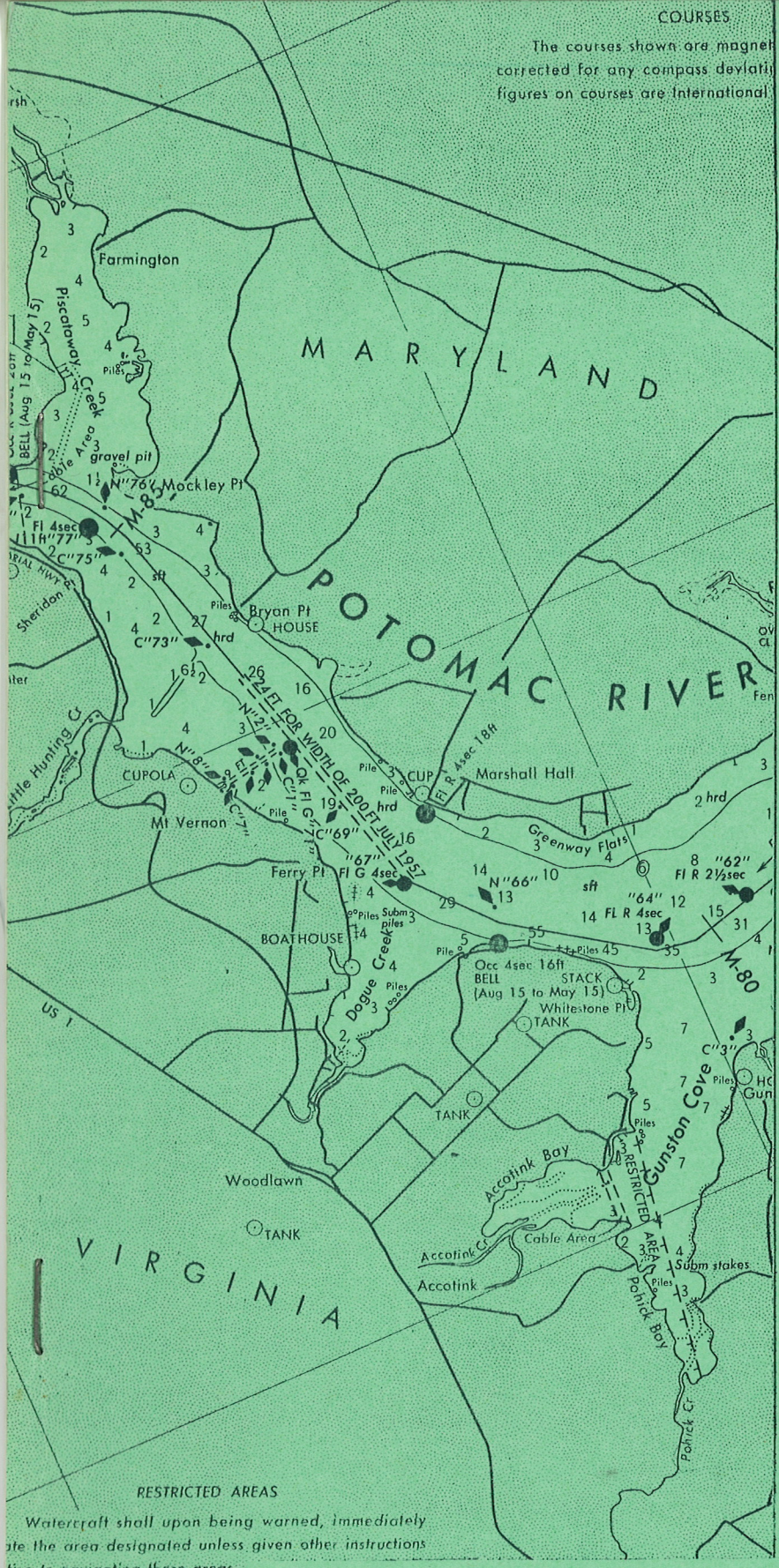
Encl. #4



Planning And Development Of

SMALL CRAFT CHARTS

U.S. Department of Commerce
Coast and Geodetic Survey

PLANNING AND DEVELOPMENT OF SMALL-CRAFT CHARTS

The explosive growth of recreational boating during the past fifteen years has pointed up the need for a special nautical chart to satisfy the safety requirements of our pleasure boat operators. This large and growing segment of our population embraces the novice as well as the seasoned navigator and all types and sizes of pleasure craft.

To meet this need, in April 1958 Rear Admiral H. Arnold Karo, Director of the Coast and Geodetic Survey, appointed a committee to study the problem and make recommendations for a compact chart for small-craft use in inland and coastal waters.

The responsibility of safeguarding valuable floating possessions of water enthusiasts and to aid in getting the most enjoyment and pleasure out of their investment is an important one. In order for a chart to be of maximum value it must reflect completely reliable information. The motorist with his road map has a relatively simple job of orienting himself for he has landmarks and cultural features to guide him. The new chart series should provide the boatman with a waterway guide that will become his road map when he parks his car and boards his yacht. The small-craft charts represent the latest efforts in the never-ceasing improvement in the design of the nautical chart to assure maximum usefulness to the greatest number of potential users. Frequent innovations and inventions have always been compelling factors in Coast and Geodetic Survey charting programs to meet the ever-changing and expanding requirements for more and better charts.

All vessels navigating the coastal waters of the United States and possessions depend on Coast and Geodetic Survey nautical charts, coast pilots and tide and current tables for safe navigation. The engineers of the Bureau have combined these three publications into one format for the use of the small-craft operator.

For his own safety and assurance that he will return to port the boat operator must have information of the channels, the dangers, the times and range of the tide, the times of slack water and of maximum ebb and flood currents, the location of navigational aids and radio facilities with their characteristics for identification. Up to now the conventional nautical charts have been available to all boatmen but to the small boater with extreme limitations on space, the size of these charts has been a handicap and the life of the charts is reduced through constant folding, exposure to the elements and lack of adequate stowage space. During 1960 about 40 million people in the United States were

involved in recreational boating. Approximately 8 million small boats and over one and one-half million boat trailers were estimated to be in use last year. The present trend is for more power in the outboards similar to the trend in motor car horsepower during the last ten years. The last estimate of outboard motors in use was in excess of six million. Not to be forgotten are the 500 thousand boats under sail, many of which have an equal requirement for charts with their brothers under power.

The new series of small-craft charts was initiated by a detailed study of the requirements of pleasure-boat operators for nautical charts and coast pilot information. The assistance of the U.S. Power Squadrons and the U.S. Coast Guard Auxiliary was enlisted for this study and both organizations canvassed their membership by questionnaire to determine user requirements. The Power Squadron summarized replies from 5,000 operators, and the Coast Guard Auxiliary furnished complete questionnaires representing 2,000 operators.

Replies from some 2,000 boat owners in the U.S. Coast Guard Auxiliary reflected 83 percent acceptance for chart sizes ranging from 18 x 24 inches down to standard page size of 8 x 10 1/2 inches. A purely mathematical average of suggested chart dimensions was 14 by 18 inches. This same high percentage desired coast pilot supply and facility information on the charts in preference to separate books.

Four experimental formats covering the Potomac River were designed to conform to the majority of the requirements and suggestions received. Two were folding charts and two were book type.

For comparative purposes, each series covered the same area and contained the same primary information. The four formats were developed in an effort to determine which was the most suitable or desirable.

Complimentary copies of these formats were sent to such organizations as the U.S. Power Squadrons, the U.S. Coast Guard Auxiliary, Outboard Boating Club of America, National Association of Engine and Boat Manufacturers, marine dealers, and many small-boat clubs. In addition, copies were displayed at various boat shows. Returns from about 35,000 mariners indicated their choice to be the Series B format, a four-panel folding chart with cover. This chart measures 14 1/2 x 32 inches when unfolded, and 8 1/2 x 15 1/2 inches when folded in the cover. Many suggestions for notes and educational information were received during the period of compilation. The scale and format used for the base charts depend on the physical characteristics and boating pattern of the area to be charted.

It should be noted that the three experimental formats developed for the Potomac River and not now in use have not been discarded. It is likely as the program develops that we will find it expeditious and necessary to vary the small-boat format according to the configuration of the water area for a particular district. There is strong sentiment, for example, to convert the standard size Intracoastal Waterway charts to an accordion folded chart printed in one sheet on both sides of paper 15 x 58 inches long. By including facility and supply information on such a chart, it can be made to serve the needs of the small boatman as well as through traffic on the Intracoastal Waterway.

The following small-craft charts are now on issue:

Series 101, Potomac River, Md., Va., and D.C., 3d edition.

Series 140, Fort Pierce to Miami, Florida, 2d edition

Series 165, San Francisco Bay to Antioch, California, 1st edition

Series 184, Bellingham to Seattle, Washington, 1st edition.

User reaction to these charts has been extremely favorable, and they are very much in demand by small-craft operators. Unlike the conventional charts of the Bureau designed for use on the big broad table of merchant vessels, this handy folding chart is easily used on the flying bridge of a sport fisherman and in the limited space of the speedy outboarder.

It is difficult to write instructions for the construction of a small-craft chart since they can only be general in nature because the importance of the area, the pattern of traffic, the sunken and visible dangers therein, and the scale dictated by the compact format of the chart, all preclude the possibility of making any two charts precisely alike in character and scope. We can only strive for completeness, uniformity and simplicity in general appearance.

Source material for small-craft charts, except for revision photography and coast pilot data, is about the same as that used for our conventional charts. It consists principally of topographic and hydrographic surveys made by the Bureau and miscellaneous surveys made by other organizations. Since small boats can operate close to shore, in small creeks, or in very shoal water, the Coast and Geodetic Survey is putting more emphasis on the closer development of these areas during hydrographic surveying operations. The cartographer

must examine all source material and pay particular attention to the date of survey, geographic datum, depth unit, plane of reference, purpose and character of the survey and whether original or compiled. Original source material is used in the compilation of new small-craft charts and in the correction of existing charts. However, where a larger-scale conventional chart has been corrected from the latest available source material, a smaller-scale small-craft chart is made directly from it, referring to original information, if necessary, to check questionable detail.

The cover is 8 1/2 by 15 1/2 inches printed on buff jute tag board. The face of the front cover is used for title purposes and presents a maritime scene with a salty flavor. The remaining three sides of the front and back cover are used for tide tables and notes of particular interest to the navigator.

Small-craft charts are constructed on the Mercator projection. North may or may not be at the top of the chart as in conventional charts. New air photography is taken for each area immediately before field work for a chart is to begin. Topographic detail in the area is corrected from these aerial photographs. The topography at facilities is enlarged where necessary to pictorially represent the installations. A screen is used in lieu of the street pattern in urban areas and all through roads and highways are numbered and charted with a single line. The elevations are shown for tops of hills or mountains and additional landmarks are charted for close inshore navigation. The position, call letters and frequency of all commercial radio stations are charted. Clearfaced type, bold aid-to-navigation symbols and large compass roses provide easier reading of the chart. A heavy black line serves as border and neat line. Projection numbers are placed close inside the border and minutes of latitude and longitude are indicated by tick marks on projection lines in water areas. Graphic scales include nautical miles, statute miles, and yards.

The density of soundings on the small-craft charts is less than that shown on our conventional charts. Soundings for the small-craft chart are taken from the largest-scale conventional chart covering the area, provided its scale is equal to or larger than the chart under construction. If it is not, the soundings are taken from the original survey covering the area. Care is taken in the selection of these soundings to show all shoals and deeps. The 6-foot curve or the critical depth curve for the area is the only one shown.

For added emphasis and clarity, the following features are shown in red: facility numbers with leaders to the location of the facility on the chart; magnetic courses and

distances; direction and strength of currents; limits of large-scale insets of active boating areas; storm warning stations; junction lines between charts in the series; screen to indicate red sectors at lights; and all features shown in magenta on the conventional nautical charts of the Bureau.

Marsh and areas bare at low water are shown in green; water areas are blue tinted to the 6-foot or critical depth curve; and all land areas are shown in buff.

The back of this 4-panel folding chart is used to show information of particular use to yachtsmen and pleasure-craft operators.

Each chart has a tabulation which provides useful information about the supplies and services offered by each marine installation in the area covered by the chart. Every facility is visited to determine the exact location on the aerial photographs and approximate location on the present chart coverage, and to record the services and supplies offered by each. During this inspection, other information is collected, such as local regulations, depths in the approach and alongside facilities, highway numbers, and water depths in small creeks or privately-dredged areas. Operators of marine installations are usually familiar with their immediate boating areas and provide a great deal of useful charting information. Local U.S. Coast Guard Officers, U.S. Coast Guard Auxiliary and U.S. Power Squadron leaders discuss boating patterns, active boating areas, chart limits and local small-craft chart needs with us.

Facility tabulations are brought up to date yearly by the returns from questionnaires sent to each facility operator. The regular Coast Pilots are reviewed, and any information found which is necessary for use by small craft is shown by notes throughout the chart. A complete inspection will be necessary about every five years.

A study is made to determine the active boating areas for each chart, and large-scale insets on the back of the chart provide the scale needed for safe navigation. These areas are outlined in red on the front of the chart where much of the detail has been eliminated to make it necessary for the mariner to use the large-scale insets.

Oblique photographs from seaward, printed in halftone, depict selected marine installations, aids to navigation and topographic features. Low level photographs taken from helicopters appear to be the most satisfactory for this purpose.

For easy reference and education of the small-boat operator, graphic whistle signals, fog signals, distress signals, weather information, radio telephone call letters and times of operation, basic rules of the road, and abbreviations necessary for the use of the chart have been shown.

The chart index shows drainage, geographic names, and other conventional chart coverage in black, water areas in blue and land areas in buff. The limits of each chart in the series are printed in red.

See page

A chart series consists of three or four charts printed on high wet strength or chemical wood paper similar to that used for aeronautical charts of our Bureau. The charts are trimmed with a tab on one panel for mounting in a cover with a plastic clip. This type of mounting permits the users to fold the cover and other charts in the series out of the way for plotting courses on a flat surface.

New editions of small-craft charts are issued annually and are not hand corrected between printings. Notices to Mariners warn boat operators of critical changes between new editions. This compact chart series provides small-craft operators with an instrument of navigation made to the same high standard of accuracy set for our conventional nautical charts. The small-craft chart is a substantial companion to the existing five series of nautical charts, classified as Sailing, General, Coast, Harbor, and Intracoastal Waterway. It can and will become a handy reference to navigators on the bridge of commercial vessels when in inshore waters.

This program assumes formidable proportions if we consider the vast coastline and the contiguous waterways of the United States and Alaska. The Atlantic coastline of the United States exceeds 28,000 statute miles, the Gulf Coast contributes 17,000 more miles, and the Pacific Coast measures almost 8,000 miles. Add to this mileage the 35,000 mile coastline of our newest states of Alaska and Hawaii and the problems assumes its proper perspective.

You are quite likely to find the small boatman almost anywhere there is water to float his craft. It is not uncommon to observe tiny 35-foot fishing boats well over 200 miles offshore on the Pacific Coast. Cruising into Mexican waters and to the West Indies is fairly common today, so to equate all of the requirements needed by pleasure craft into one type of chart is a most difficult task and one that at best is a compromise.

This vital support to the safety and pleasure of our citizens is made in conjunction with other functions of government that supervise our sea lanes, provide lighting and buoyage for our channels, and establish and maintain various aids to navigation. The essential public service of chart production and related activities compels constant alertness to increasing efficiency in progressive research for new means of better serving. The Coast and Geodetic Survey of the United States Department of Commerce is proud of the opportunity to serve in the national welfare.

PIO 10/61 US COMM-CGS-DC