

MANUAL OF COASTAL DELINEATION

FROM AERIAL PHOTOGRAPHS

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This Manual is intended for use by photogrammetrists, hydrographic engineers, and cartographers, particularly for those who are delineating coastal areas from aerial photographs and for those who are using that delineation in compiling coastal charts. The purpose is to promulgate the elementary principles involved in coastal delineation in a manner that will aid the photogrammetrist in recognizing some of the characteristics of the natural features that are viewed on the photographs and thereby make it possible to delineate and symbolize those features in a more intelligible and systematic manner. An attempt is made to emphasize the vital need to establish a common ground of general knowledge of the physical processes that produce and alter the landscape. In other words, it is hoped that this will result in making the photogrammetrist "hydrography conscious", and in turn make the hydrographic engineer "topography conscious" by helping him understand some of the problems of the photogrammetrist. It should be realized that without complete hydrographic data from actual surveys it's extremely difficult to interpret the characteristics of many shore and offshore features, such as, the existence of small pinnacle rocks, the amount of water over shoal areas, whether reefs uncover at low water and to some extent, whether the beaches are made up of sand, gravel, boulders or a combination of all. For the photogrammetrist to properly interpret these features, it is essential that the hydrographic engineer annotate field photographs so as to clarify their interpretation in the Office. Therefore this manual will develop a better understanding of the problems of "Coastal Delineation from Aerial Photographs" and will result in better charts.

The subjects to be discussed relate more specifically to the problems of the photogrammetrist, but also contain the thought of assisting the cartographers in combining the photogrammetric work with the hydrography. It is essential, therefore, that the cartographer become familiar with the symbols placed on the photogrammetric manuscript sheets so that he will be able to combine this information with the hydrography. It should be observed that some of the foreshore and offshore features taken from the photographs are of an indefinite nature and must be combined with the hydrography with this understanding in mind.

At the beginning of the book a few terms and definitions are given so that when the reader sees the words: Shoreline, foreshore, backshore, offshore, etc., a definite area along the coast will come to mind.

Chapter III gives a very general discussion of the geological processes that are involved in developing the shore profile of the different types of coasts in order to aid in discovering and interpreting the different features on the photographs and to provide some of the geomorphic aspects of the more general types of coasts and their associated characteristics. The coast lines in this manual are divided into four major types: I. Emergent, where the land adjacent to the sea has been elevated by deformation or where sea level has fallen relative to the old shoreline. II. Submergent, where the land adjacent to the sea has been depressed or partially drowned or submerged relative to sea level; the submergent type of coast may be subdivided into two main types, such as (a) ria coastal areas and (b) fiord coastal areas. III. Neutral, where essential features of the coast depend on some process such as land building and are independent of either the recent submergence or emergence of a former land surface; this type of coast is subdivided into four main subtypes; (a) coral reef; (b) delta; (c) volcanic shorelines and (d) fault shorelines. IV. Compound, where the essential features are a combination of two or more of the preceding types. Minor shore features such as tombolo, spits, bars, and beach cusps are also described.

Besides two other coastal types, not derived geologically are considered: V. Vegetative

types in which the shoreline is bordered with vegetative growth such as Nipa Palm, Wild Cane, Rain Forest, and Mangrove; flora of this kind complicate the problem of correct shoreline delineation; and VI. Man-made shoreline, such as harbor areas, breakwaters, causeways, seawalls, piers and docks. A seventh type: Ice cap or ice barrier of coast should also be included at some later date when a revision of this Manual will be made.

Chapter IV gives a list of coastal items to be mapped along with a description sufficient in detail so that the features may be identified on the photograph and transferred to the manuscript sheet.

A series of stereo-pairs of photographs showing the various details is given :—

Backshore items.—Cliffs, Beach, Sand, Shingle, Marsh, Mud or Land subject to Inundation, Glaciers, Sand Dunes, Shoreline, Salt Pans, Mangrove Swamps, Nipa Palm, Islands, Islets and Rocks.

Foreshore items.—Beach, Detached Foreshore items, Unnatural Foreshore items.

Offshore items.—Dangers areas, Sunken rocks, Breakers, Kelp, other offshore items.

Man Made features : namely, docks, piers, breakwaters, seawalls, causeways, marine railways, seaplane landing ramps, etc.

In agreement with the above classification Chapter V shows the Manuscript Symbols which anticipate the manuscript symbolization which will shortly be standardized by the Joint Mapping and Photo Committee. These are as follows :—

Backshore items.—Cliff : a) Rocky; b) Not rocky, Sand, Shingle, Marsh, Glacier, Sand dunes, Shoreline, Salt pans, Inundated area, Mangrove, Nipa palm, Islands, Islets or rocks.

Foreshore items.—Beach : a) Rock ledge; b) Coral reef; c) Mud flat; d) Sand; e) Shingle. Detached items : a) Rock awash; b) Coral reef or rock ledge; c) Mud bank; d) Sand bar. Unnatural items : a) Wreck; b) Piling; c) Huts; d) Fish trap; e) Area under reclamation.

Offshore items.—Danger area, Sunken rock, Breakers, Kelp. Other items : a) Tide rips; b) Eddies; c) Submerged piles; d) Submerged wreck; e) Submarine net, pipe line, etc.

Man Made items.—Dock, Pier, Seawall, Marine railway, Seaplane ramp, Wharf.

In Chapter VI a recommended procedure is outlined for delineating the coastal items to be mapped and for transferring these features from the photographs to the manuscript sheets. This procedure is the result of many year's experience by personnel of the U.S. Navy Hydrographic Office.

In Chapter VII a large number of aerial photographs (oblique and stereopairs of vertical) illustrates the many problems encountered in delineation of coastal features with the purpose of helping delineators in fulfilling their responsibility.

Reproduction photograph examples have been used profusely in this Manual as it is a well founded theorem that a few selected photographs give a better description than volumes of words.

It happens frequently that the photogrammetrist is working along coastal areas for which no adequate chart of hydrographic data is available for reference. He has to rely largely upon the information that the field hydrographic engineer finds time to add on the photographs or notes in the field book as well as his own experience in properly interpreting the shoreline and offshore features, and the fact should be stressed that aerial photographs covering coastal features require expert interpretation by a photogrammetrist experienced in hydrographic surveying. As a general rule, topographers and photogrammetrists do not take this into consideration with the result that the coastal features are sometimes improperly portrayed.

