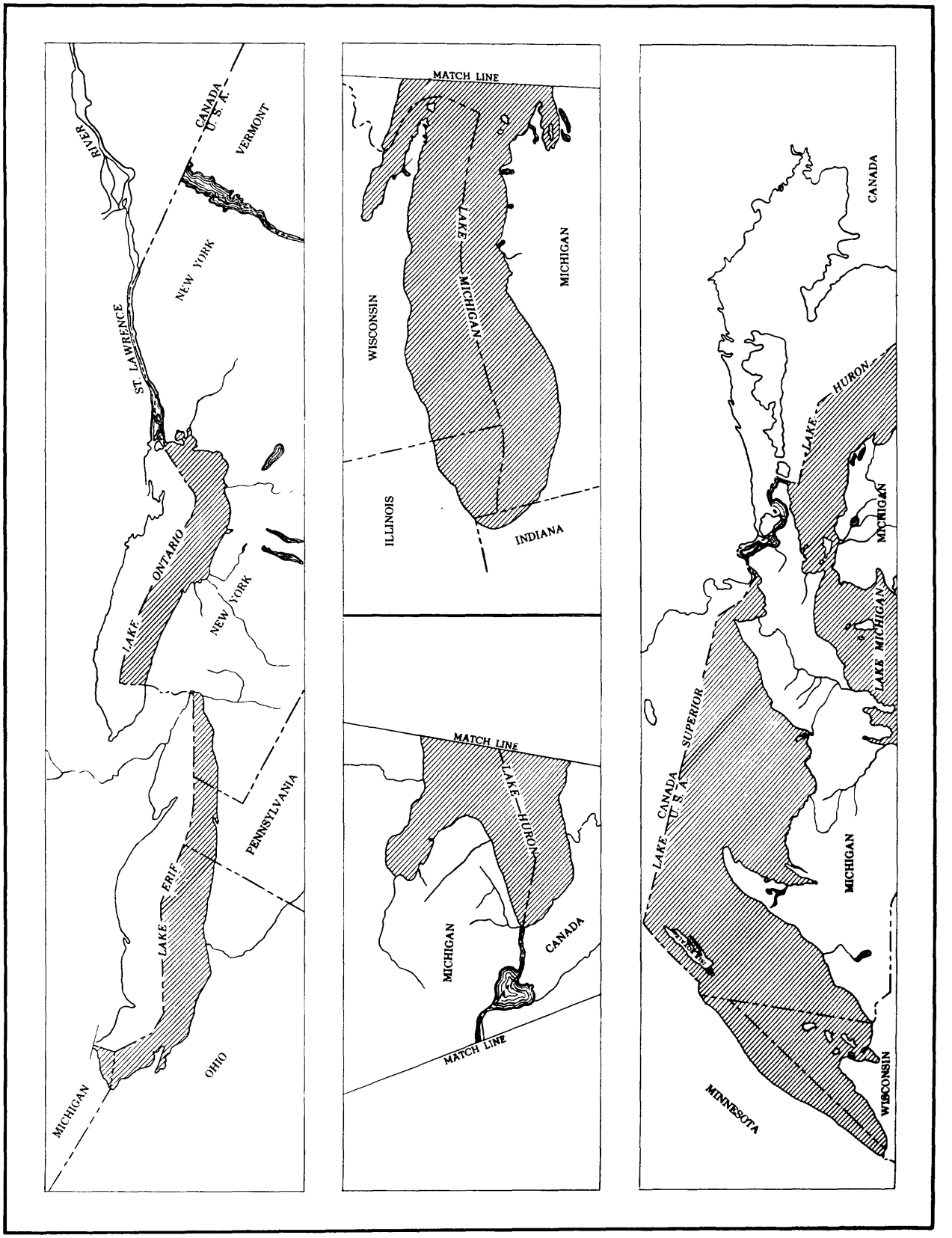

I
J
K
L
MATCH LINE
MATCH LINE
MATCH LINE
PACIFIC OCEAN
PACIFIC OCEAN
GULF OF SANTA CATALINA
San Luis Obispo
Estero Bay
San Luis Obispo Bay
Santa Maria
Santa Barbara
Santa Clara River
Santa Monica
Van Nuys
San Fernando
Redondo Beach
LOS ANGELES
Whittier
Wilmington
San Pedro
Torrance
LONG BEACH
Santa Ana
SAN DIEGO
National City
CALIFORNIA
MEXICO

Plate XIV



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