

United States Coast Guard Auxiliary
NAUTICAL CHART UPDATE TRAINING GUIDE

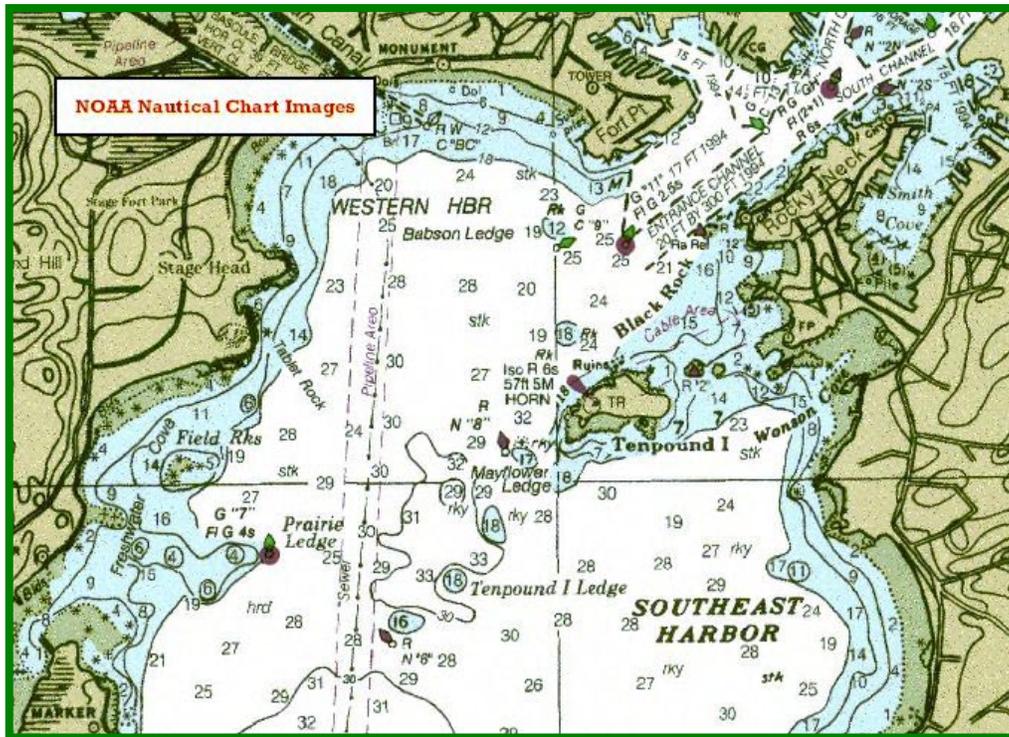


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NAUTICAL CHARTS and CHART NO. 1

INTRODUCTION:

In order to be an effective observer and reporter for the Auxiliary Chart Updating program, members must understand the general composition and purposes of a nautical chart and Chart Number 1.

A nautical chart is a representation of a portion of the earth's surface.

- The earth's surface is commonly portrayed in a significantly reduced form.
- The earth's surface is usually illustrated on a plane surface in a two-dimensional presentation.
- Primarily in water with emphasis on natural and man-made features.

Throughout its extensive ATON, PATON, Bridge, Small Craft Facility and Chart Update program activities, the Auxiliary plays an important role in providing informational updates that correct and change nautical charts. This information will assist NOS/NOAA to maintain a high level of quality and reliability of nautical charts used for general navigation.

OBJECTIVE:

1. To acquire a general knowledge of nautical charts, CHART No. 1, and the responsibilities of the Auxiliary regarding the use and update of nautical charts.
2. To become familiar with the various projections and scales used on nautical charts.
3. To become familiar with the colors, symbols and abbreviations presentations on nautical charts.

INFORMATION:

The primary purpose of a nautical chart is to provide navigational related information to assist mariners while plotting courses and trying to avoid dangers, and to standardize information interchange. Nautical charts are maintained by various Government agencies. They provide the pilot or navigator with a high level of accuracy, as charted, of navigable bodies of water by portraying depths, aids to navigation, obstructions, shorelines, physical features and other useful and essential information. However, the accuracy of a nautical chart depends on the competency of the survey upon which it is based. It is important to know that, a nautical chart and the data provided, does not absolve the pilot or navigator of the responsibility of safe passage. Prudent mariners always use two methods for determining a vessel's position and course. In addition, weekly updating of nautical charts from the LNM—Local Notice to Mariners publications is necessary to keep them current with the latest changes and Aid to Navigation updates.

All nautical charts display a grid of intersecting lines to assist the mariner in the definition of a specific location on the chart. These grid lines are the charted representations of a system of geographic coordinates (lines of vertical parallels and horizontal meridians) on the earth's surface. Two types of circles on the earth's surface are used to define geographic coordinates.

MERIDIANS OF LONGITUDE consist of Great Circles. A great circle is described by a plane passing through the earth's center. Meridians of longitude pass through the earth's north and south geographic poles. The north and south poles are positioned at the polar axis on which the earth spins.

PARALLELS OF LATITUDE consist of parallel planes cutting through the earth, perpendicular to the polar axis. The Equator, the largest of these parallel planes, is located midway between the poles, passing through the center of the earth. The Equator is a Great Circle but it is only one of these parallel planes. All the other Parallels of Latitude form Small Circles.

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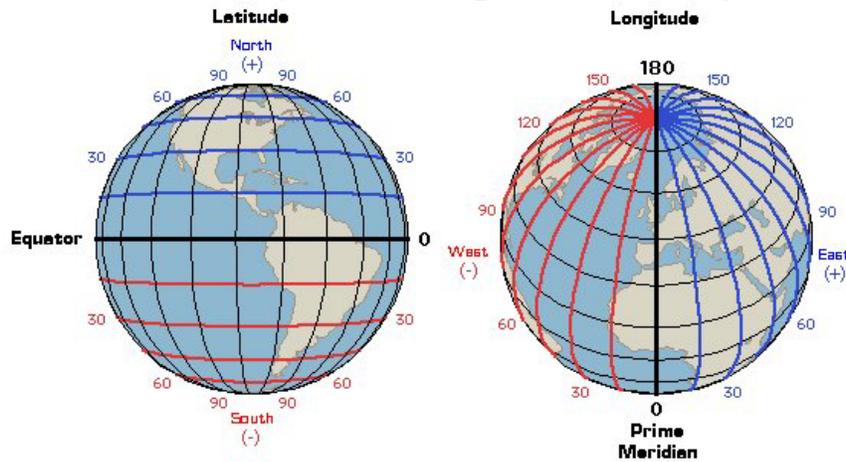


Figure 1 - Latitude and Longitude lines on globes that represent the earth's surface.

The earth is essentially a sphere. Therefore, the earth's surface or portions thereof cannot be spread on a flat surface without some distortion. Again, a nautical chart is a reduced form, two-dimensional, flat surface representation of a portion of the earth's surface. As such, the construction of a chart immediately produces an accuracy problem. Since a certain ratio of distortion is inevitable, various methods for transferring details from a sphere to a flat surface have been invented. Conversions of a sphere's surface to a cone or cylinder, that can be unrolled to form a flat surface, are reasonable methods. The process of transferring details from a sphere onto a flat surface is called a "**Projection.**" In all projections, as the chart segments of the earth's surface, presented on the chart, decreases, the ratio of distortion also decreases, and the accuracy of the projection increases (viz., as the segment of the earth's surface presented on a chart is closer to the point of tangency between the sphere and the plane (usually the center of the chart), the ratio of distortion decreases and the accuracy of the projection increases).

The optimum characteristics for a projection include:

- True shape of physical features.
- Correct angular relationships.
- Equal area, for representation of areas in relative proportions.
- True scale that permits accurate measurement of distance.
- Rhumb Lines presented as straight lines. A Rhumb Line is a line on the earth's surface that crosses all MERIDIANS at the same angle.
- Great Circle represented as straight lines. A Great Circle is a circle on the earth's surface described by a plane passing through the earth's center.

NOTE: It is not possible to prepare a chart that includes all of the listed optimum characteristics. For example, it is impossible to prepare a chart on which both Great Circles and Rhumb Lines are represented by straight lines.

GPS NOTE: Electronic generated bearings and course headings are usually always **Great Circles**. A Great Circle bearing from a GPS does not plot as a straight line on a nautical chart. Many newer GPS sets do have a feature that converts Great Circle bearings to Rhumb lines. Check your GPS Operating Manual for this feature and select it.

There are many different types of chart projections. The two, which are of primary interest to the mariner, are the **Mercator** projection, most commonly used for ocean and coastal navigation, and **Polyconic** projection, which are used to generate charts of the Great Lakes and Inland Rivers. Therefore, the Auxiliary is involved in

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the updating of both Mercator and Polyconic projection charts. The chart's projection is identified within the General Information Block on the chart.

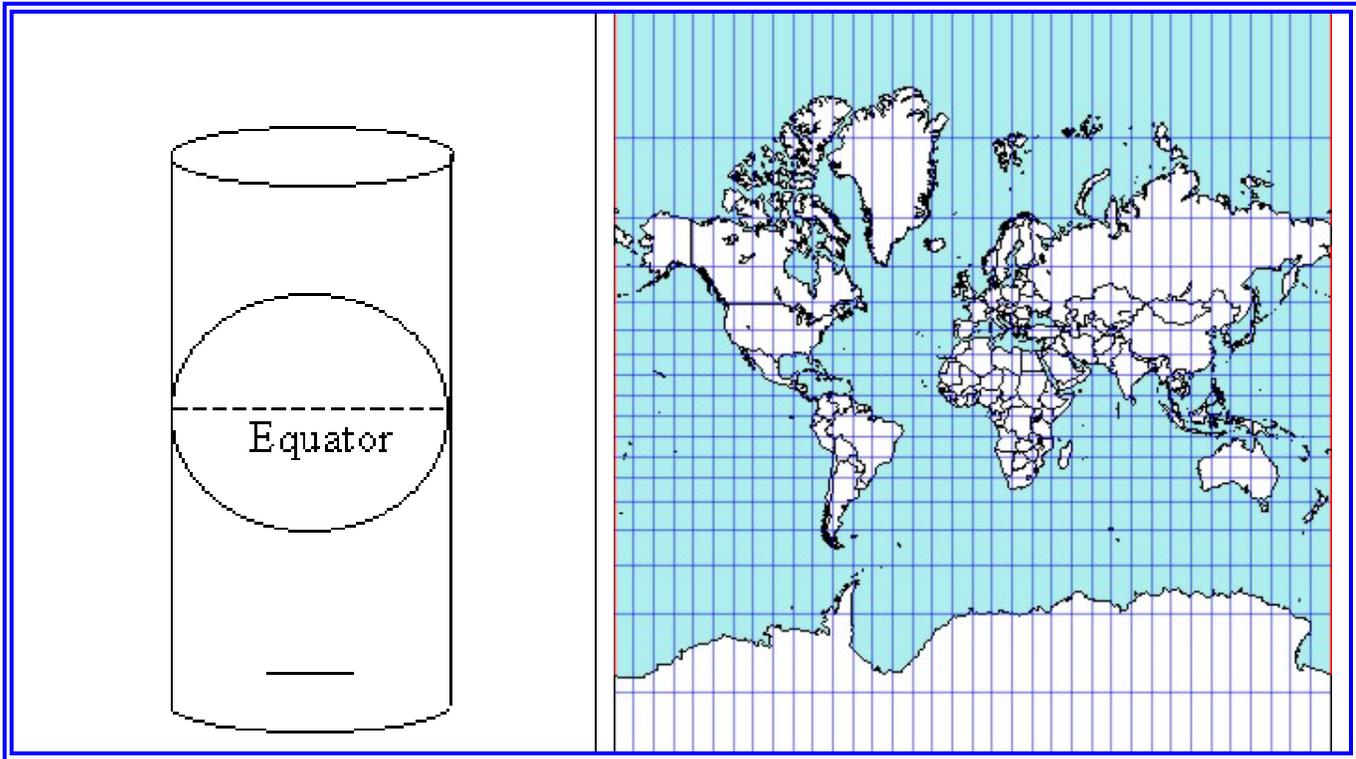


Figure 2 - Mercator Projection

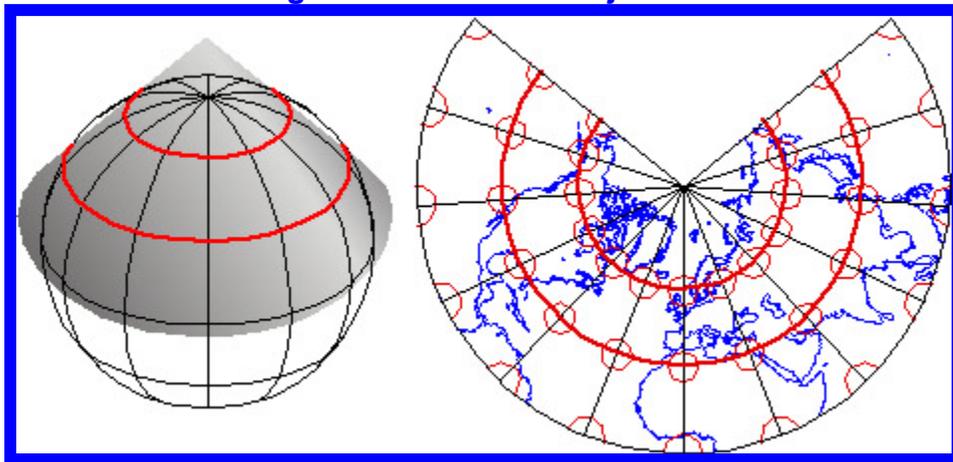


Figure 3 - Polyconic Projection

Since a nautical chart has to be a representation, in reduced form, on a flat surface of a specific area of navigable water on the surface of the earth, actual distances on the earth's surface must be presented relative to the available space on the chart. This distance dimension reduction is termed the **Scale of the chart**. The Scale of a chart is an expression of the relationship between a given distances on the chart to the actual distance it represents on the earth's surface. The chart scale may be expressed in the form of a **ratio**, such as, 1:80,000, where one unit on the chart represents 80,000 units on the earth's surface. It may also be expressed in the form of a **fraction**, say 1/80,000. Charts are published in a wide range of scales. The Scale of a chart is normally printed within the General Information Block on the nautical chart.

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For general convenience of reference, the issuing agencies have classified charts into the, following series:

- SAILING CHARTS** Have a 1:600,000 scale and smaller
- GENERAL CHARTS** Scales range from 1:150,000 to 1:600,000
- COASTAL CHARTS** Scales range from 1:50,000 to 1:150,000
- HARBOR CHARTS** Scales range from 1:50,000 and larger.

Charts of the Great Lakes are also grouped into series:

- GENERAL** Showing all of the lakes plus one for each lake
- COAST** Scaled 1:80,000 or 1:120,000
- HARBOR** Have larger scales than NOS charts

CAUTION: When chart scales are expressed as a fraction, confusion sometimes results from the use of terms Large Scale (where the denominator of the fraction gets smaller), and Small Scale (where the denominator of the fraction gets larger). For example, 1/80,000 is a smaller fraction than 1/40,000, thus a chart of 1/80,000 scale is termed a Small Scale Chart.



Figure 4 - Small and Large Scale Charts

When using a Mercator projection chart for measuring distance, one minute of latitude is equal to one nautical mile. This means that the Latitude Scale can be used to measure distance on the chart. On charts of a scale smaller than 1:80,000, the latitude scale will be the only means of measuring distance. **Auxiliary members should use the largest scale charts available for Aid to Navigation and Chart Updating activities.**

A general information block is located at a convenient place on charts. The chart title, description of the area covered, type of projection, scale, unit of depth measurement, the horizontal datum and the vertical datum plane for each sounding are found in this block. It is important to know that nautical charts are being converted to the Metric System. At that time the base unit of measure will be expressed in meters.

GPS NOTE: Be sure that the horizontal datum that is preset in your GPS matches the horizontal datum referenced on the NOAA Nautical Chart that you plan to use.

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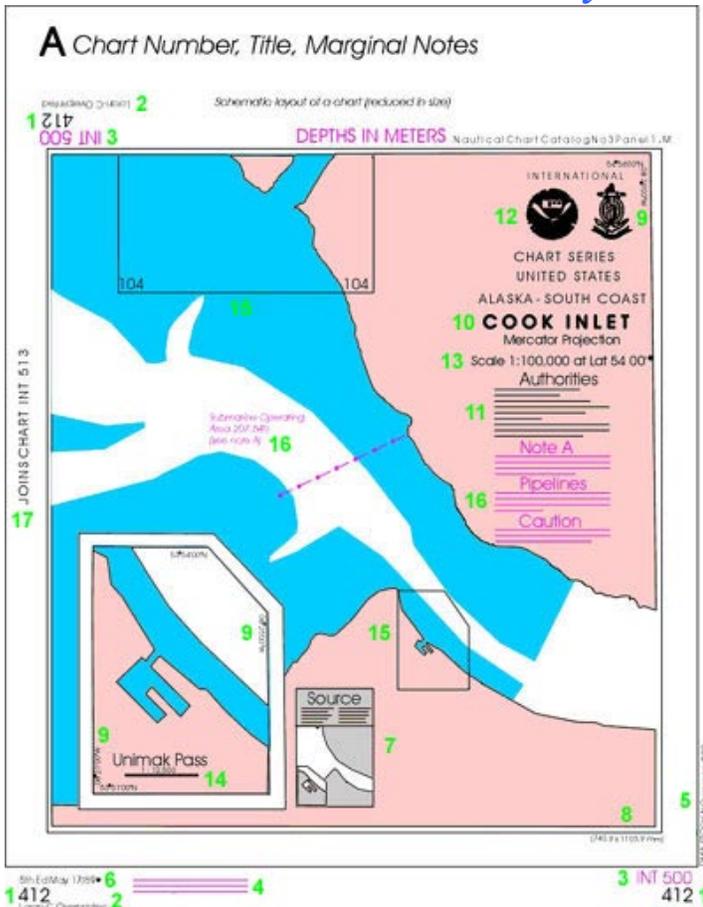


Figure 5 – Chart Standard from Chart No. 1 Publication

Other useful and essential information may be found on the chart, such as the meaning of symbols and abbreviations, special notes of caution, units of measurements of heights and the reference plane from which measured, tidal information, anchorage information and physical features data.

The Horizontal Datum and how it related to GPS use.

The horizontal datum for a nautical chart serves as the reference for the placement of lines of latitude and longitude. The advent of GPS has changed the position of these lines. Today most charts reflect the North American Datum of 1983 (NAD83) or the World Geodetic System of 1984 (WGS84) datum. **Your GPS set must be set to the horizontal datum referenced on the NOS chart that you are using. See your GPS Owners Manual for instructions for making this adjustment.**

The changed generated by GPS did not change the position of objects in relation to each other but rather a shift

in the latitude and longitude grid. This means that the LAT/LON of an object on an older chart with a different horizontal datum will not be the same as the object on a chart with a WGS84 datum.

In general, the range of this latitude and longitude shift varies in the United States from 15 yards in the Great Lakes, 34 yards along the Atlantic Coast and the Gulf of Mexico, 100 yards on the Pacific Coast, 500 yards in Hawaii, to 240 yards in Puerto Rico. As a precaution, always use the latest edition of a nautical chart.

Chart Edition

The chart edition number and publication date appear at the lower left hand corner of the chart. Immediately following this data will be the corrected through dates and the magenta caution note that explains the meaning of this information.

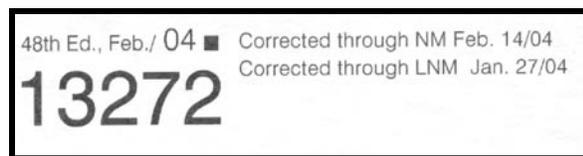


Figure 6 – Chart Edition

New Edition charts are published when major critical changes occur, as reported by chart updating reports from the Auxiliary and other sources. A New Edition chart is a revision that cancels previous issues. Auxiliary members should only use the latest edition chart in support of ATON, PATON, Bridge and Chart Updating activities. Recently, sales of charts had initiated more frequent releases due to the ease of generating digital charts.

Latitude and Longitude Scales

Conventional NOAA paper nautical charts have the geographical north direction oriented towards the top of the sheet. Latitude scales are located on the left and right side borders. Longitude scales are placed at the top and

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bottom borders. The Parallels of Latitude are drawn across the chart in fine black lines at intervals of two, five or 10 minutes of Latitude and Longitude as determined by the scale of the particular chart. Meridians of Longitude are read from the top to the bottom on the chart.

NOS charts which have a scale larger than 1:40,000, such as a 1:100,000 harbor chart, have border Latitude and Longitude scales in increments of minutes and tenths of minutes. On smaller scale charts, such as a 1:80,000 chart, the border may be subdivided into minutes and fractions of minutes.

Color used on Nautical Charts

Most charts employ color to emphasize various features and to facilitate chart reading and interpretation. NOS uses various shades of five colors on their regular charts:

1. Land areas are shown in buff or yellowish color.
2. Water masses are shown in white.
3. Shallow water areas are shown in blue.
4. Submerged areas, which uncover at some stage of the tide, are shown in green.
5. **Magenta** is used for many purposes on charts and stands out well under red light that preserves night vision. Lighted buoys of any color have a magenta disc printed over the aid's position circle to assist in their identification at night. Instructions useful for night operation are printed in magenta.

Buoys and other aids are appropriately colored, red, green, and yellow. Black is also used for most symbols and printed information

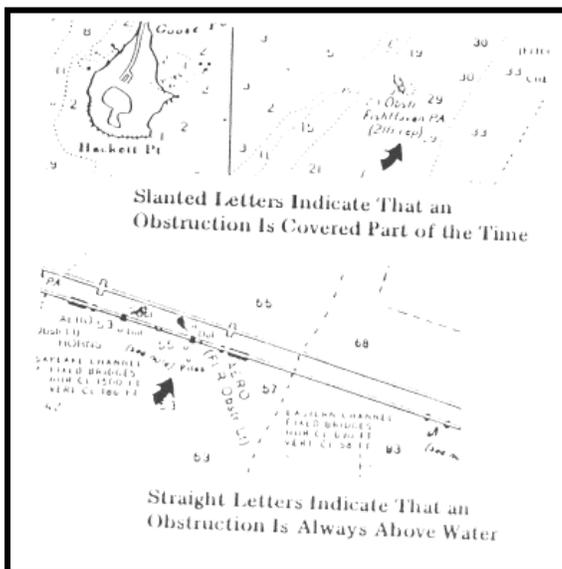
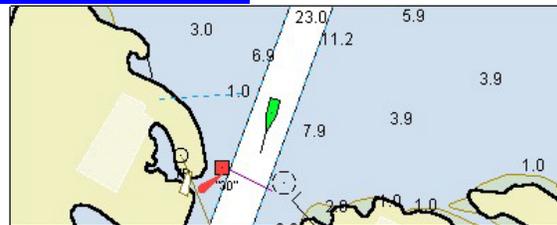


Figure 7 - Significance of Slanted Lettering

Certain classes of information are printed in one style of lettering and other classes in another style. Vertical lettering is used for features which are dry at high water and are not affected by movement of water, while leaning or slanted letters are used for water, underwater and floating features except depth features.

Figure 8 - Charted Depths



In order to interpret the charted depths on a nautical chart, there must be a reference plane or datum, particularly in coastal areas where depths may change hourly as the result of tidal action. Each chart contains a statement of datum from which all depths are measured at near to normal low-water levels. The vertical datum is shown in the General Information Block on a nautical chart. Vertical datum is commonly expressed as either feet, meters or fathoms. A fathom represents six feet.

Depth information is commonly referenced on a chart by a numeral. This number indicates the estimated depth of water whose unit of measure is defined by the chart's vertical datum. The datum's coverage will be valid over the complete surface of the chart unless noted otherwise. The tidal datum system for all marine waters of the U.S. and its territories has implemented the conservative expression of "Mean Lower Low Water." This

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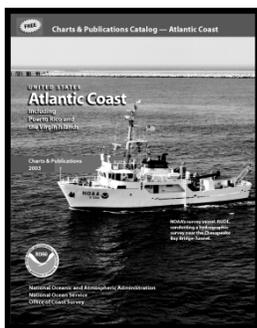
means that the arithmetic mean (or average depth) is calculated from the lowest of the low water readings for each day.

Lake and river charts will usually use a datum based on past records of variations in depth levels recorded over many years.

Most charts contain **contour lines**, sometimes called “**Depth Curves**” that connect points of equal depth. Such lines appear at certain depths as determined by the chart scale and relative range of the depths. Continuous solid lines or various combinations of dots and dashes are used to code the depth along each contour line.

Nautical Chart Catalogs

Currently NOS publishes four Nautical Chart Catalogs. These catalogs are available to the public and the Auxiliary through regular chart distribution sources. The catalogs indicate areas covered by each chart, the scale used and the price. Catalogs 1 through 4 cover contiguous waters of the United States as follows:



#1 -Atlantic & Gulf Coasts including Puerto Rico and Virgin Islands.

#2 -Pacific Coast, including Hawaii and Pacific Islands, Guam & Samoa.

3 -Alaska including the Aleutian Islands.

#4 -Great Lakes, including connecting and adjacent waterways.

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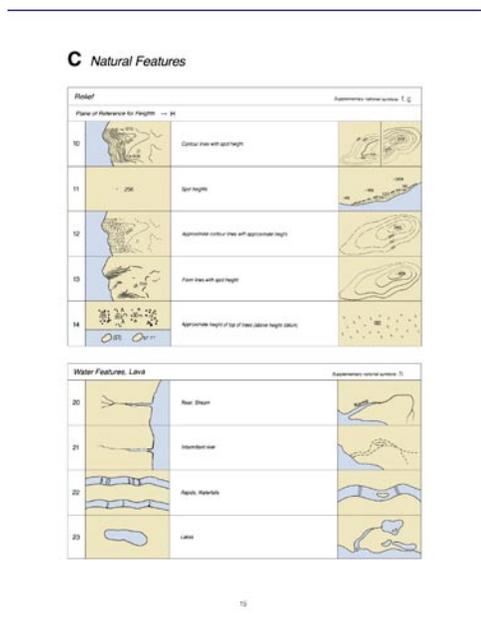
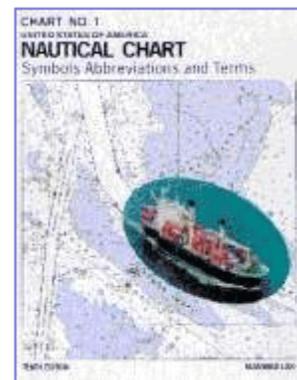


Chart No. 1

Chart No. 1 Nautical Chart Symbols, Abbreviations and Terms is a reference publication depicting basic chart elements and contains a description of the symbols, abbreviations and terms that appear on nautical charts produced by the National Geospatial-Intelligence Agency, the National Oceanic and Atmospheric Administration and the International Hydrographic Organization. It is a valuable aid for all mariners. The digitized Chart No.1 can be found at <http://pollux.nss.nima.mil/pubs>.



Auxiliarists participating in the ATON, PATON, Bridge and Chart Update Programs should become familiar with Chart No. 1, particularly with some specific symbols and abbreviations. For example, it is important to know that the symbol for an approximate position is a small circle with lower case lettering, whereas the

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symbol for a surveyed position is a larger circle with a dot in the center with capital letters. When available, always use surveyed positions for taking bearings or determining position.

NAUTICAL CHART UPDATING

INTRODUCTION:

NOS and the Coast Guard rely on mariners for notification of any errors, updates or changes that may be required to order to keep nautical charts and other related navigational publications reflecting current conditions. The Coast Guard and the Auxiliary entered into an agreement for the Chart Update program, wherein the Auxiliary through its Aid to Navigation /Chart Update Program agreed to report data useful for the correction of Nautical Charts. Because of this agreement, chart updating is an important responsibility of each member of the Coast Guard Auxiliary.

OBJECTIVES:

1. To acquire a general knowledge of the responsibilities of each Auxiliary member for accurate Nautical Chart updating.
2. To familiarize Auxiliary members with the characteristics and types of charted information that needs to be reported.
3. To acquaint Auxiliary members with the procedures for reporting chart updates and corrections using the ***NS-CU03-Chart Update Form***, the ***NS-CU04-Chart Update Worksheet(s)*** and other specified and required attachments, including photographs.

INFORMATION:

To order to maintain the efficiency and effectiveness of the navigation information provided on nautical charts and other related publications, the publishing agencies constantly need new data about any observed non-standard conditions. Therefore, report all changes, deletions, additions and all discrepancies observed on-scene versus information published on nautical charts or in nautical publications.

Assume that any observed problem is a “**first instance discovery**” and report it as a chart update. Independent redundant reporting only increases the credibility of the charted discrepancy. Redundant data reports often confirm the prevailing situation and provide more specific detail that enhances the needed chart or publication modification. Do not report items checked and found to be charted or published correctly except when requested by an appropriate agency or when they are part of an overall survey of an area. Identify them as **CAC**—**Correct as Charted** on your report(s).

Make your Chart Updating Reports as concise, definitive, accurate and complete as possible. Of particular concern are those features on the water, which must be observed close aboard and are the most difficult for charting agencies to verify. Features on land or those in the water that are fixed to the bottom, such as beacons, can be verified more accurately. Discrepancies to Federal and Private Aids are usually not reported as chart updates, with the exception of errors to chart symbols or abbreviations. The proper reporting path for aids to navigation is through the local Coast Guard ANT or Unit that is responsible for the aids. District DPW (Department Prevention – Waterways) offices forward the corrections to aids to navigation directly to NOAA via the LNM.

For chart updating activity, always use the **latest edition** of the **largest scale** charts available. Keep these charts current by updating with the data provided in the LNM- Local Notices to Mariners, which is available through the Internet on a weekly basis. Check the National Navigation Systems Division Web Site for LNM—Local Notice to Mariner links.

When you submit acceptable chart updates with chartlets, NOAA has agreed to replace the charts free (if your report is accepted by NOAA).

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Tools needed for Chart Updating:

The following tools are suggested for use when checking a charted object. Usually, most of this equipment is found aboard every operation facility (**OPFAC**). However, many Auxiliarists, who are active in the Navigation Systems Programs, carry a personal *navigation kit* that contains the following equipment. For a successful Chart Updating experience, insure that the right navigational tool is available when it is needed by including this equipment as part of your pre-underway checklist. Pre-calibrate each navigational instrument to insure that it is operating accurately. Make it a standard practice to record this activity and the test results. You may need it later as part of your chart updating report(s).



Binoculars - Size 7 x 50 are preferred. Binoculars are needed to view aids or objects that are located where it may be unsafe to operate an operational facility (**OPFAC**) to get a close up view of potential discrepancies. Many small, inexpensive and powerful binoculars or monocular are commercially available and make a perfect addition to your Navigation Kit.

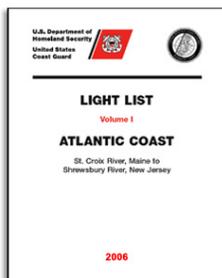
Time Piece - A stopwatch is a useful tool for timing the period of an aid's light. Any good wristwatch satisfies this equipment need. Your GPS set can provide very accurate date and time information when checking locations and depths of aids. Set up a GPS screen to show time, Lat/Lon, and EPE (Estimated Position Error). This screen set up is very handy reference when collecting data for locating objects.



Figure 9 – Three-line GPS Screen

Latitude	Longitude
42-36-22.50 N	070-23-59.00 W
12.4 ft EPE	
Time:	14:45

GPS - A GPS set with **WAAS** (Wide Area Augmentation System) can provide location (LAT/LON) data within 8 to 10 feet or within a 20-foot diameter circle. WAAS usually comes as a standard feature on GPS sets. Ten feet is inside the limits of the width of the ordinary OPFAC. If you use one of the fine hand-held GPS models that are currently available, be sure to buy a power cable that plugs into your vessel's 12v power. Also, add spare batteries for your GPS to your Navigation Kit. Consider purchasing a hand-held GPS mounting bracket and attaching your GPS to a plotting board or large clipboard that will hold your GPS set while underway and will keep your reference documents secured. Good organizational practices speed up the on-scene observations and recording time.

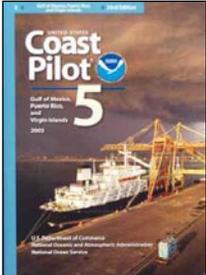


The **Light List** contains a listing for most of the aids to navigation in your AOR. Some private aids will not be listed in the Light List. Different volumes are available depending on your geographic location. The Light List is available on line. Print out only those pages that pertain to the area where you operate your boat. Reference the Navigation Systems Division Web Site for a link to the Light List that covers your AOR. Check the on-scene observations of each aid to navigation against its entry in the Light List. Also, validate the observation of the aid and the entry in the Light List to the symbols and abbreviations used to identify the aid on a nautical chart. Any

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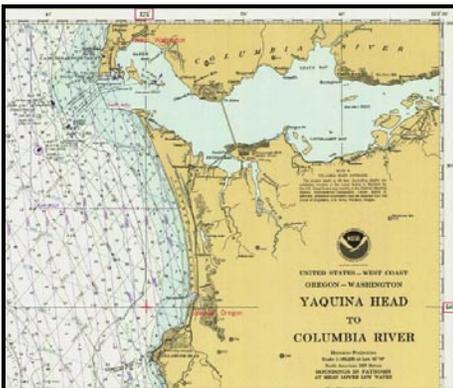
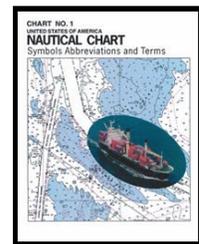
mismatch is a reportable discrepancy to the Coast Guard. Charted errors provide an additional Chart Updating report to NOAA.

LNM – Local Notice to Mariners - Keep your flotilla charts and other nautical publications updated to the latest Notice to Mariners. The LNM is available by e-mail on a weekly basis from your District AN office. Prudent mariners update their nautical chart(s), Light List and Coast Pilot before every ATON patrol.



Coast Pilots contain information that is not easily included on the nautical chart. This publication is also available on line. Print out only those pages that pertain to your area of operation (AOR) and keep them in your Navigation Kit. Reference the Navigation System Web Site at www.uscgaan.com for a link to the Coast Pilot that covers your AOR. It is always a good practice to review the Coast Pilot data while you are performing Chart Updating activity while underway in an area or when you are planning a patrol. Usually, if you do not preplan an event, nothing productive happens.

Chart No. 1 contains every abbreviation and symbol used on a nautical chart and should be part of the *navigation kit* of every serious navigator. While this publication is also available on-line, it is better to purchase a hard copy. Every authorized marine chart dealer should stock a copy or you can purchase a copy on line from the major book dealers. Reference the Navigation Systems Web Site at www.uscgaan.com for a link to this publication.



NOAA Nautical Chart - Every OPFAC should be using the latest NOAA nautical chart for navigating. **Use only nautical charts with horizontal datum of NAD83 or WGS84 for chart updating activities.** Also, update this chart to the latest Local Notice to Mariners (LNM).

A link to the LNM corrections for every NOAA nautical chart is available on the Navigation Systems Web Site at www.uscgaan.com. Keep copies of the current NOAA Nautical Charts in your *navigation kit*.

Note that aid to navigation corrections are digitally updated to “*on-line charts*” on a continuing basis. Reference to the latest LNM is printed at the top of these charts. These on-line charts are current to within two weeks. Log onto www.uscgaan.com and click on *Helpful Links*. Select “*On-LINE CHARTS.*”

While chart updates are also updated digitally as they are approved, they do not appear on these on-line NOAA charts until the next official release of the chart.

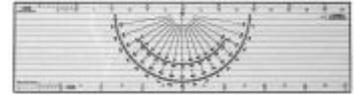
CU FORMS - The **NS-CU03-Chart Update Form** , **NS-CU04-Chart Update Worksheet** and the **NC-CU05-Coast Pilot Text Corrections Worksheet** are available on the Navigation Systems Web Site at www.uscgaan.com. Print out some blank forms for use while on scene. Keep adequate copies of this form in your *navigation kit* along with a copy of the form’s field use instruction sheets.

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Pencil - An automatic pencil using 0.5 HB lead with an eraser is ideal. It is always sharp. Include extra pencils, leads and erasers in your Navigation Kit. If you decide to use regular wooden pencils, add a small pencil sharpener to your **navigation kit**.

Plotter – A paraglide plotter is the more practical plotting instrument to use on a small boat. Be sure your plotter has wheels to easily roll it on your chart without losing the course angle. Prudent mariners plot their intended courses on their nautical chart before they venture out on the sea or river. Modern mariners take the extra step to enter waypoints and routes in their GPS and schedule their verifications and checks along the route. This practice not only speeds up the Chart Updating patrol but also saves much time and fuel. It also provides an opportunity to teach navigation to the crew between planned patrol events. There are many varieties of plotters are available.



Digital Camera – A digital camera is a great tool for communicating discrepancies to the Coast Guard and NOAA. Purchase a computer cable with your camera to be able to download your pictures to your PC and transmit them to the appropriate agency. One picture of a discrepancy is often worth a thousand words and greatly increases the credibility of your Chart Updating reports.

Special Developments

Some Auxiliarists have fabricated many unique tools and instruments. Examples are sounding poles for shallow depths, chain and wire drags, tools for measuring the angle of leaning aids, and plotting boards fitted with mounting devices for hand held GPS sets. In addition, there are EXCEL systems developed that calculates the distance an aid is off station using location (Lat/Lon) and almanac data available on your GPS.

Calculators

There are many calculations needed when updating charts. Add a good calculator to your *navigation kit*. The ideal unit would have a solar panel and a battery system for nighttime use. You may have to get two units. Do not forget to add spare batteries to your Navigation kit.

Hand Held Calculator with solar panel



How to determine whether an object is chartable?

The chartability of an object depends on its length in relationship to the scale of the chart. This explains why an object, plotted on a large scale, does not appear on a smaller scale chart that covers the same geographic area. To be charted, the ratio of the object's length to the scale of the chart must be greater than the ratio of **0.03**. Use the following formula to determine whether an object should be charted.

“Divide the length of the object in feet, multiplied by 12 (to convert it to inches), by the chart scale.”

For example, a 90 ft. pier is observed and the scale of the chart for the area is 1:40,000. For the pier to be chartable and be reportable as a chart update, it must be equal to or greater than 0.03 inches relative to the scale of the chart.

Step 1 - Convert measurement of the object in feet to inches.

Pier length in feet multiplied by 12 - (90 feet x 12 = 1,080 inches).

Step 2 - Divide the pier length in inches by the chart scale.

1,080 inches divided by 40,000 - (1,080 inches / 40,000 = 0.027).

The Pier is not chartable since it is less than the **0.03** criterion. This pier is not reportable as a chart update but could become a Coast Pilot Update depending on the services offered at the pier.

If the pier appeared on a larger scale chart, it may be charted. (i.e., a 1-10,000 scale chart)

1,080 inches divided by 10,000 - (1080 inches / 10,000 = 0.108).

The pier would be charted on this chart.

Check the CU web page on the Navigation Systems Web Site at www.uscgaan.com for the **NS-CU07-Vertical and Horizontal Error Calculator**. This EXCEL form will calculate the ratio for you and provide a go-no go message.

How to take and report photos of objects

Photos add great credibility to your chart updating reports. Remember that you are communicating with the remote cartographer who, most probably, has never seen the area that you are reporting. Try to put yourself in their chair and recheck your reports accordingly. Use your photo to communicate a clearer picture of the problem? Photos often resolve these issues. It is best when you can include an easily recognized charted object as part of the photograph. This helps the cartographers to better understand what they are looking at. A drawing provides a clearer picture for the cartographer.

Always include a fix for the location where each photo is taken. Add a bearing, corrected to True, from the fix to the object. If you have not included a fix for the object that you are photographing, include on your report a distance estimate in feet to the object from the spot where you took the photo.

Label each photograph clearly. Use your computer to add copy to your digital photos or change the slide's name. Assign each photo a PLN-Position Locator Number for identification and report organizational purposes. Also, on your *NS-CU03-Chart Update Form* or *NS-CU04 Chart Update Worksheet(s)*, explain the purpose of each photo, what they are presenting to the cartographer, and what they contribute as evidence in support of the premise of your chart updating report.

When you are charting a large area, such as a marina where multiple photos are involved, it is recommended practice to always assign a **PLN-Position Locator Number** to each photo. Plot the locations where photos are taken on a chartlet and explain the purpose of each photo.

Measuring Heights of Objects

Measure charted heights from **MHW**—Mean High Water. This means that, for the sake of accuracy, you must take your measurement at as close to the MHW level as possible, or you must correct the resulting height calculation for the height of tide. Since, at best, we will be calculating an estimate of the height, explain in your report how you determined the MHW level. You can also estimate the height of the object and subtract the “Range of Tide” less the “Height of Tide.”

Step One – Take a fix at your location. Estimate your height at or above the MHW level. The ideal situation is being at MHW level.

Step Two – Take a second fix at the location of the object for which you are measuring the height. The ideal situation is an actual fix at the location of the object.

- If you are unable to visit the location of the object, read the LAT/LON of the object from a nautical chart. If you are measuring a cable, take the fix at center of the span between two supports, which should reflect the lowest point of the cable.
- If the cable is not charted, take fixes at both ends at the support towers and plot the cable on the chart. Then, take a fix from the chart at the mid-point of the span between the two supports.

Step Three – From your location, measure the angle in degrees from the base of the object (at MHW) to the top of the object, with the following exceptions:

- For cables, determine the angle to the lowest point of the cable across the span.
- For lights, determine the angle from MHW to the focal plane of the light.
- For bridges, determine the angle to the lowest point of the span over the navigable channel.
- Use a vertical sextant angle or a compass to determine the angle from the base of the object at the MHW level to the top of the object or the special point for the situations indicated above. When using a compass, be sure the base at zero degrees is level. Here are three examples of some tools.



Step Four – Using the NS-CU07-Vertical and Horizontal Error Calculator, enter the LAT/LON for your observed fix and the assigned LAT/LON at the base of the object being measured. The calculator will estimate the distance and bearing in True to the object in feet.

Step Five – Using the “NS-CU07-Vertical and Horizontal Error Calculator,” enter the distance determined by Step Four and the angle determined by Step Three in Section 5, “Estimating the Height of an Object from a known distance.” The EXCEL calculator will compute the estimated height of the object.

It is a good practice to include a copy of the completed **NS-CU07-Vertical and Horizontal Error Calculator** with your report as further evidence of your calculations. This increases the credibility of your report.



The Use of GPS for Chart Updating Your GPS is one of the most important instruments that an Auxiliary member can use for determining the locations of objects, both ashore and afloat, with a high degree of accuracy. GPS/WAAS or DGPS has sufficient accuracy for taking fixes in the Chart Updating Program. In your Chart Updating support role, as an Auxiliary member, you need to understand how to set up and use GPS for determining and plotting fixes. You are required to check the GPS on each OPFAC that you use for Navigation System Program activity. Read the following copy about GPS sets very carefully.

INFORMATION:

Without getting into too many technical details, GPS is operated from 24 orbiting satellites that are continuously rising and setting overhead. These satellites are positioned so that we are able to receive signals from six satellites nearly 100% of the time that provides excellent position information to our GPS sets. GPS satellites are equipped with precision clocks that keep time to within three nanoseconds—or three billionths of a second. Chart Updating guidelines require that a GPS be operating in 3-D status (viewing 4 satellites) when used for taking fixes.

SELECTIVE AVAILABILITY ERROR - SA—Selective Availability is a term used to describe a transmission error that can be built into the GPS satellite signal output. Since SA error was shut off, any standard GPS set will provide a position within a 25- to 35-meter target circle 98 percent of the time. This is the equivalent of having your boat in the middle of a football field while you look for the goal posts. Note that a GPS set not using WAAS or DGPS requires the averaging of location readings over a period of time to insure position accuracy.

DGPS - Differential GPS uses a land-based station and signal to correct general GPS signals. While increasing your GPS cost, it provides a position target inside a 30 target foot circle, 99 percent of the time. DGPS is a step up on regular GPS accuracy and is acceptable for location reports in the CU Program. Always include a HDOP-Horizontal Dilution of Position quality check reading with each reported fix.

WAAS - Wide Area Augmentation System is a GPS feature that was developed for aircraft use. WAAS is bundled into most GPS sets that are sold today. Accuracy of 8 to 10 feet is common which is inside the footprint of every Auxiliary facility. When you buy your next GPS, be sure it has WAAS. Always report an **EPE**-Estimated Position Error quality check reading with each reported fix.

SETTING UP YOUR GPS SET

In order to insure that a GPS set is providing the accuracy needed for CU reporting, here are a few tasks and checks to make:

- **Always keep your GPS Operating Manual handy on your boat.** You will need to reference the GPS procedures on many occasions.
- **Spend the time to get fully acquainted with your keyboard.** Most sets come with a “Quick Guide” which is a menu card list. If you didn’t get a Quick Guide, develop your own.
- **Set up the GPS Units of Measures:**
 - **Depth/Altitude** – Set your GPS to the Vertical Datum shown in the General Information Block on the NOS Nautical Chart that you are using.
 - **Distance** – Set your GPS set to Nautical miles. Most new GPs sets come preset to Statute miles.
 - **Speed** – Set you GPS speed to KNOTS. Usually, this setup is related to the Distance set up above. However, be sure and check your GPS Operating Manual.

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Navigation Setup decisions.

- **Horizontal Datum** – Set your GPS to the Horizontal Datum shown in the General Information Block on the NOS Nautical Chart that you are using. Note that only charts with a WGS84 or NAD83 Horizontal Datum are usable for Chart Updating.
- **Navigation Mode** – Set your GPS set to Rhumb line. This feature removed any LOP error projections generated by regular electronic bearings.
- **Auto-waypoint Shift** – This feature causes an automatic shift to the next waypoint as you break the Waypoint Circle Alarm.
- **Way Point Circle Alarm** – Defines a distance limit that forms a circle around a waypoint and sets off an alarm when circumference is crossed.
- **XTE Alarm** – Prescribes a distance limit that forms on either side of your Track Line between waypoints that sets off an alarm when crossed. This is a helpful aid for keeping a boat on course.
- **Latitude and Longitude Expression** - Set the LAT/LON read out to:
“DD MM SS.SS N / DDD NN SS.SS W.”

The GPS Navigation Validation Process – the Quality Control function.

- **Satellite Screen** – Check your GPS Operating Manual for the explanation of satellite accuracy as displayed on the Satellite Screen in your GPS.
- **3D Operation** – Be sure you understand how to recognize when your GPS set is operating at a three-dimension level. This means that the GPS is locked on to four satellites. Do not use fixes when you are not operating at this level. Many sets will read “GPS Differential” when operating in 3D Mode.
- **HDOP** – Horizontal Dilution of Position Error. This error is an expression of the relative geographic position of the satellites to each other. The lower this error, the more accurate is your position. Check your GPS Operating manual to learn how to read this error and use it when you are positioning. Many ATON/CU procedures require that you list this error along with the LAT/LON of your position readings. Readings between 1 and 2 and most desirable.
- **EPE – Estimated Position Error.** This error is an expression of the diameter of a circle in which you position target exists. Many sets will show this error in feet. Many ATON/CU procedures require that you list this error along with the LAT/LON of your position readings.

ENTERING WAYPOINTS

A waypoint is simply a location expressed in latitude and longitude that is used for navigation with a GPS set.

- The best waypoints are aids to navigation because they provide a visual confirmation to validate the electronic directions received from your GPS set.
- Use sounding aids for extra help during periods of reduced visibility.
- Use lighted aids for night-time runs.
- Waypoints can be entered in different ways. Check you GPS Operating Manual to understand these different methods:
 - Manual input of latitude and longitude.
 - Input by chart cursor on an electronic chart.
 - Actually visiting the waypoint position with your boat. This is called **Waypoint Verification**. You should verify every waypoint that you enter in your GPS.
 - Remotely entering your waypoints with a computer.

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WAYPOINT USAGE:

- **Keep your waypoint definitions simple for ease of entry.** Complex waypoints only clutter your display screens. Use waypoints IDs such as 001, 002, 003, etc.
- **Develop an EXCEL waypoint list** where you can include much more information. These lists can also help you reuse the waypoint over in various routes. The list also provides you with a means to indicate that the waypoint has been verified.
- In searches for various aids, **load the LAT/LON of the aid as a waypoint** and use the GPS GOTO feature in the navigation section of your GPS. The GPS will provide the heading and distance to the aid. This is a good technique to use when verifying that an aid or object is actually missing.
- Use **colored labels** to mark waypoints on your chart. Write the waypoint number on the label. This technique provides a quick visual check for a waypoint when you need it in a hurry.

ENTERING ROUTES

Routes are created by linking a series of waypoints in a file and are the key tool for navigating with a GPS.

- Set up a **XTE—Cross Track Error** once you establish a Route in your GPS. This will help keep you on track and alert you when you stray off course.
- **Practice running routes in clear, calm weather** so you will be prepared to run them in times of reduced visibility.
- **Use your GPS as a quality control tool** to check your progress, but, always steer your boat by your compass.

GPS INTERFERENCE PROBLEMS.

There are a few systems that you must become aware in order to maintain accurate operation of your GPS set.

- **Operating too close to ground RADAR** usually located around airports. RADAR freezes your set's operation. The set continues to appear operating because the screen freezes. You have to be extremely observant to pick up when the freeze occurs. Generally, you have to take the power away from the set to restore GPS operation. On hand held models, you often have to remove the batteries to restore GPS operation.
- **Operating near cell phone towers** can create problems with the proper operation of a GPS set. Larger systems appear to be affected more than smaller hand-held sets. Operation is restored as you move away from the tower.
- **Powered TV antennas can cause degradation** in the performance of GPS receivers. Problems have been reported up to 2,000 feet from the interference site. Operation is restored as you move away from the tower. Report these anomalies as chart updates to NOAA.

Guidelines for taking and reporting a Fix:

Taking fixes is one of the most important aspects of the Chart Updating job. Your main focus has to be on accuracy, professionalism and quality control. This guideline for taking fixes is designed to generate this impression. It begins by requesting data about the instruments being used and is focused on how you pre-set and check them just prior to beginning your chart updating activity, how you rechecked them while on scene to insure that they are reading accurately, and finally by reporting the quality control data generated by the instrument when the fix is taken. Short of this process, your data is questionable to NOAA. So, spend the time to get the job done correctly.

All fixes reported to NOAA must be of high quality and accuracy. This guideline supports this goal. A GPS set using WAAS or DGPS is the recommended tool for taking a fix. Hand-held GPS sets with WAAS can produce LAT/LON (Fixes) within 8 to 12 feet of the actual position of the object on the earth's surface. That is inside a pinhole on a chart.

Horizontal sextant angles and bearings using a hand-held compass are not considered sufficiently accurate for use in developing fixes in the Chart Update program in comparison to the electronic tools that are available.

Normally, there are three different tools available to the Auxiliarist for taking fixes. Each has different levels of accuracy. From a credibility aspect, it is important to always identify which tool you use.

GPS with WAAS is the most accurate. Readings as close as 8 to 10 feet are common with the correct positioning of satellites. Always provide the EPE-Estimated Position Error reading with each fix. If the EPE is reading high, check that your set is in 3D Mode—reading four satellites overhead. If the EPE is high, wait a while until some new satellites move into position.

DGPS is a close second and quite acceptable. Provide a quality control reading with each fix. Often these quality indicators are HDOP-Horizontal Dilution of Position.

GPS – Reading from a standard GPS may not be acceptable for a fix on a lateral aid due to a large error. The proper process is to stay on scene for an extended period and take many readings, and then, average the results. If your set is less than 4 or 5 years old, it may have WAAS. GPS WAAS is usually not enabled when you buy the set. Check your set's operating manual. You may be pleasantly surprised. Regular GPS reading are considered of lower quality. Usually, they are acceptable for Class III PATONs but not Class II Lateral PATONs or charted locations. Always report an EPE or HDOP with each fix.

1. During the pre-underway check, test out the equipment in your navigational kit and on your OPFAC:

- Check that the nautical chart that you are using has a Horizontal Datum of either NAD83 or WGS84. *Charts with other older datum cannot be used for chart updating.*
- Verify that the WAAS or DGPS feature is enabled. These features enhance the accuracy of the GPS.
- Verify that the horizontal datum in the GPS matches the horizontal datum on the nautical chart that you are using for the chart-updating project.
- Check that the distance unit of measure on the GPS is set to nm-nautical miles or knots (KTS).
- Be sure that the unit of measure for courses and bearings on the GPS matches the unit of measure showing on the compass that you will be using during the chart updating activity.
- Set the Latitude / Longitude on the GPS to read out in degrees, minutes, and seconds. This is the NOAA standard for reporting Latitude and Longitude.

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2. Explain how you determined and/or calculated the fix alongside the aid to navigation.

- Make a note of the procedure and include it on your final report to NOAA.

3. Take the Fix close aboard or next to the object.

- *Fixes should be taken after the OPFAC stops alongside the object.* Recording fixes while an OPFAC is still in motion can introduce excess error to the GPS and can produce inaccurate or unreliable fixes.

4. Show quality control support for each fix, such as EPE and HDOP readings that you record from the GPS during the process of taking the fix. This practice enhances the quality of your report.

- Reference the make and model of the GPS equipment that you used to determine the fix on your final report to NOAA. This information enhances the credibility of your data.
- Always show the date and time when you take every fix.

GPS PRECAUTIONARY NOTE: Be alert to the fact that cell phone towers and radar installations can have a negative affect on some GPS sets while operating in their vicinity. Report cell phone interference problems as a chart update. Include the extent of the area affected. Be extra cautions when taking fixes with a GPS or DGPS near tall buildings. Pay particular attention to whether the set is still operating in **3D**—using four satellites, and to the GPS's quality readouts such as **EPE** or **HDOP**.

Guidelines for taking and reporting a single depth.

Depth is the vertical distance from the charted datum to the bottom or seabed. It is expressed in the same unit of measure (feet, meters or fathoms) as the vertical datum (soundings) designated in the General Information Block on the nautical chart. Here are some of the different depth classifications that are often referenced:

- The **controlling depth** of a channel is the least depth within the limits of a channel. It restricts the safe use of the channel to drafts of less than that depth.
- The **centerline controlling depth** of a channel applies only to the channel centerline or close proximity. Lesser depths may exist in the remainder of the channel.
- The **mid-channel controlling depth** of a channel is the controlling depth of only half of the channel.
- The **federal project depth** is the design dredging of a channel constructed by the U.S. Army Corps of Engineers. The project depth may or may not be the goal of maintenance dredging after completion of the channel, and for this reason, project depth must not be confused with controlling depth. **Do not report the water depth in a Federal controlled channel.** NOAA gets this information from the USACE-Corps of Engineers.
- **Depths alongside wharfs** usually are supplied by owners and/or operators of the waterfront facilities and may not have been verified by Government surveys. Since these depths may be subject to change, local authorities should be consulted for the latest controlling depths.

Spurious reports of depths from echo sounders are not useable or chartable by NOAA or the Coast Guard. Besides controlling the output quality of the measuring instrument, for usefulness, correct depths to the charted vertical datum. Otherwise, depths reported in tidal waters will always be vacillating within the range of the tide. This problem is more significant in areas at the higher latitudes where tidal ranges can vary 10 to 12 feet.

SOUNDING POLES – a pole marked in 1-foot increments. The depth is recorded when the pole touches the bottom and is vertical in a water column. Record depths to the nearest tenth of a foot. The pole should have a base that will keep it from sinking in the seabed.

LEADLINES – A line measured in 1-foot increments and marked at the 5- and 10-foot levels with a colored cloth or string. A reading is taken when the weighted line is touching bottom and the line is taut and vertical.

ECHO SOUNDERS

- ***Non-recording***: Instantaneous digital read out of depth with no graphical record as the vessel proceeds along its track. The set must be continuously monitored and recorded manually.
- ***Recording***: Set produces a graphic profile, either on screen or on paper, representative of the vessel's track. Output may be analyzed at a later time.

1. During the pre-underway check of the OPFAC, check that the depth datum on your echo-sounder is set to the vertical datum shown in the “General Information Block” shown on the chart you will be using.

- If your echo sounder is integrated to your GPS set, verify that the depth datum's units of measure on the chart, on the echo sounder, and on the GPS are the same.

- Use a lead line or a sounding pole to check that the echo sounder is operating properly.
2. **Take the depth. Explain the method used for taking the depth alongside the aid on your report.**
 - List the equipment that you used—echo sounder, lead line, chain or dragline, or sounding pole. If an echo sounder is used, show the manufacturer’s name and model number on your report.
 3. **When an echo sounder is used, always report the distance from the sounder’s transducer to the water line.**
 4. **Record the date and time for every depth that you take.**
 5. **If you operate within a tidal zone, show the height of tide for the time when you take each depth. Height of tide is available from the almanac screen on a GPS. For the sake of accurate depth readings, be sure that the Almanac in your GPS is referencing the nearest Tide Table Substation.**
 6. **Correct the observed depth reading to the charted datum:**
 - For an echo sounder: ((Observed Depth plus Distance from transducer to the water line) minus the Height of Tide = **Estimated Depth at Datum**)).
 - For a sounding pole or a lead line: (Observed Depth minus the Height of Tide = **Estimated Depth at Datum**).
 7. **Compare the “estimated depth at datum” to the charted depth and comment on any difference on your report.**

Guidelines for reporting a string of depths in a Depth Survey.

There are occasions where a single depth reading will not resolve the observation. This guideline was developed for this situation. The base procedure defines a string of depths. If you need to cover a wide area, such as coverage of a channel that has shifted, you can combine a series of strings, which should provide a bottom profile that outlines the shifted channel. Always, preview the area at low water to identify any obstructions or shoaling that could damage your OPFAC. Perform your depth taking activity at high water to avoid any OPFAC problems. Safety should be your primary concern.

Develop an EXCEL spreadsheet. Number each point on a chartlet where a depth is taken. Reference this number on the EXCEL spreadsheet showing the observed depth, the transducer correction, the height-of-tide, and the corrected depth at charted Datum.

You will need a GPS, an echo sounder, a stopwatch, a pad of paper and a writing instrument.

1. **Follow the guidelines for the pre-underway check** of your echo sounder paying particular attention to the accuracy of the echo sounder, the distance from the transducer to the waterline, and the accuracy of the vessel's compass.
2. **Pre-plot the planned depth strings on a nautical chart.** Check for obstructions or shoaling that may be located in the area. Predetermine the headings of each string or gridline. When you are planning to measure an existing charted channel, run the depth survey on the charted centerline.
3. **Maneuver your OPFAC to the starting point of a string or gridline of your survey.**
4. **Take and record a Fix at each starting position and record the height-of-tide.**
 - a. Record the Height of Tide from the GPS' Almanac Screen. Be sure reference the nearest substation.
5. **Maneuver the OPFAC along the pre-determined course line at no more than five knots,** while recording:
 - a. The depth at the starting point of the string or gridline.
 - b. Start the stop watch and continue to record depths every three seconds along the string or gridline while maintaining a constant slow speed.
6. **At the end of the string or gridline:**
 - a. Stop and record the time.
 - b. Take and record a Fix at the end of each string or gridline.
 - c. Record the height-of-tide and compare it to the height-of-tide recorded at the start of the run. Normally, on a short run, there will not be any or just a slight change.
 - d. If you are using a recording echo sounder, include a copy of the graph with your report. Marks the start and end points on the chart graph.
7. **Calculate the distance run in feet and divide it by the number of depths taken minus 1.**
8. **Using the distance-interval determined above, plot the points where the depths were taken along the string or gridline.**
9. **Correct the depth readings for the location of the vessel's transducer and for the height of tide.** Report the depths at datum on the plotted points along the charted string or gridline. Always, show all three readings on your spreadsheet.
 - a. Add the correction for the transducer to the observed depth.
 - b. Subtract the Height-of-Tide. If the Height-of-Tide is a negative figure, add it.
10. **Compare the observed depths to the charted depths** and make a recommendation.

Change Analysis

Change Analysis is an appropriate term for the type of investigation that is requested by NOAA for proper chart update reports. In effect, we are asked to look at the current editions of their documents (NOA Charts, Light Lists, Coast Pilots, etc.) and to compare them to the existing environment. NOAA is asking us to answer the question, “What has changed?” It sounds like a simple instruction but it becomes compounded with the necessity to document and prove that the change actually occurred. This is where the skill of the observer is important.

As an observer, you have to use every means at your disposal to convince a remote cartographer, who doesn't get into the field very often, that your observation constitutes a valid change. Starting your report with a brief summary of what you are trying to report provides a focal point for the cartographer. Once completed, your job is to prove your point to the cartographer.

Using the new locating and depth taking guides lines immediately adds credibility to your report by showing that you pre-calibrated your instruments and are reporting quality control readings while at the scene. Photographs place the cartographer visually at the scene as long as your location and the object that you are observing are documented with a fix. Adding an already charted object to the photo background further enhances your report's credibility. Plot all of the details of your observations on a chartlet in a neat and professional manner. Attaching a NS-CU04-Chart Update Worksheet when multiple locations exist is required to prove your premise. Including any evidence that is corroborated by a registered engineer adds great credibility to your report. If a charted object has been removed, try to provide a formal statement from the corporation or municipality who removed it.

Have you proved that the change occurred? Let another member read your report to get a second opinion.

You can further enhance your point by checking the Internet for data to substantiate your reported change. Local harbor masters may have information. Local newspaper articles add credibility. Town records and any other official documents greatly increase your report's credibility. NOAA does not have time to perform this research. That is why they have requested that the Auxiliary provide documented change analysis.

The greatest satisfaction gained from the Chart Update program is to feel that you have proven the premise of your report and that you have submitted a highly professional report to NOAA. You have analyzed an observed change and have proven your point with the preponderance of the evidence that you submitted

The following section describes multiple opportunities for chart analysis and updating. Read it carefully as background information. It will improve your knowledge of the various objects found on a nautical chart. Most of these entries have a photograph and show the chart symbols for the object.

REPORTABLE NAUTICAL CHART FEATURES AND COAST PILOT CORRECTION OPPORTUNITIES

Airports and Landing Strips

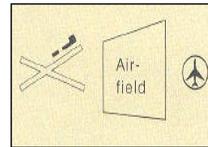


Report new or discontinued facilities. Airport facilities should be plotted even when they can't be seen from the water because mariners can usually see the rotating beacon, the arriving and departing aircraft, and other clues to their existence.

Show the extent of the airport, the location of the control tower, the start and end of the runway(s) and their direction as a True bearing.

Show the name of owner, the POC-person of contact, a telephone number, and an e-mail address. Also, report any Federal Regulations regarding rules to the approach to the area.

Also, check the Coast Pilot for references about the airport.



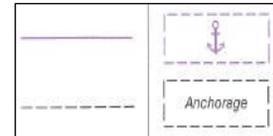
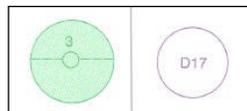
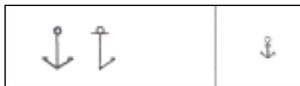
Anchorage



Report normal or emergency anchorages. Review the Coast Pilot for official boundaries of anchorages. Often the structures used to define existing anchorage boundary bearings have been torn down making the recorded boundaries meaningless. Check the Coast Pilot for these reference errors.

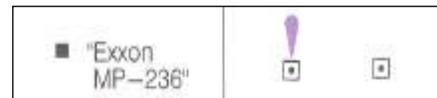
Take fixes to validate the existing boundaries. Check their locations by plotting them on a nautical chart. Take digital photos from a high point to support your report.

Include a **NS-SC03-Small Craft Facility Field Report**



Artificial Island

The term Artificial Reef is not used. Artificial Island and Marine Structure are. A chartable marine structure is a man-made structure anchored or otherwise fixed in position in a navigable waterway or foreshore area and is stationary in that position at least through the normal boating season. These include platforms and cribs, fishing and hunting structures, drilling platforms and other oil and gas well paraphernalia, etc.



Sources for charting marine structures on NOS nautical charts consist of the LNM, USCG, USACE, USGS, other U.S. Government agencies, States, private organizations, USCGAUX, USPS, NOS field reports, Coast Pilot inspections, topographic and hydrographic surveys, etc. However, NOS shall

remain the final authority for charting any marine structure that it considers to be potentially hazardous to marine navigation regardless of other recommendations.

Bridges

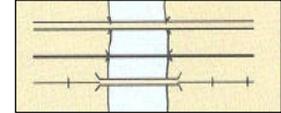
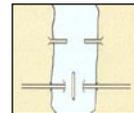
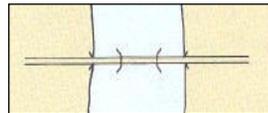
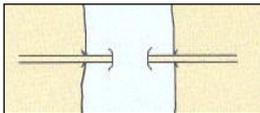


NOAA wants to receive reports when bridges are new, removed, changed, renamed, under construction, or in ruins. Report fixes for both extremities. Also show vertical and horizontal clearances if span is still intact. Include digital photos to prove your report.

It is important to include the official name of the bridge and the name of the bridge owner on your report. Also, include the names of the cities or towns that are connected by the bridge and any official route numbers or railroad names that cross the span. Attach a chartlet and a copy of the local roadmap where the bridge is located.

Vertical clearances of bridges and overhead are in feet above mean high water unless otherwise stated. Clearances of drawbridges are for the closed position, although the open clearances are also given for vertical-lift bridges. Whenever a bridge span over a channel does not open fully to an unlimited clearance position, a minimum clearance for the sections over the channel should be given; the same guidelines apply to swing and pontoon bridges with openings less than 50 feet horizontally.

Clearances are supplied by the U.S. Coast Guard (bridges). They may be as-built (verified by actual inspection after completion of structures) or authorized (design valued specified on the permit issued prior to construction). No differentiation is made between as-built and authorized clearances.



Check the text area of the Coast Pilot for clearance errors reference errors. Also, verify the Federal Regulation section on bridges for potential violations to Federal Law on the Bridge's regulatory sign.

Every lift bridge should have Federal Regulations that explain the duration of operation and any special requirements regarding the opening and closing of the bridge. Bridge regulation cannot be changed unless they are reviewed and published in the Federal Register. Federal Regulations for bridges are published in the Coast Pilot. Check these regulations for the bridge against the Regulatory Signs posted on the bridge.

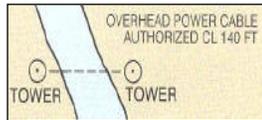
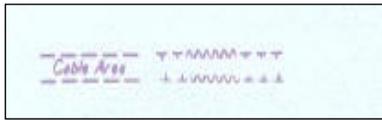
Report any errors with a **Bridge Characteristics Modification Report**. Use the on-line Bridge Reporting System to make your report. Access is available from the Bridge Web Page on the DINR Navigation Systems Web Site at www.uscgaa.com. Also, check the Federal Regulations shown on the **Bridge Detail Display Screen** for accuracy.

Cables

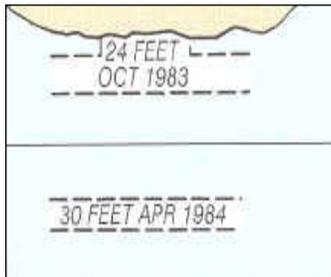
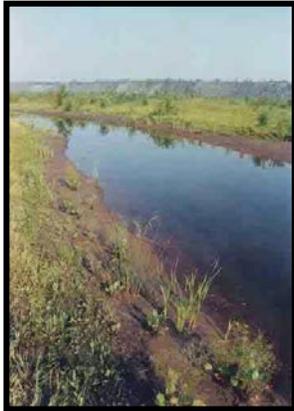
Cables over or under navigable waters, where depths are shown on the nautical chart, must be charted.

If a cable is not charted, include the name of the owner, a person of contact (POC), a telephone number and the e-mail address. This is important data for NOAA in order to verify the specifications of the structure.

The vertical clearances of overhead cables should be in feet above mean high water unless otherwise stated. Clearances are those approved for nautical charting, and are supplied by the U.S. Army Corps of Engineers. Check the Coast Pilot for reference errors or omissions, and possible clearance errors.



Channels



Newly dredged waterway channels and modifications to existing channels, as approved, by local authorities, private firms, and individuals, should be indicated on nautical charts. Some waterway channels may be of a purely local nature, but, if shown on the chart, would benefit mariners in general. New, re-dredged or modified channels should be reported with attention toward:

- The width and depth of the channel.
- The centerline and the controlling depth of the channel.
- The date and hour such measurements were taken.
- The position of any channel markers.

If possible, report who performed the dredging and for whom it was done.

For those situations, when an area in which a dredging operation was recently completed and has not been charted, the particulars should be reported. When possible, include and attach a copy of the after-dredging survey to your chart updating report. Also, report the name of the owner, the POC, telephone number and e-mail address.

The ***controlling depth of a channel*** is the least depth within the limits of the channel; it restricts the safe use of the channel to drafts of less than that depth.

Reference the Coast Pilot for any information about the channel and report any errors.

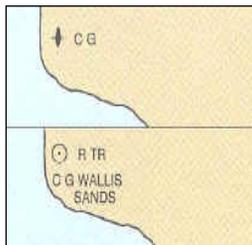
Chart Symbols and Abbreviations



One of the major checks that must be performed during the review process on an aid to navigation is to validate that the observation of the aid matches the symbols and abbreviations displayed on a nautical chart. Both the observations and the charted symbols should also match the specifications for the aid as advertised in the Light List.

Any discrepancies regarding the symbols and abbreviations are reportable on a ***NS-CU03-Chart Update Form*** to NOAA. Pay particular attention to the color of the buoy symbol.

Coast Guard Stations



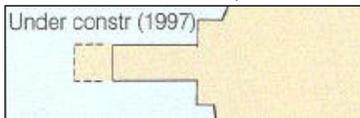
Report new, discontinued, or changed stations. Also, survey any changes to the docks or piers. Indicate any prominent features such as towers, flagstaffs, or buildings that are visible to mariners transiting the area. Since these features are on government owned property, they can be plotted on a nautical chart.

Include fixes and plot new or features not plotted on a nautical chart. Show photos of some off shore views to prove the benefit of the features to a mariner.

Also, report the locations of local harbormasters and/or other waterway administrative offices and docks.

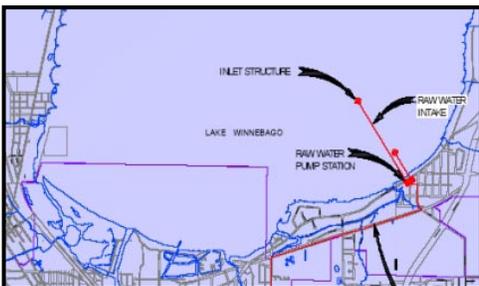
Check the Coast Pilot for references to these facilities. Provide telephone numbers and other data relating to the location and access to these facilities.

Construction, New



In environments where massive new construction or reconstruction is occurring, new landmarks emerge and old landmarks are modified, demolished or obscured. Include such occurrences as chart updating information.

Cribs and Water Intakes



Cribs are offshore structures that collect water from close to the bottom to supply a pumping station onshore. The name *crib* is derived from the function of the structure—to surround and protect the intake shaft.

Report both visible and submerged facilities. Also, include the **size, type of construction, depth alongside, and a fix**. Include a photo of the object. Plot the object on a nautical chart. When it is submerged, provide the depth over the facility [Corrected to Charted Datum.]

In addition, indicate the type of fluid being carried by this pipe. Note any pollutants that may appear on the water surface generating from this facility such as soapsuds, colored water or oil slicks. Prove your report with photos. Send a copy of your report to the local CG Agency.

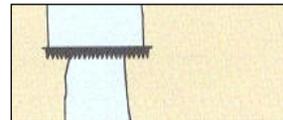
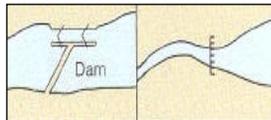


DAMS - Report the type of dam, its lights and any other prominent features.

Indicate any dangers such as sudden water release schedules or other navigational dangers associated with the dam.

Provide fixes to define the boundaries of the facility. Plot the fixes on a nautical chart. Indicate whether the dam determines the end of navigation for the waterway.

Report and document any protective log booms that may be deployed in the area.



DEPTHS

The term "*Depth Legend*" is not used. More proper is the term "legend," which is the controlling depth information labeled on the chart to provide the mariner channel details that include controlling depth, available width, and date of survey or report. Legends are used for both federally maintained channels and non-federally maintained channels.

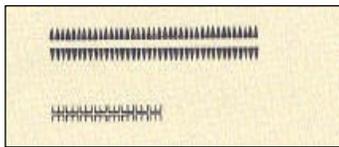
Channel depth and date information, provided by authoritative sources and non-authoritative sources, may replace charted channel legends. Authoritative sources include NOS surveys, USACE surveys, state and local government surveys and port authority surveys. Non-authoritative sources include reports from pilot associations, U.S. Power Squadrons, U.S. Coast Guard Auxiliary, facility owners, managers, operators, harbor masters and private parties.

Source depths must be adjusted to the chart sounding or vertical datum. This is the guideline prescribed for taking and reporting depths on page 19 of this training guide.

The term "*Reported*" is attached to controlling depth information that has not been confirmed by an authoritative field examination or survey party. Information on these channels is shown in a channel legend on the chart. Usually, these are channels which are not federally maintained and the depth information in the channel legends is often very old. Members of recognized chart updating organizations, Office of Coast Survey Coast Pilot inspectors, chart evaluation parties, and other Office of Coast Survey hydrographic field parties usually receive these reports from private individuals while in the field, but occasionally reports from private individuals are received directly at NOAA. Reports from Office of Coast Survey field parties with personnel capable of evaluating positional and data accuracy, assessing sounding methods used, or interpreting indications of recent maintenance dredging are considered more reliable than other reports.



DIKES and LEVEES



Embankments of stone, cement, or soil that hold back water from dry land are called dikes or levees.

Dikes usually protect land that would naturally be under water most of the time.

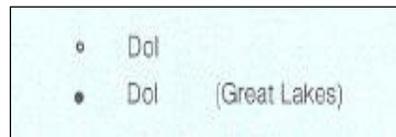
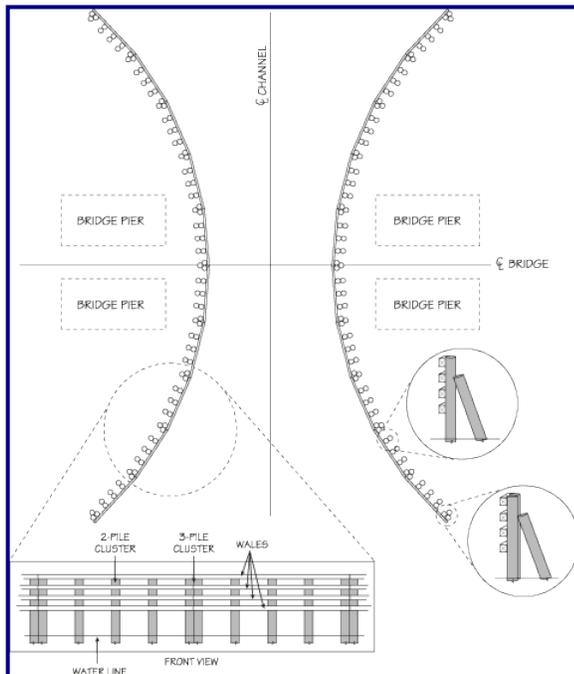
Levees protect land that is normally dry but that may be flooded when rain or melting snow raises the water level in a body of water, such as a river.

Report the **type**, **height** and **extent** of the dike or levee.

Plot and show fixes that define the extent of the facility on an attached chartlet.

Indicate any special lights or other marks that could be useful to a mariner. Show the color and characteristics of the lights. Use photos as supporting evidence to prove your report.

DOLPHINS OR OTHER PILINGS



Report both visible or submerged dolphins and pilings. Show GPS quality control readings to prove the accuracy of the fixes. Of all chart updating input, accurate data pertaining to submerged objects are the most critical and difficult to obtain, define, and report. Include the following data on these reports:

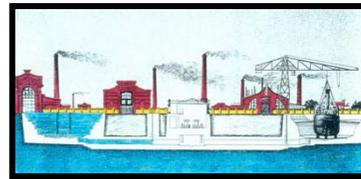
Object definition such as dolphin, pile, submerged pile, etc.

Characteristic of the object, such as, height above vertical datum, length, material make-up, etc.

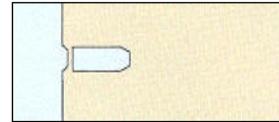
Fix the location and the extent of the piles or dolphins. If it covers a large area, multiple fixes may be necessary to define the scope and size of the hazard. Follow the guidelines for taking fixes.

Depths over objects should be corrected to charted datum. Follow the guidelines for taking depths. Multiple depths may be needed depending on the scope and size of the hazard. **Take extra precaution when maneuvering near or over submerged objects. Always pre-confirm clearances at periods of low water from a distance and only take readings alongside the objects at high water.**

Dry Docks Report new or discontinued dry-docks. Provide the corporate name, the POC--person to contact, telephone number, and the e-mail address of the dry dock.



Plot the extent of the dry dock on a nautical chart. Provide a chartlet. Provide digital photos to prove your report. Data regarding dry docks are also good chart updates.



Duck Blinds



Report temporary or permanent structures, including a fix of the location. This is a good opportunity for a photo. Plot on a nautical chart.

Indicate the dimensions of the blind's length, width, and height.

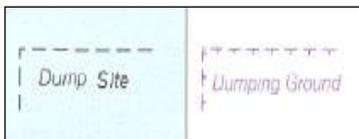
Dumping Grounds /Spoil Areas



Report fixes for the boundaries of the dumping ground. This is a good time to report strings of depths over the spoil area. Correct the depth readings for the height of tide—charted datum. It is very difficult to determine dumping grounds by visual checks of the sea's surface.

Federal regulations regarding dumping grounds have been revoked and the use of the existing areas are also revoked. These areas will continue to be shown on nautical charts until they are no longer considered a danger to navigation.

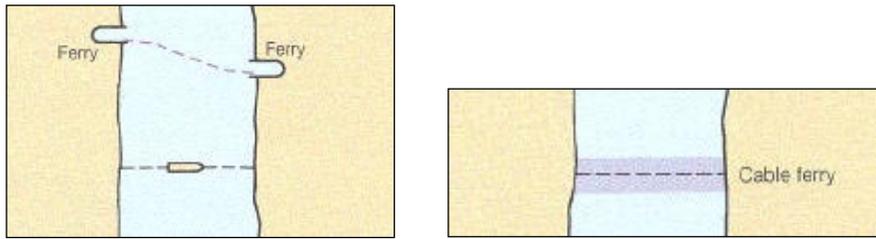
Spoil areas are used for the depositing of dredged material, usually near or adjacent to the channel. They are plotted from USACE after-dredging surveys. Spoil areas are tinted blue on a nautical chart with all soundings and depth curves omitted.



Ferries / Cable Ferries

Report the type of ferry, dock facilities, and schedules. Include a brochure if possible to enhance the credibility of your report. Indicate the ferry routes on a chartlet along with the charted fixes that define the facility docks. Include any special lights or other prominent features.

Include a chartlet plotted with the ferry dock(s). Plot any special lights. Check the Light List to see whether the Coast Guard permits the lighting. Also, notify the local C.G. Unit of the condition of the lights using an on-line **PATON Reporting System**. Report light colors, height, characteristics, and rhythms.



Cables fastened to shore and sometimes propelled by a cable rig attached to the shore guide Cable ferries. Generally, the cables are suspended during crossings and dropped to the bottom when the ferries dock. Where specific operating procedures are known they are mentioned in the Coast Pilot. Since operating procedures vary, mariners are advised to exercise extreme caution and seek local knowledge. ***DO NOT ATTEMPT TO PASS A MOVING CABLE FERRY.***

NOTE: A **charted cable ferry or ferry route will not be removed** until an established authority provides conclusive evidence that the cable ferry does not exist in the charted position. Non-authoritative sources (e.g. U.S. Coast Guard Auxiliary Reports, photo revisions without field edit) do not have sufficient authority to declare a cable ferry non-existent.

In instances, where non-authoritative sources identify a cable ferry that is not operating in its charted position, the feature shall be retained as charted until its removal has been confirmed by an established authority (e.g. Field Investigations by the National Ocean Service (NOS), U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG) Local Notice to Mariners, a harbormaster or port authority or the company that operated the ferry).

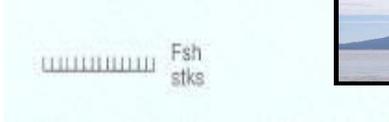
FISH FARMS



Report the boundaries of fish farms as well as any special lighting. Report light type, color, characteristics, and height. Fish farms are often marked with private aids to navigation. These aids are usually **special purpose aids**, colored yellow and, if lighted, show **yellow** lights depending on location of the fish pens. Any aid is that is lighted must be permitted, be charted and listed in Light List. Ideally, the four corners of the pen area should be marked. If the pen area is close by a federal channel, the outer two aids near the channel should be lighted. If the owner chooses not to mark the four corners of the fish pen, then they need to permit each and every marker in the area. Report changes to the charted location of the limits of a fish farm to both NOAA as a chart update and the Coast Guard as a PATON report.

NOTE: Fish farms follow the same permitting rules as Fish Havens and are not permitted to private interests. For liability reasons, they are permitted to municipalities by the USACE-Corp of Engineers. The boundaries are established by the USACE (Army Corps of Engineers) who reports them to NOAA for charting purposes.

FISH STAKES



Report visible and submerged stakes located outside of its charted trap area.

Take fixes to define the extent of the fish stake area. Plot the area on a nautical chart.

Indicate whether and how the area is lighted. Provide the light color and characteristics with your report.

Also, report your observations to the local C.G. Unit.

If you suspect submerged fish stakes, survey the area at low tide from a navigable channel or deep water area. *Operate with extreme caution near the fish stake areas.*

SUBMERGED STAKES



FISH HAVENS

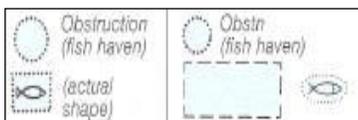


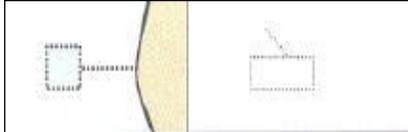
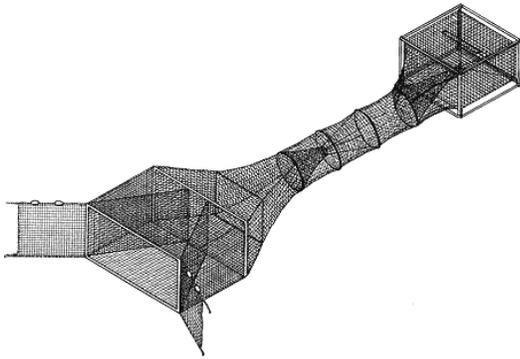
Report obstructions, lights, fixes of boundary locations of the area blocked or covered by the fish haven. The picture shows a buoy marking a boundary position for the fish haven. Many of these buoys will be private aids. Check the light list for their light's assigned positions or take the LAT/LON from a nautical chart. Also, submit a report to the local C.G. Unit. Report light colors, characteristics, and rhythms. The authorized, geographical limits of fish havens are usually marked with special purpose aids and, if lighted, yellow lights.

Fish havens are not "permitted" to private interests. For liability reasons, the USACE-Corp of Engineers permits them to municipalities. Usually, fish havens are designed to simulate natural reefs and wrecks that attract fish. The reefs are constructed by intentional placement of assorted secondary-use materials and designated fishery habitat, ranging from old trolley cars and barges to scrap building material in areas which may be of very small extent or may stretch a considerable distance along a depth curve; old automobile bodies are a commonly used material. The Corps of Engineers must issue a permit, specifying the location and depth over the reef, before such a reef may be built. However, the reef builders' adherence to permit specifications can be checked only with a wire drag. Fish havens are outlined and labeled on the charts and show the minimum authorized depth when known.

On a chart, fish havens are tinted blue if they have a minimum authorized depth of 11 fathoms (66 feet) or less or if the minimum authorized depth is unknown and they are in depths greater than 11 fathoms but still considered a danger to navigation.

Be cautious about passing over fish havens or anchoring in their vicinity.





FISH TRAP AREAS

Show the limits of the area covered by the fish trap with fixes. Plot them on a nautical chart. Report the light colors and characteristics. Also, report your observations to the local C.G. Unit. If the trap is observable above water, submit photos to prove your report

Fish trap areas are areas established by the U.S. Army Corps of Engineers, State Waterway Administrators or local authority, in which traps may be built and maintained according to established local regulations. The fish stakes, which may exist in these areas, are obstructions to navigation and may be dangerous. **The limits of fish trap areas and a cautionary note are found on the chart.**

Most fish trap areas will be marked with lighted private aids (PATONs). These aids will usually be Class II and be charted. The authorized location of fish trap areas are marked with special purpose aids and, if lighted, with yellow lights. Aids normally mark the four limits of the area authorized for the location of the fish trap. Corrections to the location of these PATONs are communicated to mariners by the LNM-Local Notice to Mariners. Unauthorized changes to the charted locations of fish traps should be also reported to the Coast Guard and to NOAA as chart updates.

Geographic Names

Report omitted, missing, incorrect, or misspelled names on NOAA charts. Also, check the Coast Pilot and Light List for similar reference errors. An object may appear on a chart or the Coast Pilot under a name by which it is not locally known. Residents, road maps or other publications may refer to it by another name.

If you want to see a name changed on a nautical chart or Coast Pilot, you must first check the **GNIS—Geographical Name Information System** to see whether it is already an approved name. A link to this database is provided on the Navigation Systems Web Site at www.uscgaan.com under Special Links. Submit the documentation from GNIS that shows the name is recorded as part of your report to NOAA. NOAA will only then change the charted name to the name listed in GNIS.

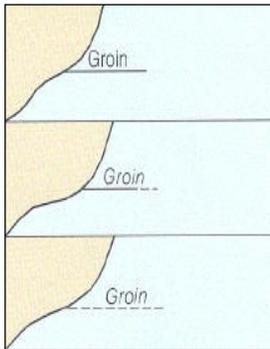
If a name is not listed in GNIS, submit the proposed name to GNIS. Forms are provided on the GNIS database. Fill out the GNIS form and submit it with the required documentation. Be patient, this process may take a few years to complete. Once the name is approved and entered on the GNIS database, report it to NOAA with the appropriate documentation.

GNIS—Geographical Names Information System was developed by the USGS in cooperation with the **U.S. Board on Geographic Names (BGN)** contains information for almost 2 million physical and cultural geographic features in the United States and its territories. The Federally recognized name for each feature described in the database is identified and references are made to the feature's location by State, county, and geographic coordinates (Lat/Lon). The GNIS is our Nation's official repository of domestic geographic names information.

Have you ever wonder where your chart feature names originated? You can look up their history in the Board of Geographic Names database on this link:

<http://geonames.usgs.gov/pls/gnispublic/f?p=116:1:2292385629983565::NO>

Groins



Groins are walls built perpendicular to the shoreline. They are designed to trap sand that is moving along the shore due to the long shore current. A groin usually extends to the end of the surf zone. The construction of a groin severely affects the flow of sand moved by the along shore currents, depriving down stream beaches of the sand needed for replenishment.

Report the **type** and whether **visible**, **submerged** groins, or in **ruins**. If submerged, report the depth(s) over the obstruction, corrected for the height of tide. Show fixes at each end and at any bends. Be sensitive to the length of the groin. Check that the groin is chartable before you report it. Use the **NS-CU07 Vertical and Horizontal Error Calculator** to make this determination. Plot the fixes on a chartlet. This is a good photo opportunity to support and add credibility to your observation(s).

Jetties and Breakwaters

Jetties are walls built perpendicular to the shoreline. They are designed to trap sand that is moving along the shore due to an along shore current. A jetty extends into an inlet to stabilize a navigation channel. The construction of jetties severely affects the flow of sand moved by the long shore currents, depriving down stream beaches of the sand needed for replenishment.

Report the **type** and whether they are **visible**, **submerged**, or in **ruins**. When submerged, report the depth(s) at datum over the obstruction, corrected for the height of tide. Show fixes at each end and at any bends. Plot on a chartlet. This is a good photo opportunity. Accurate data pertaining to submerged objects are the most critical and difficult to obtain, define, and report. Include the following data on these reports:

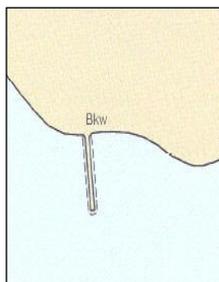
Object definition or type, such as, rock, submerged pile, etc.

Characteristic of the object, such as, height, length, material make-up, etc.

Fix of the location of the object. If a large object, multiple fixes may be necessary to define the scope and size of the hazard.

Record the depth over the object corrected for height-of-tide. Multiple depths may be needed depending on the scope and size of the hazard.

Never put your OPFAC in any jeopardy when attempting to obtain depth readings over submerged jetties or breakwaters. Always pre-check the area at low water from a distance so you become aware of any hazards that may be close to the surface. Perform your chart updating activity at high water.



LANDMARKS



Prominent objects or features are charted on nautical charts as distinctive landmarks for use as points-of-reference for mariners. Such objects include tall or large, distinctive structures, such as, smokestacks, spires, towers, flagpoles, lights, buildings, and natural formations of rocks, cliffs, trees, hills, etc., at significant locations. Noticeable structures on a hill or promontory that distinctively the hill from others in the immediate vicinity. An outcropping of rocks in a generally

grassy area or a sandy area may show clearly at a distance. A strip of sandy beach on a generally rocky shore, a cliff, or a tree-covered shore makes excellent landmarks. In these days of massive new construction and reconstruction, once prominent landmarks are becoming obscured by this new construction, or may have been demolished. They should be reported for removal as landmarks. Also report charted landmarks that no longer exist or are no longer visible from navigable water.

Flagstaffs and towers on private property are usually not plotted on a nautical chart.

More recently, with the increased use of cellular telephones, many new micro towers have been established which are ideal landmarks due to their height, lighting and visibility from the sea. These micro towers can be observed during reduced visibility and at night.

Report new, removed, destroyed, or submerged landmarks. Report only prominent new ones that can be seen from seaward. Take photos off shore as evidence to prove your report that this landmark should be a chartable object. Take fixes at the edges of the footprint of the structure. Also, provide an estimate the height of the structure. Include official supporting data referencing the removal of objects whenever possible. If this is not available, submit your report with as much information as possible, especially depths and photos.

Review the **Coast Pilot** for references to prominent features. Are they still there? Has new construction or tree growth obstructed their view?

Local Magnetic Disturbances

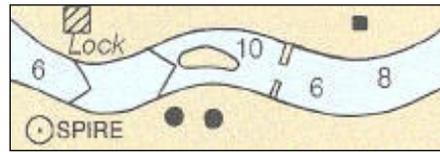
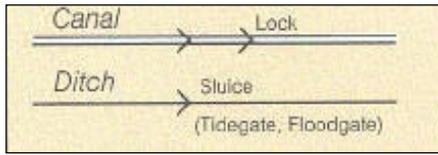
If measured values of magnetic variation differ from the expected (charted) values by several degrees, a magnetic disturbance note will be printed on the chart. The note will indicate the location and magnitude of the disturbance, but the indicated magnitude should not be considered as the largest possible value that may be encountered. Large disturbances are more frequently detected in the shallow waters near land masses than in deep sea areas. Generally, the effect of a local magnetic disturbance diminishes rapidly with distance, but in some locations, there could be multiple sources of disturbances and the effects may be distributed for many miles.

Observations, at a location where the **magnetic disturbances** affect compass readings and/or electronic disturbances deflect electronic equipment readings, should be reported as chart updates. Indicate the magnetic differences in degrees True. Include the extent of area affected, the amount of deflection observed, water and weather conditions. Always note whether any similar disturbances were observed during previous surveillance of the area.

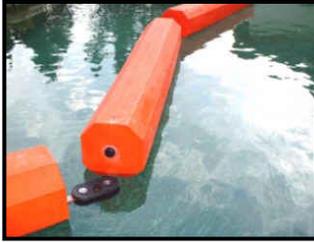
Also, review the **Coast Pilot** for magnetic disturbance references. Check them out on scene.

Locks

Check the **Coast Pilot** for the Federal regulations on the opening of locks. Check that the traffic signal is operating correctly. In addition, report about the light configurations, light colors and rhythms. Check the regulatory signs for compatibility to the Federal Regulation.



LOG BOOMS



Report the extent of the log boom with fixes along the outer edges, and report on any navigational hazard(s) that the boom protects. Indicate the name of owner, POC-person of contact, telephone number and e-mail address. Submit a chartlet with the plotted fixes. This is a good photo opportunity.



There are also booms that are placed in areas that may be leaking pollutants in the waterway. Be sure to report the reason for the boom in your report. Check the Coast Pilot for references to the booms and their use.



Marina, Marine Facilities and other Small Craft Facilities

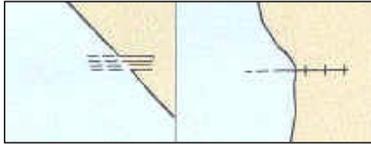


Report new, updated, or discontinued marinas. Marinas can be an opportunity for a Chart Update, a Coast Pilot and/or a Small Craft Facility Field Report.

Take and submit fixes for the marina layout. Also, plot any prominent objects that could be used as aids to navigation by local mariners transiting the area. Submit photos to substantiate your report.

Active marinas may be good candidates for Small Craft Facility Update. Check the **NS-SC02 SCF Training Guide** for details on how to prepare and perform a SCF interview. These reports and guides are available on the Navigation Systems Division Web Site. NOS/Marine Chart Division specifies that only small craft facilities that meet the new criteria will be charted. The same standard is used for including small craft facility information in the Coast Pilot.

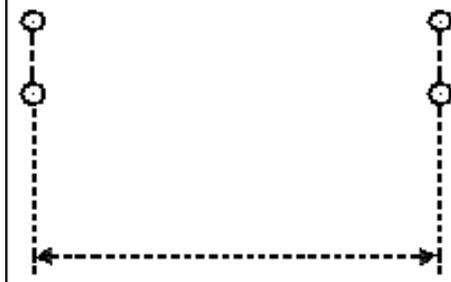
Marine Railways



Report new, updated, or discontinued facilities. Indicate the vessel length and tonnage capacity. Indicate name of owner, person of contact, telephone number and e-mail address. Submit fixes that define the extent of the marine railway.

Since marine railways are often part of a marine facility, this facility could also be an opportunity for either a Small Craft Facility Field Report or a Coast Pilot Text Correction report. Always submit photos to substantiate your report.

Measured Mile – Trial Courses



MEASURED NAUTICAL MILE
COURSE 150°00' - 330°00' TRUE

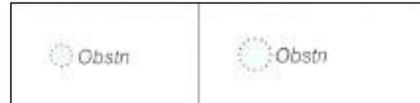
A trial course is a course at sea, the ends of which are marked by ranges ashore and the length of which has been accurately measured. Trial courses are used by vessels to calibrate logs, engine revolution counters (tachs), etc., and to determine speed. Reciprocal bearings will be charted.

Standard landmark symbols are used to mark the ranges ashore. When the measured distance is within 6 feet of the standard value for a nautical mile (1,852 meters or 6,076.1 feet), a trial course is charted as shown at the left.

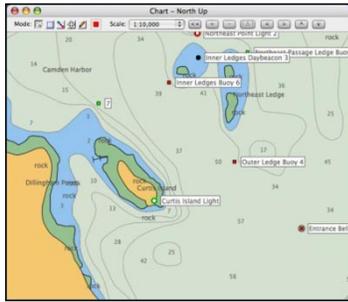
Measured mile features are also good Coast Pilot updates.

New Chart Requirements

Recommend new additional coverage, such as, bulkheads, wharves, docks, piers, dredging, etc. Validate that they are chartable before doing any observations.



Obstructions and Dangers to Navigation



Report new, discontinued, and extended ruins, visible or submerged. Show accurate fixes on an attached chartlet. If safe, report the water depth over the obstruction. Correct the depth for datum.

Accurate fixes are critical for this type of report. Attach a chartlet with the obstructions clearly plotted. Take photos at low and high water, especially if the obstruction shows at low water. Check the obstructions at low water.

Dangers to navigation are also good Coast Pilot updates. However, conclusive evidence must be submitted.



Piers, Docks and Wharves.

Reports bulkheads, wharfs, docks, and piers, etc. Before reporting, verify reportability by using 6. Chartability of an Object on the **NS-CU07 Vertical and Horizontal Error Calculator**.



Show fixes for each item and plot on a chartlet. This is a good photo opportunity. Check **the Coast Pilot** for wharf usage and ownership. Much of this data is often out of date.



Piles



Report visible or submerged piles. Show single or multiple groups. Include fixes for each pile and plot them on an attached chartlet. This is always a good photo opportunity.

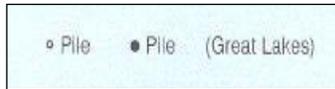
Accurate data pertaining to submerged objects are the most critical and difficult to obtain, define, and report. Include the following data on these reports: The word "Piling" or "Dolphin" is not quite sufficient. A sketch or photo showing whether they extend perpendicular or parallel to the shoreline or exactly how they do run is most helpful and provide a more complete picture of the situation. Photographs are highly desirable. Report:

Object definition or type, such as, pile(s), submerged pile(s).

Characteristic of the object, such as, height, material, etc.

Fix of the location of the object(s).

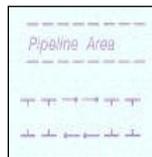
Depth over the object, corrected for the height of tide.



Pipelines

Show estimates of the **overhead or submerged clearances** and material transported. On overhead pipelines, estimate and report the vertical clearance from MHW (near High Water). Include the name of the owner, the person of contact, the telephone number and the e-mail address.

Reports of authorized or unauthorized submerged cables and pipelines that are not charted will be sent to the C&CS, Marine Chart Branch with supporting information for issuance of a notice to mariners and charting. A follow-up report should be sent to the USACE stating that the information has been sent to C&GS.



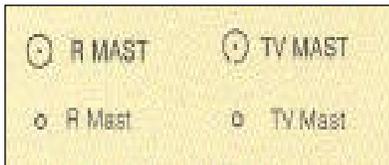
Platforms

(All types)

Container type, markings, lights, and hazards.



Radio Broadcasting Towers.



Report new or discontinued towers. Indicate the call letters of the radio station.

Estimate the **height** of the tower, if questionable. Use 5. Estimate the Height of an Object from a Known Distance on the **NS-CU07 Vertical and Horizontal Error Calculator**.

When the tower is **lighted**, indicate the light color, the position, the height and the characteristics of the lights.

Ramps



Indicate **type**, **surface material** and **length**, and whether it is a private or public. Ramps can become a Chart Update, a Coast Pilot update, or may be part of a **NS-SC03-Small Craft Facility Field Report**. Include the name of the owner, the POC-person of contact, their telephone number and the e-mail address.

If there are any questions about this facility, NOAA may need to contact the owner or manager directly.

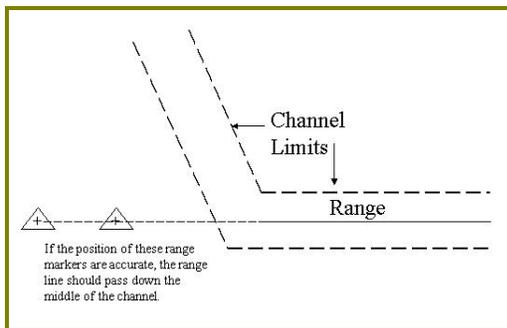


NAVIGATIONAL RANGES

Overview

The American Practical Navigator (Bowditch, 1995) defines a range as: “Two or more objects in line.” Such objects are said to be “in range.”

- An observer whose boat is in line with the two objects is said to be “on range.”
- Two beacons are frequently located for the specific purpose of forming a range to indicate a safe route or the centerline of a channel. Ranges on NOAA paper charts are typically shown as two fixed aids connected by a dashed line that extends out from the fixed aids. This dashed line, called a “leading line,” becomes a solid line on the portion of the range where vessels are to transit, as shown in the figure below.



- This graphical representation of a range on a paper chart shows the navigator where a range exists, what course it marks and where the fixed aids are located.
- When actually navigating in the area, the mariner visually lines up the two fixed aids and follows the range, thus staying in the channel.

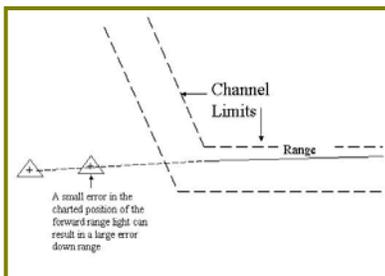
Correct range line in channel

The Problem

Now that mariners are navigating with GPS, differential GPS (DGPS), and WAAS, they have a very accurate, real-time position for their vessel. Visual ranges are still an important piloting aid, but with absolute positioning, they are arguably less important than in the past.

When navigating with DGPS on a system that uses electronic charts, either raster or vector, it may quite often become apparent that the range line drawn on the chart does not accurately match the center of the channel. This can be due to any number of factors, which include:

- Generalization for chart scale.
- Shifting of data due to datum conversions, manual plotting methods that were used until recently in the chart making process.
- Inaccurate positions for the fixed aids marking the range.



Position of a range in error

Data Collection Method

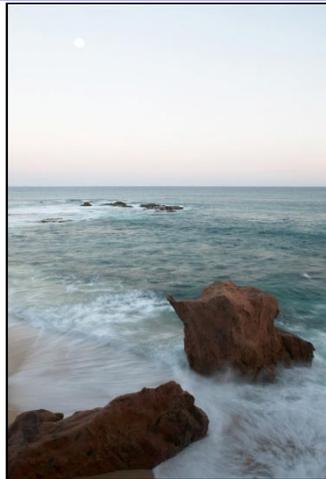
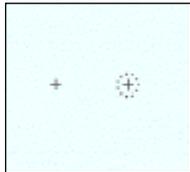
In order to correct this problem, the range line accuracy in the electronic products can be adjusted to match a series of fixes recorded along the range line using DGPS or GPS/WAAS. A vessel equipped with a DGPS or GPS/WAAS receiver follows the range line down the channel, being careful to stay as close to on-range as possible, and logs positions using the following criteria:

Positions should be recorded at approximately 1-inch intervals at the scale of the paper chart. The table below gives general guidelines as to the position interval. **Record positions**

only when precisely on-range. Quality of position readings should take precedent over quantity. Use the table only as a general guideline.

Chart Scale	Distance Between Positions (Nautical miles)
1:5,000	0.05 nm
1:10,000	0.10 nm
1:20,000	0.25 nm
1:40,000	0.50 nm
1:80,000	1.00 nm

Rocks



Report visible or submerged rocks at various stages of the tide. Report depth over the rock. Indicate depth differences over 2 feet. Correct your depth readings for the height of tide in order to determine the full danger of the rock at vertical datum for the chart. i.e. MLW, MLLW, etc.

Never put your vessel in any danger during the investigation process. View the site at low water in order to make the judgment whether it is safe to transit over the obstruction at high tide. This is a more doable exercise in the northern latitudes where the tide range is 10 to 12 feet.

In the lower latitudes, where the tide range is only a few feet, this is not a prudent procedure.

Ruins



Verify the ruins against the nautical chart. Take fixes to locate the ruined area.

Take digital photos to prove your report.

Submit the fixes plotted on a chartlet.

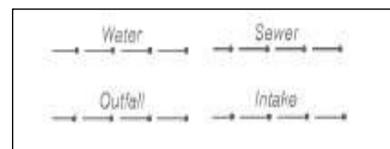
If the ruins are being removed, submit the name of the company, the POC, telephone number and e-mail address. A copy of the final project report adds great credibility to your report.

Sewer or Overflow Outlets



Report the size and type of the construction. Locate the outflow area with a fix. Plot the facility on a chartlet. This is a good photo opportunity.

Use extra caution when approaching these facilities. There is most likely shoaling near the outlet. From a safety aspect, you may have to take fixes from the shore.



Shoals, Sand Bars



Report visible or submerged shoals at various stages of the tide. Correct your depth readings for height of tide in order to determine the full of shoal. Always show date and time for each depth reading submitted to NOAA.

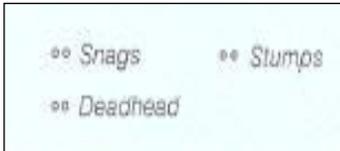
Outline the boundaries with fixes and plot them on a chartlet. Digital photos of the shoal or sand bar at low water will help prove your report.

[Take extra precautions transiting near shoals and sand bars](#)

Preview the area at low water from nearby deep water. Take any depth measurement at high water only if there is sufficient clearance. Never put your OPFAC at risk for a measurement.

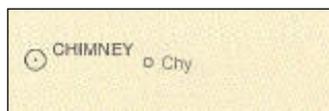
NOAA usually plots shoals on the chart.

Snags or Hangs



Report the type of snag or hang, visible, or submerged. These are underwater obstructions that can snag trawler nets. Speak to local fishermen or commercial pilots about the location of these obstructions. Report the data provided by the fishermen, especially any LAT/LON data.

Stacks and Chimneys



Indicate any visible markings, lights, light color and characteristics, height of lights, height of stacks, and method of construction.

If new construction, show the name of the owner, POC, telephone number and e-mail address.

Also submit long-range photo from seaward to show benefits of the stacks to the mariner. Take accurate fixes for each stack and plot them on a chartlet. Follow the guidelines for taking and reporting items very closely.

Wrecks



Report visible or submerged wrecks at various stages of the tide. Wrecks above the high water mark should not be reported unless useful as a landmark. Include fixes that define the extent of the wreck. Include photos at low water to prove your point.

If wrecks are removed, try to get the report from the person or company that removed the wreck. Have them submit a report on their letterhead signed by an engineer.

Note: Charting agencies are very reluctant to remove a charted obstruction from the chart because they must protect themselves from any legal action in the future. These agencies desire indisputable proof of such removals before they will remove them such a designation from their charts. Try to

secure a statement from the person who removed the obstruction. Local marine interests can often furnish this information. Newspaper articles and photographs taken during the removal of obstructions contribute much to providing proof of such removal.

Not Reportable Charted Features

Aids to Navigation

Aids to Navigation problems are handled through the Federal Short Range Aid to Navigation program and the Private Aid to Navigation program. Submit an **NS-AN03 Aid to Navigation Report** to your local C.G. Unit or agency that is responsible for the ATONs and PATONs in your area. The local C.G. Unit will communicate with the DPW Office who will notify NOAA through notices and corrections published in the Notice to Mariners.

NOAA will only evaluate aids to navigation that are currently charted and will accept reports and make corrections only if the discrepancy is:

- ***The name of the aid is incorrect.***
- ***The aid is not charted correctly.*** e.g. The position indicated in the Light List does not match the charted position of the aid..
- ***The charted symbols and abbreviation are in error.*** e.g. The charted characteristics do not reflect the narrative in the Light List for the aid.

NOAA always has to run these aid reports through the Coast Guard for verification of I-ATONIS--the Coast Guard Aid to Navigation database.

When the Federal or Private ATON is being established, removed, or is not charted, your discrepancy report should be sent directly to the Coast Guard, not to NOAA.

If a PATON is observed as established but is not permitted, alert the Coast Guard and try to provide the name of the owner of the aid so the Coast Guard can contact them. The owner has to submit a permit application to the Coast Guard. The Coast Guard may decide that the non-permitted aid is a hazard to navigation and remove it.

When reports on aids, that don't meet these criteria are received, NOAA has to forward them to the Coast Guard. NOAA does not award credits for these points. In reality, it causes NOAA extra work in an already busy work schedule. Depending on the credibility of your report, the Coast Guard may or may not choose to act on your report. See the *NS-AN02 Short Range Aid to Navigation Training Guide* on the Navigation Systems Division ATON Web Page for more information on reporting aids to the Coast Guard.

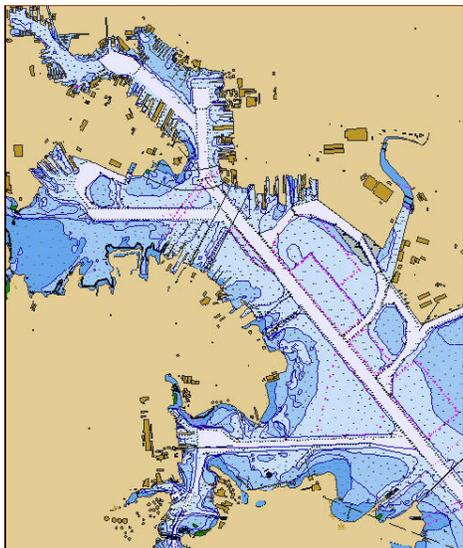
Please note that, if the aid is not in the Coast Guard I-ATONIS database, it cannot be on a NOAA nautical chart.

NOAA Credits awarded for Aid to Navigation Reports

- a. 15 credits will be awarded if an aid to navigation is reported as discrepant as part of a multi-tasked chart update report. The aid must be listed in the Light List and a difference must exist between the charted position and/or characteristics and the position and/or characteristics published in the Light List. Reports showing on-scene observed differences should also be sent to the Coast Guard Unit and a copy of the CG Report should be attached to NS-CU03 Chart Update Form.
- b. Aid to Navigation reported as add, delete, change, relocate, and reported to USCG, **15 credits will be awarded.** The aid must be listed in the Light List and a difference must exist between the charted position or characteristics and the

position and/or characteristics published in the Light List and a copy of the report to the Coast Guard is attached to the NS-CU03 Chart Update Form.

NOAA ELECTRONIC NAUTICAL CHARTS - ENC



What is a NOAA ENC?

The NOAA ENC is a database of vector chart features for U.S. and territorial waters, which is updated for Notice to Mariners corrections on at least a monthly basis. The structure and format is defined by the International Hydrographic Organization S-57 standard, which means that the NOAA ENC is in an internationally recognized, non-proprietary, publicly available format. Worldwide, international hydrographic offices also create ENCs in the S-57 format for their own waters.

What is the status of NOAA's ENC program?

NOAA is in the process of creating a suite of ENCs for 100% U.S. coverage (968 charts). As of November 2005, NOAA had 522 ENCs on our web site for use--all of which cover the major U.S. commercial port areas. Most new ENC are built through contracts with private companies; however, the greater amount of work is keeping all the existing ENCs up to date, as U.S. coastal waters are in a constant state of change (natural shoaling, channel dredging, etc.).

Why are ENCs important?

NOAA ENCs contain information about the location of each chart feature (latitude and longitude), as well as attribution information such as color, shape, depth, and so forth. This information is used by navigation system software to draw a display that resembles a paper nautical chart, but with greatly enhanced functionality. Mariners need this high-accuracy digital chart data as a backdrop for their real-time navigation display systems, which may assist in identifying and tracking other vessels nearby and for grounding avoidance. A navigation system using a NOAA ENC "knows", for example the location of a dangerous reef, as well as how much water is over the reef, and can sound an alarm if the vessel's projected course carries it to close to the dangerous feature--possibly avoiding an oil spill.

Is expensive hardware and software needed to use ENCs?

No. NOAA ENCs can be used by systems that run affordable electronic charting software on laptop computers. However, recognize that ENCs are data and the manner in which an ENC appears on a computer screen is a function of the commercial software used.

Are there any ENC International Activities?

Yes. NOAA has an ongoing relationship with Canada, important cooperative-charting agreements with Cuba and Mexico and is involved in talks with Japan. NOAA created their International small-scale series, INT charts, to provide for international requirements.

What are the other uses for ENCs?

ENCs provide vector base maps for use in geographic information systems (GIS). The NOAA ENC Direct to GIS web portal, <http://nauticalcharts.noaa.gov/csdl/ctp>, provides comprehensive access to display, query, and download all available large-scale NOAA ENC data in a variety of GIS/CAD formats for non-navigational purposes using Internet mapping service technology

What is NOAA's distribution policy for ENCs?

NOAA ENC's are available for free download from the NOAA website. To redistribute NOAA ENC's to others, NOAA must certify an entity. A rule with requirements and an application checklist to become a certified distributor was published in the Federal Register on September 6, 2005.



POD - Print-on-Demand Nautical Charts

Remote Printing

Charts print, to order, at retail sites from digital files updated by NOAA just hours before.

Durable Papers

Choice of laminated or water-resistant paper. Each is easy to write and erase.

Extra Information

Mariners may choose tide, bridge clearance, and Coast Pilot excerpts in the chart margin as a ready reference, or choose safety and navigational guidelines.

Customizable

Charts without LORAN grids.

Customer logo and sailing directions. Agent business card.

Overlays with customer course lines, labels, and guidelines.

Formats

Selected charts are available in full-scale map folded or reduced scale pocket formats.



How old is your chart? How old was it when you bought it? Nautical charts are the fundamental tools of marine navigation. There are hundreds of critical chart corrections occurring each week that need to be applied in order to stay current and keep you safe on the water.

NOAA partnered with OceanGrafix to make the most up-to-date nautical charts, marketed as Charts-on-Demand. Using cutting-edge technology, the nautical charts are corrected daily by NOAA cartographers to incorporate the most current Notice to Mariners Corrections, NGA Notices, and other critical safety information. Charts are digitally printed only after your order is placed, ensuring that you receive the most up-to-date information.

The Charts-on-Demand have distinctive, brighter colors making them easier to read under varying light conditions. They meet the United States Coast Guard Carriage requirements necessary for waterway passage.

These charts are available through the OceanGrafix Chart Agent Network located throughout North America and Europe.

Visit www.oceangrafix.com or call 877-56CHART.

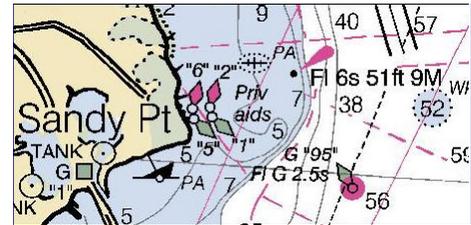
- For a list of retailers visit OceanGrafix web site:
<http://www.oceangrafix.com>
- For program information visit NOAA's Print-on-Demand web site:
<http://chartmaker.noaa.gov/POD/>



Raster Nautical Charts

In the United States, the National Oceanic and Atmospheric Administration (NOAA) is legally responsible for providing nautical charts and related navigational information for U.S. waters. Today, all official nautical charts produced by NOAA's Marine Chart Division are available in a raster .BSB format. A fundamental tool of marine navigation, NOAA maintains a suite of over 1,000 raster charts, which are distributed throughout the U.S. by chart agents and now can be downloaded free from NOAA's website at:

<http://nauticalcharts.noaa.gov/mcd/Raster/Index.htm>



Charts (NOAA RNC™) are produced by scanning at high resolution the original color separates used to print the NOAA paper charts--providing mariners with a familiar picture with which to operate. The digital files are carefully geo-referenced to enable navigation software to map real geographic positions to locations in the image. In addition, metadata is added describing the chart, its datum, projection and other information about the chart and the digital file.

NOAA RNCs™ are an important and successful contributor to safe, efficient, and environmentally sound marine transportation. They meet the International Hydrographic Organization's S-61 Standard for raster charts, are accepted as meeting chart carriage requirements of SOLAS Chapter V for certain vessels, and are updated for Notice to Mariner corrections, and other critical safety information on a weekly basis. NOAA's objective in making the RNCs easily accessible to users is to enhance navigation safety through increased use of nautical charts in U.S. waters.

Today, the NOAA website contains a fully updated NOAA RNC™ for each chart in NOAA's suite, as well as a cumulative update file to bring the existing RNC up to date with all of the Notice to Mariner information published for the current edition of the chart. NOAA intends its RNCs to be used in their electronic form for navigational use only. And plans to establish a program by which commercial, value-added providers may download the raster charts for free, and then reformat, encrypt, and/or package them with additional data or services; and may sell that product for whatever price the market will bear. By adhering to a simple set of NOAA-specified practices, these RNCs will retain their official status. No date has been set by which the value-added redistributor program will be in place.

In the future NOAA also plans to make the RNCs charts available on the website in an easy-to-view geoTIF format for non-navigational purposes.

Further information about NOAA's nautical chart program can be found at:

<http://nauticalcharts.noaa.gov>

GUIDELINES FOR PLANNING A CHART UPDATING MISSION or PATROL

INTRODUCTION: An Auxiliary Chart Updating mission or patrol, including "*multi-mission patrols*," should always have a specific purpose and a desired outcome. For example, a scheduled safety patrol may involve hours of inactivity without a SAR case while Chart Updating missions or patrols always have specific assigned tasks, including locating (fixing) a new object or the surveying of a new marina. For this reason, extensive proactive planning should be completed before the Chart Updating mission or patrol begins.

OBJECTIVES:

To acquire a general knowledge of the responsibilities of the Auxiliary in patrol planning.

To become familiar with how to select items for a Chart Updating patrol.

To become familiar with the preparation and use of a NS-CU04-Chart Updating Worksheet for planning the Chart Update activity.

To become familiar with the preparation of a NS-CU03-Chart Update Form.

To become familiar with the preparation of a 7030 Activity Report – Mission - Individual for reporting Chart Updating to AUXDATA

1. **The planning of any Chart Update activity always start with the establishment of an objective** of what you want to achieve while on the patrol. Be specific and limit the scope to a small, specific area. The objective should be achievable and reasonable. The total job should be able to be completed on one patrol. Multiple objectives or tasks can be planned and ready.
2. **Pre-identify a series of places** where positions and pictures should be taken to achieve your objective. These places may change or additional places may be added once you get on scene. Spend time to review the selected area on a Nautical Chart. For an example, your objective could be to check a section of shoreline or a marine facility, etc.
3. **Prepare a NS-CU04-Chart Update Worksheet**. List each of the positions or observations that you plan to review, and the photographs that you want to take, etc., in order to achieve your objective.
 - 1) **The criteria for the selection of an item for a chart update are subject dependent**. Ask such, pertinent questions as:
 - a. Is it a permanent item?
 - b. Will the item be used for navigation?
 - c. Is the item a hazard to navigation?
 - d. Can a mariner easily identify the item or its location?If the answer to any one of the above questions is yes, and the vital information concerning the item is not shown on the current chart of the area, the item should be surveyed and reported.
 - 2) **For planning purposes, the following time factors can be used to determine how much activity should be scheduled:**
 - a. Location of a structure such as a building, tank, or aid that is new or for verification - 1.5 hours.
 - b. Marina/facility survey - 1 to 2 hours, not including plotting the positions on a chart and re-checking.

- 3) While on scene, write, preferably print, slowly and clearly. **Write down every comment.** Be complete in your observations. Make note of every photo that you take or want to take from a higher vantage point at another time. A little extra time spent on planning will save you hours having to return to the scene to make corrections or add additional observations.
 - a. When multiple observations on a single site are planned, always use the ***NS-CU04-Chart Update Worksheet*** to list the planned observations.
 - b. List the observations in the order that you want them to be performed by the assigned Chart Updater.
 - c. It is a good practice to number each task in advance. This is called a ***PLN-Position Locator Number*** that is also used to identify the plotted location for each fix on any chartlet that you prepare.
 - 4) **Check the narrative for this area in the Coast Pilot.** This will probably provide additional items that you need to check in this area in order to make a complete report or indicate data that should be included.
 - 5) **Check each aid to navigation listed in the Light List against any commentary in the Coast Pilot and all the plotted positions, symbols, colors, and abbreviations shown on the NOS Nautical Chart for the area.** This will also provide additional things to check on scene.
4. When the specific objects or features have been determined and the mission or the patrol is scheduled, **determine the order in which the chart update tasks should be accomplished.** This analysis is done before the mission or patrol begins, utilizing an updated largest scale chart (shows the greatest detail). This is where the crew decides how to determine the location and to report the object. The preplanning questions are:
- 1) What navigation tools and instruments are needed?
 - 2) What will the weather conditions be during the time of the planned mission or patrol, i.e., wind, precipitation, visibility, etc.? For surface operations:
 - a. What is the maximum wave action that will allow acceptable results?
 - b. What is the maximum leeway or current that allows acceptable results?
 - 3) What procedures will be used to check the accuracy of your compass, GPS, and echo sounder?

Planning is essential for the accomplishment of an effective and efficient chart update mission. If you don't plan your events, nothing usually happens!

Using a NS-CU04-Chart Update Worksheet.

It is a good practice to always prepare the **NS-CU04- Chart Updating Worksheet** in advance during the planning process. Be professional and prepare your reports on the computer. Here are the steps for entering the data about each task that you have planned.

1. Enter the “Heading Data:”

 NS-CU04 CHART UPDATE WORKSHEET USCG AUXILIARY FIRST NORTHERN		General location: Newburyport, MA		Depth U.O.M	
Calibration Checks		Date observed: 12-Aug-11	Page No. 1	Feet	
		Prepared by: John Smith	Corr. for Transducer (ft)	0.8	
PRE- Yes	ON-SITE Yes	Attach this worksheet to a NS-AN03 Chart Update Report	Chart Number: 13274	Chart Date: Jun-10	Edition: 34
Yes	Yes	Method used to take FIX: GPS/WAAS	Model and manufacturer: GPS 76 by GARMIN		
Yes	Yes	Method used to determine Depth: ECHO SOUNDER	Model and manufacturer: WIDE 100 by HUMMINGBIRD		

- The **General Location** is where the Chart Updating Project will be conducted—usually the charted name for the area.
- Enter the **date** when the observations are made,
- Use the **worksheet page number** when multiple worksheet pages are needed.
- Take the **vertical datum** from the General Information Block on the chart being corrected.
- Enter the **name of the member** preparing the report. This is the person that would be contacted by NOAA in order to clarify any questions that arise.
- Enter the **correction for the location of the transducer** on the OPFAC. Enter when depths are required as part of the evidence and the area is in a tidal zone, include the correction for the location of the echo sounder’s transducer under the boat to the waterline. Leave a zero in this field when it is not being used.
- Record the **chart number**, the **Chart Date**, and the **Chart Edition**. This data is usually found at the bottom left-hand corner of the nautical chart that is being corrected.
- Enter the method used to take the **Fix**. Select **GPS, GPS/WAAS or DGPS**.
- Enter the **model and manufacturer of the GPS** set being used.
- Record the method used to take the **depth**. Select **echo sounder, lead line, or sounding pole**.
- If an echo sounder is used, enter the **model and manufacturer**.
- **Calibration checks**. Enter YES or NO to indicate whether you performed pre-underway and on-scene checks of your electronic equipment.

2. Item Task Section, during the *pre-planning* mode, enter:

No.	1	Position Location Number - PLN	001	Time Depth Taken	Observed Depth	Height of Tide	Depth at Datum
Describe the task: Document a rock off the northeast end of the Town Pier							
Report Findings and Proof:				Latitude			EPE / DOP
				Longitude			Time FIX Taken
Recommendation to NOAA							

- **No.** Task Number is simply a sequenced number assigned to each planned chart updating task. You may change the first number on a sheet in order to continue the numerical sequence on multiple sheets.
- **Position Locator Number-PLN** can be established and entered during the planning mode or entered after the observations are completed. Establish a series of numbers for the planned mission tasks, establish a numbering system for a section of the chart, or establish a numbering system for an entire chart. Reference this number when plotting the task on a chartlet and on any photos taken in support of your task recommendation. The PLN allows for continuity when multiple reports need to be submitted in a general area and helps avoid confusion document to document about specific observed points on the chart.
- **“Describe the Task”** is filled out during the pre-planning process. Be explicit in as few words as possible. Data can be added to this section during the observation process. If more room is needed, write on the back of the form. Answer the question, *“What do you want to prove to NOAA?”*
- **Charted Latitude and Longitude** – If known or when taken off the nautical chart, enter the assigned or charted Latitude and Longitude for the item being checked in the sections outlined by the dotted lines. This will assist the observer when on-scene.

Item Task Section

3. Perform an observation on scene.

Travel to the scene where the task is to be performed and follow these steps:

- **Make a full scan of the area to insure that you are at the correct location.**
Reference your nautical chart.
- **Follow the Guidelines for taking and reporting the depth.** (Depth is not always required.)
 - **Pre-calibrate your echo sounder to insure it is operating accurately.** Have a lead line available as back up. Enter YES in the Calibration Block labeled, “PRE.” *Be sure the check whether the “Substation” reading on the GPS is correct.*
 - **Enter the time when the depth was taken.** Use the 24 hour clock. Format as HHMM.
 - **Enter the observed depth** as it appears on your echo sounder.
 - **Enter the Height of Tide.** Height of Tide is available from the Almanac Screen on your GPS.
 - The **Depth at Datum** is automatically computed on this report.
- **Following the Guideline for taking and reporting a fix, record the Latitude and Longitude on the Chart Update Worksheet.** The format is [**DD-MM-SS.SS N / DDD-MM-SS.SS W.**]
 - **Pre-calibrate your GPS to insure that it is reporting accurate data.** Enter YES in the Calibration Checks block, labeled “PRE.”
 - **Enter the time when the fix was taken.** Use the 24-hour clock, formatted as HHMM.
 - **Record either the EPE or HDOP for the fix from your GPS.** Always supply evidence of the quality of each fix by recording an EPE or HDOP from your GPS at the time when the fix is taken.
- **Record your observations, findings and other proof accumulated for this task.**
- **Plot the item on your nautical chart.** Reference the PLN on your plot as a credibility exercise..

- **Based on your findings and presented evidence, make a recommendation to NOAA regarding the charted item.** When you find the item correct as charted, show the initials “CAC.” This term is used for single items in a multiple item report. “CAC” means correct as charted. It is common on multi-tasked chart update reports to have some tasks labeled as “CAC.”

No.	1	Position Location Number - PLN	001	Time Depth Taken	Observed Depth	Height of Tide	Depth at Datum
Describe the task: Document a rock off the northeast end of the Town Pier				1545	6.8	4.5	3.1
Report Findings and Proof: Visited the site to determine position and depth over rock. GPS was pre-calibrated with a second GPS. Echo sounder was pre-calibrated with a lead line. GPS was operating in 3-D Differential when fix was taken.				Latitude		EPE / DOP	
				43-48-08.35 N		8.7	
				Longitude		Time FIX Taken	
				070-52-50.30 W		1215	
Recommendation to NOAA Add this submerged rock to Chart 13274.							

Chart Updating is a great team activity with members assigned different tasks to complete for each planned object, or by assigning different objects to members and collecting and reporting the findings at a central point. It also lends itself to Auxiliary fellowship activity.

Using a NS-CU03-Chart Update Form.

It is a good practice to always prepare the **NS-CU04- Chart Updating Worksheet** in advance during the planning process. Be professional and prepare your reports on the computer. Here are the steps for entering the data about each task that you have planned.

1. Enter the “Type of Update” and Auxiliary data:

				NS-CU03 Chart Updating Form			
USCG AUX - NOAA COOPERATIVE CHART UPDATING PROGRAM							
District		Division	Flotilla	Type of Update		For DSO	REPORT NUMBER
013 – District 1NR		06	03	X	CU-CHART UPDATE	use only	District Number
United States Coast Guard Auxiliary First Northern					CP-COAST PILOT	AUX	013

- Enter your **DIVISION** and **FLOTILLA** numbers.
- Check whether your report is a **CHART UPDATE** or a **COAST PILOT** update.
- Do not enter any data in the other fields in this section.

2. Enter the Chart Updater’s Information:

I. CHART UPDATER DATA					
Member Number	Trans Code	Chart Updater's Last Name, First Name and Initial	Phone Number	Date of Investigation	Time Observed
12345678	06E	SMITH, JOHN C.	978-123-4567	23-Apr-11	1245
Street Address, City or Town, State and Zip Code.				E-Mail address	
12 MAIN STREET, ACTON, MA 01720				JCSmith@verizon.net	

- **Enter your MEMBER NUMBER.**
- **Enter your NAME.** (Last Name first, First Name and Initial.)
- **Enter the PHONE NUMBER** where you can be reached during normal business hours.
- **Enter the DATE** of the investigation in MM/DD/YY format.
- **Enter your ADDRESS.** (Street, Town, State and Zip Code).
- **Enter your ZIP CODE NUMBER.**

3. Update the Chart or Coast Pilot Information:

2. CHART / COAST PILOT INFORMATION						Distance Traveled (Miles)	Time Expended (hrs)
Chart /CP Number	Chart or Coast Pilot Name	Hor. Datum	Chart/CP Date	Chart/CP Edition	Updated to Local Notice Number		
54321	Dorchester Bay	WGS84	May-10	34	16/11	45.0	3.5

- **Enter the number of the chart or Coast Pilot** that you are updating.
- **Enter the name of the chart or Coast Pilot** that you are updating.
- **Enter the Horizontal Datum** from the chart that your are updating.
- **Enter the publication date** for the chart or Coast Pilot that your are updating.
- **Enter the edition of the chart or Coast Pilot** that you are using.
- **Enter the number** of the last LNM to which the chart or Coast Pilot was updated.
- **Enter the total distance in miles** that you traveled to complete this report. This is important data to NOAA and is included in the computation for the points awarded.
- **Enter the total time expended** planning, traveling observing and preparing this report. This is impotyant data to NOAA and is included in the computation for the points awarded.

4. Complete the Location Data.

3. LOCATION DATA							
Location of item	dd-mm-ss.ss N	ddd-mm-ss.ss W	Method Used	EPE / HDOP	QC Readin	GPS Mod. No.	GPS Manufacturer's Name
Latitude:	34.45-54.80 N	Longitude: 072-34.00.50 W	GPS with WAAS	EPE	7.9	GPS 76	GARMIN

- **Enter the Latitude** in degrees, minutes and seconds.
- **Enter the Longitude** in degrees, minutes and seconds,
- **Select and report the method used to determine the LAT/LON** from the menu.
- **Select and report the type of quality level in use by the GPS** when the fix was taken.
- **Report the EPE or HDOP** quality reading from your GPS when the fix was taken.
- **Enter the Model Number of the GPS** used to take the fix.
- **Enter the Manufacturers name of the GPS** used to take the fix.

5. Complete the depth information.

4. CORRECTED DEPTH AT CHARTED DATUM (Sounding UDM)								Enter the unit of measure used for depth:	FEET
Observed Depth	Trnsdor Correction	Height of Tide	Corr. Depth	Time Taken	Method Used	Manufacturer's Name and Model Number	Operating Frequency	Area of Coverage	
45.0	0.8	9.5	36.3	1234	ECHO SOUNDER	WIDE 100 by Hummingbird			

- **Record the Unit of Measurement** being used by the Echo Sounder.
- **Record the depth** as read from your echo sounder, lead line or sounding pole.
- **Enter the correction for the echo sounder's transducer.** Otherwise, leave as zero.
- **Record the HOT**-Height of Tide from the Almanac screen on your GPS.
- **System will compute the corrected depth at Datum.**
- **Record the time** when the depth was taken.
- **Record the type of instrument** used to take the depth.
- **Record the manufacturer's name and model number** of the echo sounder used.
- **Indicate the operating frequency of the echo sounder.** This data is available in your echo sounder's operating manual.

- **Indicate the area of coverage being achieved by the echo sounder.** This data is available in your echo sounder's operating manual.

5. Make a statement about the scope of the Chart Updating Task.

5. STATEMENT ABOUT THE SCOPE OF THE TASK(S) BEING REPORTED: DOCUMENT AS A NAVIGATION LANDMARK THE NEW WIND TURBINE ERECTED IN THE CITY OF NEWBURYPORT, MA AND VISIBLE FROM THE HARBOR AND FROM SEAWARD.

- **If you are reporting a chart update with a single task**, be specific about when you are trying to prove to NOAA that has changed.
- **If you have a series of tasks** associated with the proof and evidence that you are submitting, prepare a general statement regarding the scope of what you are reporting.

6. Summarize and report your observations.

6. OBSERVATIONS AND COMMENTS: Show the starting PLN-Position Locator Number: **001** the ending PLN-Position Locator Number: **005**
 A new wind turbine-Turbowinds/Electron model T600-48 600K wind turbine generator was erected in Newburyport, MA and went operational in late March, 2009. The wind turbine is 65 M (213 feet) from the base pad to the propellor hub. Overall height from the tower base pad to the vertical tip with the propeller blade in a vertical position is 292 feet. The tower base pad elevation above mean high water is approximately 3 M (28 feet)
 Observations were made from various points along the mouth of the Merrimac River and it approaches in the Gulf of Maine in order to confirm the wind turbine's visibility from the sea.
 Confirming worksheets, as-built drawings, local newspaper articles and internet data is attached as evidence.

- **Show the number of PLN-Position Locator Numbers** that have been used as part of this report. Multiple PLNs usually indicate the use of a NS-CU04 Chart Update Worksheet(s).
- **Summarize the evidence and proof** that you are including as proof of your premise made in your Statement of the Scope of the Tasks above.

7. Include the data about other observers that helped with this CU project.

7. ADDITIONAL OBSERVERS NOTIFICATION LIST					District	Division	Flotilla	Points
Member Number	Last Name	First Name and Initial	Phone Number	E-Mail address	(3 digits)	(2 digits)	(2 digits)	Share (%)
2343213	JONES	CHARLES F.	607-455-6778	charlesjones@grt.net	013	10	03	25%

- **Enter the required data for each additional observer** and the percentage of their share in the awarded points.

8. Prepare a brief recommendation statement to NOAA.

8. RECOMMENDATION
 ADD TO CHART 13278 AS A WIND TURBINE LANDMARK.

9. Order a replacement chart.

9. NOAA Chart Order		
Quantity	Chart Number	Chart Name
1	13278	PORTSMOUTH TO CAPE A

- **NOAA supplies charts** for CU reports that are accepted for update.

10. List of Attachments to your CU Report.

10. Attachments to prove this report in this order:	
2	a. Chart Updating Worksheet(s)
2	b. Chartlet(s)
	c. Drawing(s).
4	d. Other - :NEWSPAPER ARTICLES
5	e. Photograph(s)
5	f. Other evidence. :GOOGLE CHARTLETS

- List the quantity of each attachment on your CU Report.
- Attach them to your report in the order that they you list them.

11. List your name as the primary report preparer and show the date when sent.

Date report submitted	Enter your name here as the preparer of the report.
4/14/2011	<i>JOHN SMITH</i>

12. Copies:

The most important copy is the one that is sent to NOAA. Because of all the necessary evidence that has to be submitted, it is impossible to transmit this report electronically. And, remember that time is of the essence in order not to lose awarded credits.

13. Mail your CU Report to the DSO-NS 013

- Mail your completed Chart Update Reports with all attached evidence and documentation to:
Frank J. Larkin
DSO-NS 013
107 Concord Road
Acton, MA 01720

COAST PILOT TEXT CORRECTION PROGRAM



INTRODUCTION:

The **United States Coast Pilot**_{tm} consists of a series of nautical books that cover a variety of information important to navigators of coastal and intracoastal waters and the Great Lakes. Issued in nine volumes, they contain supplemental information that is difficult to portray on a nautical chart.

Topics in the Coast Pilot include channel descriptions, anchorages, bridge and cable clearances, currents, tide and water levels, prominent features, pilotage, towage, weather, ice conditions, wharf descriptions, dangers, routes, traffic separation schemes, small-craft facilities, and Federal regulations applicable to navigation.

Sources for updating the Coast Pilot include field inspections conducted by NOAA, Notices to Mariners, Governmental agencies, mariners and the U.S.C.G. Auxiliary. Accordingly, Coast Pilot Updating has become an important responsibility in the Auxiliary Chart Updating Program efforts. As you should see, much of the investigative work performed as chart updating can also be added, deleted or corrected to the local Coast Pilot.

OBJECTIVES:

To acquire a general knowledge of the responsibilities of the Auxiliary for COAST PILOT updating activities.

To become familiar with the types of Coast Pilot information that should be reported.

To become familiar with the forms and worksheets used to report Coast Pilot corrections and updates to NOAA.

INFORMATION:

The Coast Pilot contains information required by the mariner, which cannot be graphically illustrated conveniently on standard nautical charts and is not readily available elsewhere. The Coast Pilot consists of data that pertains to channel descriptions, anchorages, bridge and cable clearances, currents, tides and water levels, prominent features, pilotage, towage, weather, ice conditions, wharf descriptions, dangers, routes, traffic separation schemes, small craft facilities, and Federal Regulations applicable to navigation in the area.

The Coast Pilot Manual is a NOS working guide to facilitate the use of the Coast Pilot. It is available to assist in updating the various editions of the Coast Pilot, as may be required.

There are nine volumes of the Coast Pilot, five for the Atlantic Coast, one for the Great Lakes and three for the Pacific Coast. The nine volume series consists of, Coast Pilot:

- No.1 [Atlantic Coast: Eastport to Cape Cod](#)
- No.2 [Atlantic Coast: Cape Cod to Sandy Hook](#)
- No.3 [Atlantic Coast: Sandy Hook to Cape Henry](#)
- No.4 [Atlantic Coast: Cape Henry to Key West](#)
- No.5 [Atlantic Coast: Gulf of Mexico, Puerto Rico, and Virgin Islands](#)
- No.6 [Great Lakes: Lakes Ontario, Erie, Huron, Michigan, Superior, and St. Lawrence River](#)
- No.7 [Pacific Coast: California, Oregon, Washington and Hawaii](#)
- No.8 [Pacific Coast, Alaska: Dixon Entrance to Cape Spencer](#)
- No.9 [Pacific and Arctic Coasts, Alaska: Cape Spencer to Beaufort Sea](#)

The nine Coast Pilot volumes are published on the Internet at:

<http://nauticalcharts.noaa.gov/nsd/cpdownload.htm>.

Coast Pilot Corrections

Corrections to the Coast Pilot books, that are critical to safe navigation, are disseminated to Coast Pilot users in various forms. By law, vessels 1600 tons and above must enter these corrections into their Coast Pilot books. The FSO-NS in every Flotilla should maintain the corrections to the Flotilla's Coast Pilot pages. Coast Pilot corrections are posted on the Internet at <http://nauticalcharts.noaa.gov/nsd/cpdownload.htm> (by book) on a daily basis. The same corrections are forwarded to the Coast Guard and NIMA who publish them in weekly publications. Coast Pilot corrections are maintained in Microsoft Word. Principal customers are users of the Coast Pilot books. Specifications are documented in the Coast Pilot Manual, last printed in 1994.

Bearings in the Coast Pilot

Bearings shown in and reported to the Coast Pilot are True, and expressed in degrees from 000° (north) to 359°, measured clockwise. Generalized bearings are expressed by initial letters of the points of the

compass (e.g., N, NNE, NE, etc.). However, whenever precise bearings are intended, degrees are used. Light-sector bearings are toward the light.

Currents in the Coast Pilot

Stated current velocities are the averages at strength in the Coast Pilot. Velocities are in knots, which are nautical miles per hour. Directions are the true directions to which the currents set.

Some sources of information for Coast Pilot Updates

- Local piloting or tugboat firms.
- U.S. Army Corps of Engineers (USACE).
- Local harbor/dock masters.
- Marine terminal operators.
- Local residents and area users.

Small Craft Facility Updates and Charting Coast Pilot Reporting Procedure

Use the *NS-CU03-Chart Update Form* and the *NS-CU05-Coast Pilot Text Correction Worksheet* for reporting Coast Pilot updates and corrections. Reports should be accurate, brief and presented in standard terminology. Topical entries should be bold faced. The present Coast Pilot edition can serve as a guide in style and terminology. Corrections should be neatly printed or typed doubled spaced, and referenced by page, line and column of the current edition of the Coast Pilot. It is important to indicate to which edition of the Coast Pilot the corrections are referenced.

When a change is made to an existing line, the entire line must be rewritten, repeating any part of the line that is to remain unchanged and adding the new information.

Attachments to support your chart verification.

Chart sections, drawings, brochures, and photographs enhance the value of your Chart Updating report.

- Above all, neatness and legibility are most important.

Computer generated Chart Update reports are highly desirable because the data presented is always clearer and readable. Unreadable manually-prepared reports are often undecipherable by NOAA.

DSO-NS Report Review

The DSO-NS or designate will screen all Chart Update reports prior to forwarding them to NOAA attached to a ***NS-CU15 DSO-NS Transmittal Sheet***. Unacceptable reports should be returned to the chart updater for correction and resubmission. This action should not be viewed as punitive measures but more an opportunity for retraining and learning.

CHART UPDATING Report Submission Procedures:

Complete the *NS-CU03 Chart Update Form* for reporting chart and related publication associated data.

- Forward copies of the completed *NS-CU03-Chart Update Form* to the DSO-NS.
- Include on your report the method used in determining the reported item's characteristics and position, and, include appropriate chart sections, drawings, and photographs (all with LAT/LON designations or other position data per the guidelines). This type of data contributes towards the possibility of the update being accepted as a change to a chart or publication, and may result in additional reporting credits for the auxiliary member and unit.
- On all reports concerning charts published by other than NOAA/NOS, include the name and address of the chart's publisher in the Comments section of your report.

Information submitted as part of your report should be concise, definitive and accurate, as it may involve permanent changes to a particular chart or publication. It is important to note the, erroneous data submitted by you and subsequently published in nautical/aeronautical documents could result in catastrophic occurrences.

Only one member may submit the final ***NS-CU03-Chart Update Form*** to NOAA. Up to five secondary observers may be added to your report to share the credits. NOAA awards credits for each submission and publishes the results on an annual basis to the DSO-NS.

Reporting chart updating activity to AUXDATA

Each participating Auxiliarist reports their chart updating field activity on a *7030 – ACTIVITY REPORT MISSION – Individual* report as a Mission 41 to AUXDATA.

- Show the Start and End times for your field activity.
- Each member of a team may report their time performing a Chart Update, a Coast Pilot text correction, or a Small Craft Facility on an individual *7030 – Activity Report Mission – Individual (CI)* form. Include all the investigating, planning, observing and administrative time for Chart Update activity on your report, including the time spent in preparation and mailing.

When your Chart Updating activity is performed as part of an authorized Auxiliary Patrol, there is no need to submit an *ANSC 7030* report or the time underway. The OPFAC's coxswain accounts for your time via the POMS system. But you may report all other time expended before and after the patrol, such as, planning the patrol and preparing the final report to NOAA on a ***7030 Activity Report Mission – Individual (CI)*** form as a Mission 41.

Preparing a Coast Pilot Text Correction Worksheet



NS-CU05 COAST PILOT TEXT CORRECTION WORKSHEET

COAST PILOT	1	Worksheet Number	1	of	1
--------------------	----------	------------------	----------	----	----------

CP EDITION	34
-------------------	-----------

District	Division	Flotilla
013	10	07

Coast Pilot Updater's Name
JACK SMITH

Page	Paragraph	From Line	To Line
234	124	23	26

Date Observed
1-Jun-2011

For DSO use only	Report Number	
	District	No.

Always attach this worksheet to a NS-CU03-Chart Update Form with all of the evidence and proof that supports your recommendation for NOAA to make the change.

Coast Pilot Report

Current Text	Corrected Text
A channel exists between Castle Island and the Black Falcon Terminal that carries a depth of 23 feet. A bascule bridge exists at 1.5 miles on the channel that leads to a mooring basin at a yacht club.	A channel exists between Castle Island and the Black Falcon Terminal that carries a depth of 23 feet. A fixed bridge exists at 1.5 miles on the channel that leads to a mooring basin at a marina .
	Enter the text that is being corrected as it currently exists in the Coast Pilot. You can copy the text from the on-line Coast Pilot and paste it in this section.

1. **Enter the Number of the Coast Pilot** that you are reporting.
2. **Enter the number of the worksheet.**
3. **Enter the Edition of the Coast Pilot** that you are reporting.
4. **Enter your District, Division and Flotilla** number references.
5. **Enter the date** when the problem was reported.
6. **Enter the name of the Auxiliarist** preparing the report.
7. **Show the Page Number, the paragraph number, and the starting and ending lines** that are being corrected.
8. **Current Text**
 - Show the complete existing text that is being changed as it appears in the Coast Pilot.
 - Show the complete corrected text as you recommend that it appear in the Coast Pilot.

CHART UPDATING PROGRAM - SHIRT POCKET GUIDE

The U.S. Coast Guard Auxiliary, in its overall supporting role, provides specifically authorized assistance to the National Oceanic and Atmospheric Administration (NOAA)/National Ocean Service (NOS) in its Chart Updating mission. This Auxiliary support effort is provided through its Chart Updating (CU) Program. Nautical Charts, Coast Pilots, Light Lists, etc. are used in Chart Updating Program. “Chart No. 1-Nautical Chart Symbols and Abbreviations”, a NOAA/NOS and National Imagery and Mapping Agency (NIMA) provide a listing of chart features, symbols, abbreviations and terms used on nautical charts. The “Coast Pilot section of the “NS-CU02-Chart Updating Study Guide,” serves as a guide for the use of the Coast Pilot(s).

THE USCG AUXILIARY CHART UPDATING PROGRAM INVOLVES:

- **“NAUTICAL CHART”** updating.
- **“SMALL-CRAFT FACILITY”** reporting and updating. (Facilities that service small craft)
- **“COAST PILOT”** text correction and updating.

Remember “Change Analysis” and report all the differences that you see that are not already charted or are charted in error.

Airports and Landing Fields - Report new installations or discontinued establishments.

Anchorage - Normal operations and Emergency operations.

Bridges - New, discontinued, under construction, or ruins. Indicate location, type, and vertical and horizontal clearances.

Cables (Areas) - Over or under navigable waters. Indicate location, type of clearances and completion status.

Channels - Report new or modified channels. Indicate depth and width discrepancies for channels other than U.S. Army Corps of Engineers project channels.

USCG Stations - Report new, discontinued or change in facilities.

Cribs and Water Intakes - Visible or submerged. Indicate size and type of construction, and if submerged, provide depth.

Dams - Show type, position, lights and other pertinent data.

Dikes and Levees - Show type, height and extent.

Dolphins - Indicate condition – visible or submerged. Provide position data.

Duck blinds - Indicate condition – temporary or permanent.

Dumping Grounds - Indicate extent with fixes.

Spoil Areas – Indicate extent with fixes.

Fish Havens - Indicate condition – obstruction, artificial fish haven. Indicate limits. Provide fixes.

Fish Trap Area - Indicate limits of area covered with fixes.

Fish Stakes - Visible or submerged (outside of trap area). Provide fixes.

Ferries - Type, docking facilities, and under water or overhead operating cables.

Geographic Names - Report correction of misspelled or incorrect names.

Groins – Report visible, submerged or ruins. Show position data and length.

Jetties and Breakwaters - Visible, submerged or ruins. Show position data and length.

Landmarks - Report new, destroyed or obscured landmarks. Evaluate existing ones and recommend new ones that are visible from seaward. Landmark should be prominent.

Log Booms - Extent and if near channels, or if a navigational hazard. Show positions at both ends.

Marina/Marine Facilities - Report new, discontinued or modifications to a marina. Fill out a Small Craft Facility Report on the marina. Provide position data on marine layout.

Marine Construction – Show the positions of bulkheads, wharves, docks, piers, dredging, etc.

Marine Railways - Report new or discontinued ones. Include vessel length and tonnage capacities.

New Chart Requirements - Indicate your recommendations for chart coverage.

Obstructions – Indicate the positions of visible, submerged, type, permanent or temporary obstructions.

Piers and Docks - New extended or ruins. Visible or submerged. Indicate length of pier. Reference the Chart Scale Ratio Graph to ensure it is chartable. Show fixes.

Platforms (all types) - Type, markings, light and hazards.

Piles - Visible or submerged. Indicate arrangement. Show position data.

Pipelines - Overhead or submerged. Indicate clearance.

Ramps – Owner, type, surface and length. Could become a Small Craft Facility Report.

Range - Charted range position error.

Radio Stations - New or discontinued, call sign, frequency, tower height and lights.

Rocks - Visible or submerged. Single or cluster. Use extreme care obtaining position data.

Ruins - Those not covered in other areas. Use photos to support your observations.

Sewer - Size and type or construction. Show position data.

Shoals - Visible or submerged, Indicate water depth. Show position data for the extent of the shoal.

Snags – Indicate type, position and whether they are visible or submerged. Show fix.

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