



U.S. Coast Guard Auxiliary

Nautical Chart Updating Training Guide



National Ocean Service Office of Coast Survey

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What is New

On November 16, 2018, NOAA released ASSIST, a new system for submitting questions and reporting nautical chart errors to NOAA's Office of Coast Survey. ASSIST has a mobile-friendly design and improved user interface that allows customers to access the system conveniently from any device.

ASSIST replaces Coast Survey's Inquiry and Discrepancy Management System (IDMS), a database that collected nearly 20,000 comments, inquiries, and discrepancy reports since 2008. ASSIST is available from: <https://www.nauticalcharts.noaa.gov/customer-service/assist/>.

The adoption of NOAA's ASSIST Report System is beneficial to the Auxiliary Chart Updating (CU) program. CU plays a vital role in promoting safety of life and property on the water. We will still teach CU techniques and stress quality. The same information that was being provided through previous Web based programs can still be sent to NOAA.

Your reports are still important to NOAA and CU training is the vital link in providing this important information.

The credit and awards provided by NOAA have been suspended until further notice.

April 2015, NOS will no longer accept Small Craft Facility information. However, NOS will still accept as-built drawings for new marinas.

The following are acknowledged for their exceptional efforts for making the publication of this training guide possible.

U.S. Coast Guard Auxiliary Districts 013, 054, 113 and 130.

National Ocean Service, Office of Coast Survey

Introduction to Nautical Charts and Coast Pilot

Throughout its extensive ATON, PATON, Bridge, and Chart Updating program activities, the US Coast Guard Auxiliary has played an important role, providing information and updates regarding information pertinent to safety of navigation. This information has assisted the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), maintaining a high level of quality and reliability of nautical charts used for the safety of maritime navigation.

Since the inception of the Auxiliary Chart Updating Program, much has changed regarding how we view the nautical chart and report discrepancies. Even with the advent of digital chart plotters and electronic charts, we still rely on the basic concepts of the paper chart to provide the information necessary for safe navigation. Although the appearance and functionality of paper and electronic charts differs, their use is the same. Corrections made to the paper chart will translate to the electronic chart.

This guide is intended to provide the basic information that may assist the member in becoming a more competent and effective observer for the Auxiliary Chart Updating Program.

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 US Coast Pilot. This knowledge may be gained through completion of the Auxiliary Boat Crew (M16794.52A), Coxswain (M16794.53A), Seamanship (M16114.5C) Qualification Programs or completion of the AUXNAV, AUXOP class. Additional list of suggested reading material is provided in Appendix 3.

Objective

- To review the basic construction of a typical nautical chart, the information presented, and the responsibilities of the Auxiliary regarding the use of updated nautical charts and Coast Pilots.
- To acquire a basic understanding of the information required to update the NOAA Nautical Chart, Coast Pilot and Range Line Survey.

Background

The primary purpose of a Nautical Chart and Coast Pilot is to provide navigational related information to assist mariners while plotting courses and trying to avoid dangers.

Charts provide the navigator with a high level of accurate information for navigable bodies of water by portraying depths, aids to navigation, obstructions, shorelines, physical features and other useful and essential information. The nautical charts the Auxiliary help update are issued by NOAA and are based on data compiled by NOAA. However, the accuracy of a nautical chart depends on the currency of the information upon which they are based.

It is important to know that a nautical chart and the data provided do not absolve the navigator of the responsibility of safe passage. In addition, weekly updating of nautical charts from the Local Notice to Mariners (LNM) publications is necessary to keep charts current with the latest critical changes and Aid to Navigation updates.

Projections

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.

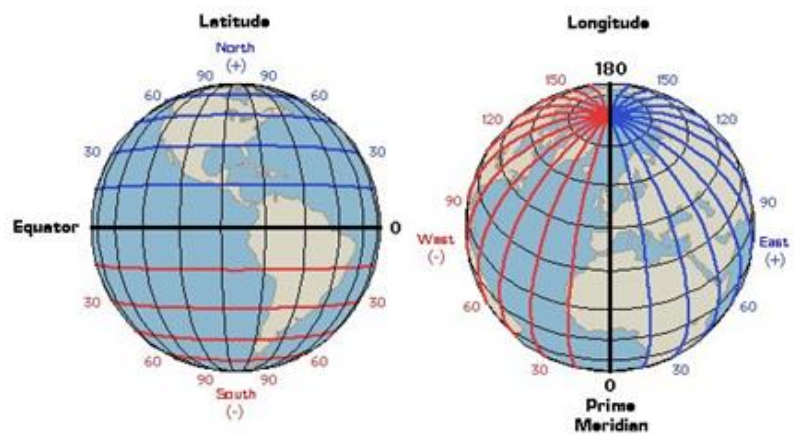


Figure 1 - Latitude and Longitude lines on globes that represent the earth's surface.

The process of transferring details from a sphere onto a flat surface is called a “**Projection**”. 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 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

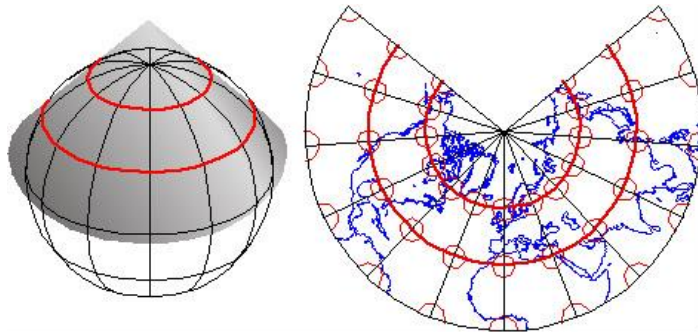


Figure 3 - Polyconic Projection

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

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

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 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 obtained from the top to the bottom on the chart.

NOS charts which have a scale larger than 1:40,000, such as a 1:10,000 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.

Scale

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 distance 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, a priori. Charts are published in a wide range of scales. The Scale of a chart is usually 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.

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. *Auxiliary members should use the largest scale charts available for Aid to Navigation and Chart Updating activities.*

Horizontal Datum

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 Owner's Manual for instructions for making this adjustment.

The changed datum 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, and 500 yards in Hawaii. As a precaution, always use the latest edition of a nautical chart.

Vertical Datum

For a system of depth information, where depths may change hourly as the result of tidal action, there must be a reference plane or datum. 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 on the General Information Block on the chart. Vertical datum is commonly expressed as feet, meters or fathoms. The tidal datum systems for all marine waters of the U.S. and its territories have implemented the conservative expression of "Mean Lower Low Water." This means that the arithmetic mean is calculated from the lowest of the low water readings for each day over a period of at least 19 years (a tidal epoch). Lake and river charts will usually use a datum based on past records of variations in level over many years, and will be expressed as a specific lake/river height.

Depths Used on Nautical Charts

Depth 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 referenced on charts:

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 (USACE). 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 water depth in a Federally controlled channel. NOAA gets this information from the USACE.

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.

Traditional Paper Nautical Charts

As of April 13, 2014, NOAA's Office of Coast Survey, which creates and maintains the nation's suite of over a thousand nautical charts of U.S. coastal waters will no longer print traditional lithographic (paper) nautical charts.

NOAA will continue to create and maintain other forms of nautical charts, including the Print on Demand (POD) charts, updated paper charts available from NOAA-certified printers. NOAA electronic navigational charts (NOAA ENC®) and raster navigational charts (NOAA RNC®), used in a variety of electronic charting systems, are also updated weekly and are available for free download from the Coast Survey website. NOAA also provides a new product as well: full-scale PDF (Portable Document Format) nautical charts, available for download (see Appendix 1 for additional information on chart formats).

Chart Title and Information Block

The chart title block provides general information about the chart and is located at a convenient place on charts. The name representing 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.

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

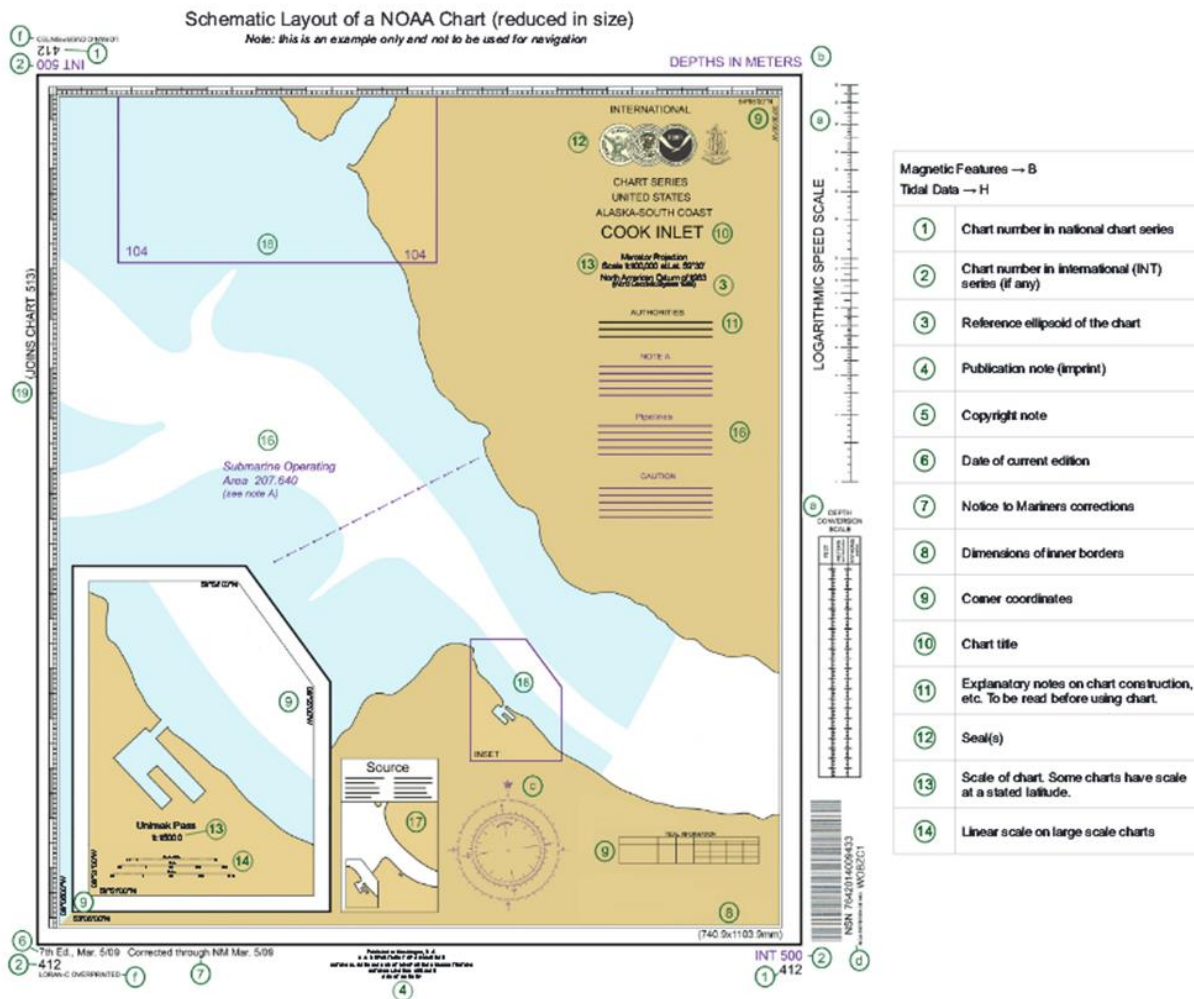


Figure 5 – Chart Standard from Chart No. 1 Publication

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:

- Land areas are shown in buff or yellowish color.
- Water masses are shown in white.
- Shallow water areas are shown in light blue.

- Submerged areas, which uncover at some stage of the tide, are shown in green.
- Magenta is used for many purposes on charts and shows well under red light, for preservation of 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.

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

Lettering Style

Generally, one of two styles of lettering represents certain classes of information. Topographic features and those attached firmly to the bottom and permanently above high water are labeled with Vertical lettering.

Hydrographic features below the high water datum (including features that dry at low tide), names of water areas, underwater features and all floating objects are labeled in Italic (leaning or slanted) lettering.

Charted Depths

For a system of depth information, 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 on the General Information Block on the chart. Vertical datum is commonly expressed as either feet, meters or fathoms.

Depth information is usually referenced on a chart by a numeral. This number indicates the depth whose unit of measure reflects the chart's vertical datum. The datum's coverage will be true over the complete chart unless noted otherwise. The tidal datum system for all marine waters of the U.S. and its territories have implemented the conservative expression of "Mean Lower Low Water." This means that the arithmetic mean 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 level 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 line.

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.

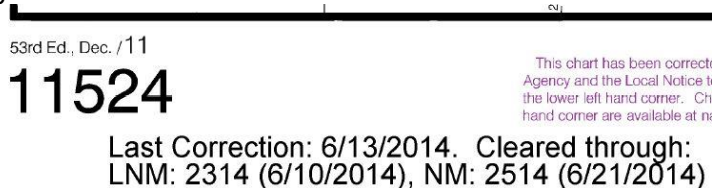


Figure 6 – Chart Edition

New Edition charts are published when the critical changes and other non-critical changes are so numerous as to make hand correction difficult. 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.

Updated Charts

NOAA has developed a paper product that addresses the problem of manual updates to paper charts. A Print on Demand (POD) chart is a paper chart that is printed at the time of purchase and contains chart updates up until the time of purchase.

Since Raster Navigational Charts (RNC) are simply electronic images of NOAA's paper chart, the same update system described for POD charts also applies to RNCs. Once NOAA cartographers update the master electronic versions, the files are geo-referenced in .BSB format, a compressed raster format, and the digital differences between the updated chart and the base edition are isolated into an update or patch file. NOAA posts these updated files on the Internet where they are available for free download.

NOAA provides about a thousand high resolution printable nautical charts as PDF files. The PDF nautical charts are exact images of NOAA's traditional nautical charts. Just as with Print-on-Demand (POD) and NOAA raster navigational charts. Coast Survey checks each chart weekly, and applies all critical corrections, so you are assured of getting the newest information when you download the PDF.

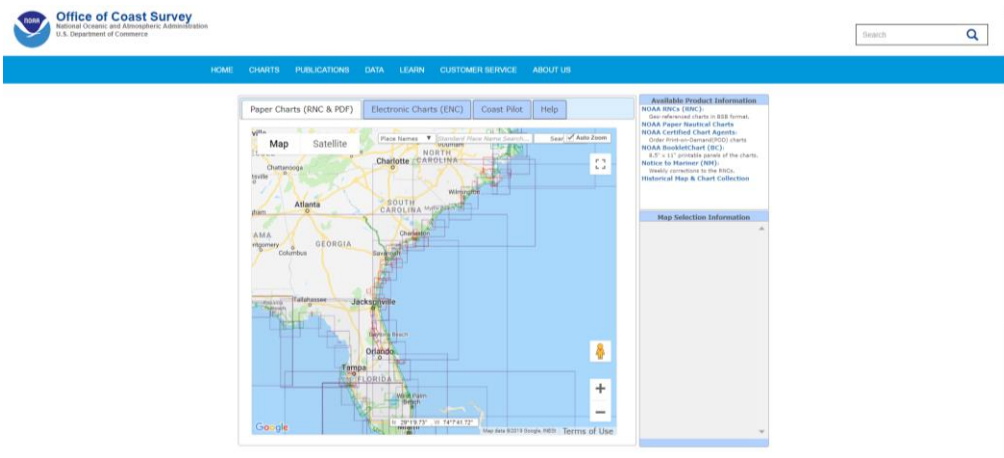
Currently, NOAA has over 600 Electronic Navigational Charts (ENC) available for free download. Updates for these ENCs are also available for free download. ENCs are a vector-based product and are not constructed from the same pipeline as paper charts or RNCs. Each LNM and NM chart correction must be applied independently to the electronic master version of the ENC. NOAA's goal is to post ENC updates weekly for its entire suite of charts.

Like charts, corrections to the Coast Pilot are published in the USCG LNM and NGA NM. These corrections can be conveniently found with the Coast Pilot downloads at <https://www.nauticalcharts.noaa.gov/publications/coast-pilot/index.html>. Coast Pilot book download files are updated weekly.

Nautical Chart Catalogs

NOAA's Nautical Chart Catalog gives you the ability to view any of NOAA's 1000+ nautical charts, as well as download NOAA's general use charts in three different raster formats: NOAA RNC® full size nautical charts in PDF format, and BookletCharts™. Three Ways to Download Products

- The Chart Locator is an online, interactive map that enables users to locate, view, and download individual RNCs, Full-size nautical charts, and BookletCharts, as well as ENCs.
- The NOAA Nautical Chart Catalogs are seven sets of 8.5"x11" formatted, regionally based, catalogs that are easy to print at home. The chart catalog webpage enables you to download the catalogs, as well as to view and download individual raster chart products.
- The RNC listing provides several options for downloading individual RNCs or groups of RNCs bundled by state, U.S. Coast Guard District, and other groupings, including downloading all RNCs at once.



<https://charts.noaa.gov/InteractiveCatalog/nrnc.shtml>

Figure 7 - Nautical Chart Catalog

US Coast Pilot

The United States Coast Pilot 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, 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 in the area. 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 2010 Coast Pilot Manual is a NOS working guide to facilitate updating the various editions of the Coast Pilot. It is available for download and review from <http://wow.uscgaux.info/content.php?unit=P-DEPT&category=ns-forms-and-manuals>

US Coast Pilot Updates

Corrections to the Coast Pilot books that are critical to safe navigation are disseminated to users in several forms and are posted on a daily basis. The same corrections are forwarded to the Coast Guard and NIMA who publish them in weekly publications.

U.S. Coast Pilot now offers completely updated publications every week. The new PDF version, available free on www.nauticalcharts.noaa.gov every Tuesday, automatically incorporates the latest revisions. The version is identified by that week's Sunday date at the top of every page.

The "Weekly Record of Updates" (now preceding the index) is intended as a log for critical updates; and for online versions or Print on Demand (POD) copies, all weekly updates issued and applied at time of download or purchase are listed. Affected paragraphs within the chapters are indicated by a gray highlight for ease of identification; e.g., (215)

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.

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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.

Introduction to Nautical Chart Updating

NOS and the Coast Guard rely on mariners and many maritime agencies and offices for notification of errors, updates or changes that may be required to keep nautical charts and other related navigational publications current.

The Coast Guard and the Auxiliary entered into an agreement for the Chart Updating program, wherein the Auxiliary through its Aid to Navigation /Chart Updating Program agree to report data useful for the correction of Nautical Charts. Because of this agreement, Nautical Chart Updating is an important responsibility of each member of the Auxiliary.

Objectives

- For Auxiliary member to acquire a general knowledge of Nautical Chart updating
- To familiarize Auxiliary members with the characteristics and types of charted information that needs to be reported
- To acquaint Auxiliary members with the procedures for reporting chart updates and corrections using the NOAA Nautical Discrepancy Report System located at:
<http://ocsddata.ncd.noaa.gov/idrs/discrepancy.aspx>.

Background

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 discrepancies. Therefore, Auxiliarists should report all changes, deletions, additions and discrepancies between 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). Note: Remember to check all charts and nautical publications for LNM updates that may have already captured your observed problem before you submit it.

Make your Chart Updating Reports as concise, definitive, 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 in the water fixed to the bottom, such as beacons, can be verified more accurately. *Discrepancies to Federal and Private Aids are not reported as Chart Updates.* The proper reporting path is through the local Coast Guard Group or Sector that is responsible for the aids. District ‘dpw’ Offices forward the corrections to aids to navigation directly to NOAA via the LNM. The exceptions are the symbols and abbreviations used to identify the aid on a nautical chart.

For chart updating activity, always use the latest edition of the largest scale charts available. Keep these charts current through the application of data contained in LNM- Local Notices to Mariners,

which is available through the Internet on a weekly basis. Check your District LNM Local Notice to Mariner link a www.navcen.uscg.gov or www.nauticalcharts.noaa.gov/mcd/updates.

With NOAA's free digital charts on the web, observers no longer have to cut sections from current editions to prepare chart updates. You may also download and print chart sections from the NOAA/NOS online chart viewer, PDF nautical chart or BookletChart at: www.nauticalcharts.noaa.gov. They are corrected to the most recent LNM's. Be sure to print these screen shots with a color printer having adequate resolution.

Tools & Equipment useful in Chart Updating

The following tools are suggested for chart updating. Most of this equipment is often found aboard operation facility's (OPFACs). However, many Auxiliaries, who are active in the NS Programs, carry a personal Navigation Kit that contains this equipment. For a successful Chart Updating experience, ensure that the right navigational tool is available when it is needed by including this equipment as part of your pre-underway checklist. However, for certain chart updating missions, only applicable items are brought. Pre-calibrate each navigational instrument to ensure 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 used 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 good addition to your Navigation Kit.

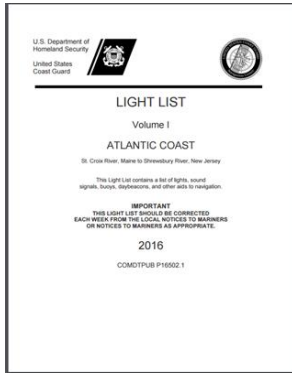
Time Piece - A stopwatch is a useful tool for timing the period of an aid's light. Also, any good wristwatch with a second hand satisfies this equipment need.



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 new GPS sets. Ten feet is inside the limits of the width of the ordinary OPFAC. If you are using one of the 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. 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. See Figure below.



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



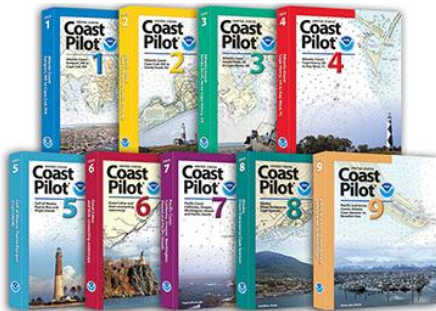
The USCG Light List is provided annually and is intended to furnish more complete information concerning aids to navigation than can be conveniently shown on charts.

Mariners are cautioned to keep their Light Lists corrected and should consult all notices issued after the date of publication of the annual Light List. Additionally, this publication should be corrected weekly from the Local Notices to Mariners or the Notices to Mariners, as appropriate.

Front matter and indices are updated annually and are accessible at the link <http://www.navcen.uscg.gov/?pageName=lightLists> as well as in the full light list book.

Local Notice to Mariners (LNM) keep your charts and other nautical publications updated through the latest Local Notice to Mariners. See: <http://www.navcen.uscg.gov/?pageName=lnmMain> for the LNM for your area.

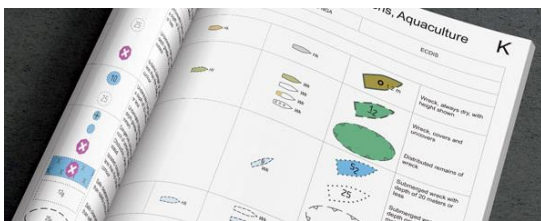
Prudent mariners update their nautical charts, Light List and Coast Pilot before every ATON patrol.



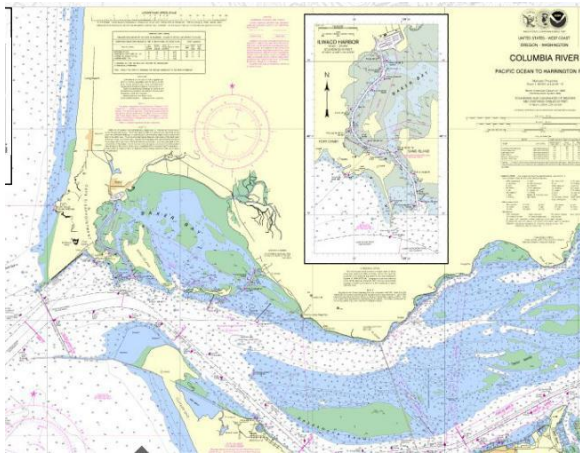
Coast Pilots contain information not easily included on nautical charts and is available on line. Use this link to download the Coast Pilot that covers your AOR:

<http://www.nauticalcharts.noaa.gov/nsd/cpdownload.htm> Print out only those pages that pertain to your AOR plus front matter (Chapters 1-3) and back matter (useful appendix tables), and keep them in your Navigation Kit. It is a good practice to review the Coast Pilot data while you are performing a Chart Updating activity while pre-planning and underway in an area, or when you are planning a patrol.

U.S. Chart No. 1 describes the symbols, abbreviations and terms used on all NOAA, NGA and international nautical charts, as well as the symbols used to portray NOAA ENC® charts on ECDIS and should be part of a Navigation Kit. While it is also available free on-line <http://www.nauticalcharts.noaa.gov>, you may purchase a hardcopy. Every authorized marine chart dealer should stock a copy or you can purchase a copy online from major book dealers.



Auxiliarists participating in the Chart Updating Program should be 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 small lettering, whereas the 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.



NOAA Nautical Charts - Every OPFAC should be using the latest NOAA nautical charts for navigating. Use only official NOAA nautical charts available at: <http://www.nauticalcharts.noaa.gov>.

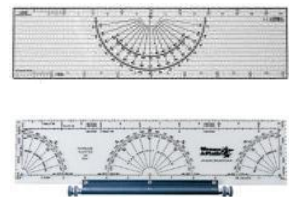
From this site, you can access all the updated charts that NOAA provides; Print-on-Demand paper charts, Raster Navigational Charts (NOAA RNC®), and Electronic Navigational Charts (NOAA ENC®). This site also provides other information considered essential for safe navigation. Keep copies of the current/updated NOAA Nautical Charts in your Nav Kit.

NS Chart Update Worksheets are available on line from the National Navigation Systems Division web site: <http://pdept.cgaux.org/nsForms.html>. Print out some blank forms for use while on seen and keep adequate copies of these forms and instructions (see page 32-33) in your Navigation Kit.



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 (or parallel) 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. 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 provides an opportunity to teach navigation to the crew between planned ATON 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 so you can download your pictures to your computer 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. Consider using PowerPoint to label/annotate/highlight your photos.



Compass – If your handheld GPS does not include a compass function, be sure to bring one in your Nav kit.

Steel Measuring Tape – A steel tape is used usually ashore to measure offsets and perform survey mark recovery measurements. The best type is a 100-foot surveyor's tape, but shorter tapes will do.



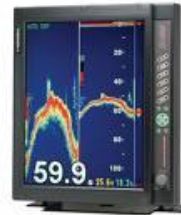
Sounding Pole – a pole marked in 1-foot increments. The depth is recorded when the pole touches the bottom and is vertical in a water column. The pole should have a base that will keep it from sinking in the seabed.



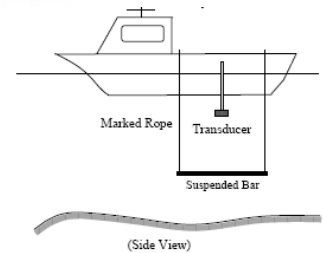
Leadline – A line measured in 1-foot increments and marked at the 5- and 10-foot levels with a colored cloth, leather, or string. A reading is taken when the weighted line is touching bottom and the line is taut and vertical.



Echo Sounder – Non-recording: Instantaneous digital read out of depth with no graphical record as the vessel proceeds along its track. Recording: Set also produces a graphic profile, (either on-screen or) preferably on paper, representative of the vessel's track.



Bar Check - a metal bar with many holes (or a flat, very thick metal screen), which is attached to two leadlines and calibrated off a survey tape. If only obtaining one reading, it is used to verify the transducer depth. If obtaining readings every 5 feet or so, down to 30 feet (at slack water), the numbers can be used to construct a velocity correction table. (Too complex for almost all members.)



Special Developments

Some Auxiliarists have fabricated survey tools and instruments. Examples are sounding poles for shallow depths, chain and wire drags (to catch objects), tools for measuring the angle of leaning aids, and plotting boards fitted with mounting devices for handheld 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.

NOAA/NGS also has short programs that compute offsets. See:

http://www.ngs.noaa.gov/PC_PROD/Inv_Fwd/

Calculators

There are many calculations needed when updating charts. Add a good calculator to your Nav. Kit. An ideal unit would have a solar panel plus a battery system for nighttime use. Don't forget to add spare batteries to your Nav. Kit.



Obtaining Information from Knowledgeable Sources

Most human-caused chart discrepancies that you discover will have a credible source from whom you can obtain the needed CU information. It may not be as exciting as gathering the information yourself, but it will likely be much more efficient and accurate. Some of the sources you should look to include:

- District offices of the Army Corps of Engineers, especially their Navigation Branch, Topographic Survey office, Regulatory/Permits office, Civil Works Operations Branch.
- online government databases (see examples below)
- the engineering/survey offices for the applicable state, county, and city government
- the engineering/operations offices for the applicable Port Authority/Director
- applicable Harbormasters and facility owner/operators. Note: Facilities can include businesses like boat/shipyards, private marina operators, owner/operators of wharfs and piers, property with charted landmarks, etc.

If you conduct a professional interview with knowledgeable/credible sources, and explain that this information is being submitted to NOAA/NOS to be incorporated onto the chart for safety of navigation purposes -- you should be able to obtain the necessary information.

Some of the types of information you should be looking to acquire from others include:

- Survey mark and some landmark positions from the NOAA/NGS Datasheets at: <http://www.ngs.noaa.gov/cgi-bin/datasheet.pl?Type=DATASHEETS>
- Transmitting towers: <http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistrationSearch.jsp>
- Proper geographic names at: <http://geonames.usgs.gov/pls/gnispublic/>
- “As-built” Drawings (from facility owner)
- Photogrammetric photos of the changed landscape (from facility owner)
- Correspondence that has position information (from facility owner)
- The name, title, and contact details for the person you obtained the information from

How to determine if 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 land mass. 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, 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 included on this chart.

Go to <http://wow.uscgaux.info/content.php?unit=P-DEPT&category=ns-forms-and-manuals> for the Navigation Systems Calculator. This Excel form calculates the ratio for you.

How to take and report photos of objects

Photos add great credibility to chart updating reports. Remember that you are communicating with the remote cartographer who probably has never seen the area that you are reporting. Try to communicate a clear picture of the problem and recheck your reports accordingly. Photos often help in this regard. 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 can help develop a clearer picture for the cartographer.

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 distance/bearing estimates (in feet and degrees true) to the object from the spot where you took the photo.

Label each photograph clearly. Consider inserting your photos into PowerPoint to label and annotate them (with red arrows/circles and explanations). Many members have used PowerPoint, then color-printed and attached this file to their reports. Assign each photo a PLN-Position Locator Number for identification and report organizational purposes. On your *NS Chart Update Worksheet(s)*, explain the purpose of each photo, what they are imparting to the cartographer and what they contribute to document to your CU premise.

When you are charting a large area, such as a marina where multiple photos are involved, it is recommended that you assign a PLN-Position Locator Number to each photo, plot the locations where they were taken on the chartlet and explain the purpose of each photo. How does it support your CU premise?

Measuring Heights of Objects

You measure charted heights from MHW—Mean High Water. This means that, for the sake of accuracy, you must take your measurement from as close to the MHW level as possible, or 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.”

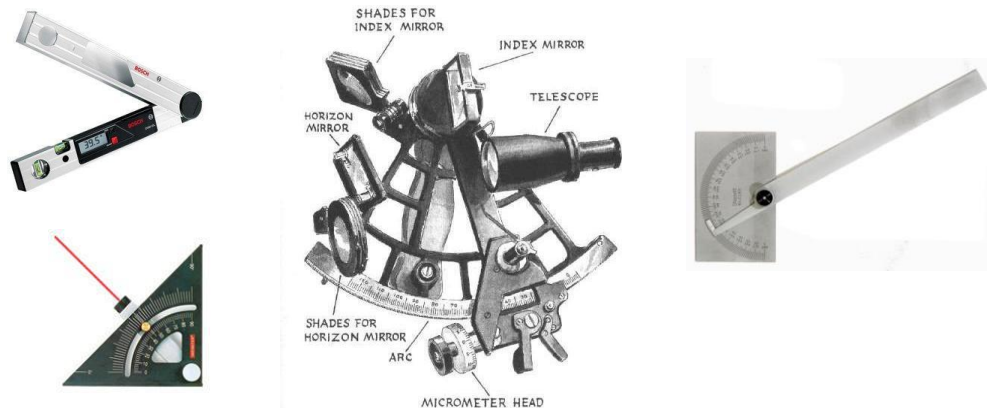
Step One. Take a fix at your location. Estimate your height at or above the MHW level. The ideal situation is being at MHW level.

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 of elevation 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 four examples of some tools.



Step Four. Using the “Navigation Systems Calculator”, enter the LAT/LON at your location (Permitted Position) and LAT/LON at the base of the object being measured in (Observed Position). The Excel program will compute the distance from the object in feet and NM.

Step Five. The height of an object is calculated by taking the distance from the object and the angle of elevation of the object. The tangent of the angle is the object height divided by the distance from the object. Thus, the height is found. Use any of the online Trig programs: <http://www.calctool.org/CALC/math/trigonometry/height> or your Nav. Kit. Calculator.

A useful alternative for computing distances are the NGS calculators downloadable from: http://www.ngs.noaa.gov/PC_PROD/Inv_Fwd/. Use the inverse calculator.

The Use of GPS for Chart Updating

Your GPS is one of the most important instruments that an Auxiliary member uses to determine 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 will be required to check the GPS on each OPFAC that you use for NS Program activity. Read the following copy about GPS sets very carefully.



Basically, GPS is operated from 24 orbiting satellites that are continuously orbiting overhead and are positioned so that we are able to receive signals from six satellites nearly 100% of the time, resulting in excellent position information to our GPS sets. GPS satellites are equipped with precision clocks. Chart Updating guidelines require that a GPS be operating in 3-D status (viewing 4 satellites) when used for taking fixes.

SA—Selective Availability provides a position within a 25- to 35-meter target circle 98% of the time. A GPS set without WAAS or DGPS is inadequate for chart updating.

DGPS - Differential GPS uses a land-based station and signal to correct SA-GPS signals. While doubling your GPS cost, it provides a position target inside a 30 target foot circle, 99% of the time. DGPS is a step up on regular GPS accuracy and is acceptable for location reports in the CU Program. Always report a HDOP-Horizontal Dilution of Position quality check 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 at no additional cost or equipment. 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 with each reported fix.

Advanced precise GPS-based positioning system such as Relative Kinematic Positioning (RKP) and Real Time Kinematic (RTK) are beyond the scope of this Chart Updating effort.

Setting Up Your GPS – Basic

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

- Always keep your GPS Operating Manual handy on your boat. GPS sets are more complex than LORAN. You will need to reference the GPS procedures on many occasions.
- Spend the time to get familiar 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.

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.
- Latitude and Longitude Expression: Set the LAT/LON read out to:
- “DD MM SS.SSS N / DDD NN SS.SSS W.” Note: If your unit gives you only a choice between Minutes and Seconds whereby you will lose accuracy using Seconds, use Minutes and convert to MM/SS.SS for your report. For example, if the unit will read to MM.MMM or SS, use Minutes.
- Navigation Mode: Set your GPS set to Rhumb line. This feature removed any LOP error projections generated by regular electronic bearings.

GPS Validation

- 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 DGPS 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 (or the EPE) along with the LAT/LON of your position readings. Readings between 1 and 2 and most desirable.
- EPE – Estimated Position Error. This WAAS-GPS error is a statistical 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 (or the HDOP) along with the LAT/LON of your position readings.
- Comparing GPS to Survey Mark Positions. (How surveyors check their units.) If researched before, you can find a survey mark close to your AOR. Download the position and station description information from NOAA/NGS at: <http://www.ngs.noaa.gov/cgi-bin/datasheet.prl?Type=DATASHEETS> Pick a data search method (Radial, Rectangular; USGS Quad; COUNTY; Map). Be sure to use a horizontal control station (not vertical). Following the station description “to reach” directions, take your unit to the survey mark and record your unit’s position versus the published position. This will provide you an accurate position difference in seconds of Lat/Long. And if you use the NGS FORTRAN subroutine: “Inverse” at: http://www.ngs.noaa.gov/PC_PROD/Inv_Fwd/ you can compute the survey distance and bearing between the two positions. Note: This is useful for finding the survey mark’s reference marks. Also you can use the Inverse calculator to compute distances between other positions, i.e., for Step 4 in the “Height of Objects”, above.

GPS Interference Problems

There are a few systems that you should be aware of in order to maintain accurate operation of your GPS set. Note in your report the size of the area if you experienced any interference.

- 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 handheld 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 handheld 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.

Setting Up Your GPS - To Run On-water Survey lines (complex)

Navigation Setup decisions

- 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. That distance measurement is called the Cross Track Error. This alarm a helpful aid for keeping a boat on course.

Entering Waypoints

A waypoint is a position expressed in LAT/LON 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 aids with sound signals 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.

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 record 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 a 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.

Guidelines

Up to now, we have discussed the basic nautical chart and supporting publications, the tools and introduced you to Chart Updating techniques. In the following sections, we will discuss the process guidelines, and report submittal process.

If you are not following this guideline, you are probably not doing a complete chart update report.

Change Analysis is the term for the type of investigation that has been requested by NOAA for proper chart update reports. In effect, we are asked to look at the current editions of their documents (NOAA/depth, 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 simple but it becomes compounded with the need to document and prove that the change actually occurred. This is where the skill of the observer is important. At first, most Auxiliarists should tackle a couple specific changes before attempting a complete change analysis.

Many types of features depicted on nautical charts – and their potential knowledgeable source – are listed in Appendix 1. Be sure and review that listing for tips on who to obtain the update information from, and absent that, how/what to collect yourself.

As an observer, you should use every means at your disposal to convince a remote cartographer, who does not get into the field, 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 locating and depth-taking guidelines can add credibility to your report by showing that you pre-calibrated your instruments and are reporting quality readings while on-scene. Photographs put Chart Updating Training Guide Ver. 2.5 2019

the cartographer visually at the scene if you document your location with a fix and add a fix for the object you are observing. Adding an already-charted object to the photo background further enhances your information. Plot all of the details of your observations on a chartlet in a neat and professional manner. Including a Chart Update Worksheet when multiple locations are involved, can simplify the chart update package and help to satisfy documenting your premises.

Adding supporting documentation from a registered engineer or facility owner adds credibility to your information. And remember that you might be able to get copies from them of survey data more accurate than what you could obtain. (In which case you should use that for the update.) If something has been removed, get a formal statement from the facility owner responsible for removing it. You can further substantiate your reported change by getting statements from other responsible parties like local harbor masters, from town records and other official documents.

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. NOAA's Nautical Discrepancy Report System provides space for all comments and attachments. It is important to note that erroneous data submitted by you and subsequently published in nautical documents could result in catastrophic occurrences.

Have you proved that the change occurred as reported? Let another member read your report to get a second opinion. The greatest satisfaction gained from Chart Updating is to see those submitted chart changes appear on the next edition. You have analyzed an observed change and have proven your point with your submission.

Guideline for taking and reporting a Fix to NOAA

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 and forms 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 ensure 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 to 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.

There are different GPS's available to the Auxiliarist for taking fixes. Each has different levels of accuracy. Always report an EPE or HDOP with each fix.

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. Note: GPS WAAS is usually enabled when you buy the set. Check your set's operating manual.

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. Remember - your GPS unit needs to “see” a DGPS transmitter (be line of sight) to meet DGPS-expected accuracies.

GPS/SA – Reading from a standard GPS may not be acceptable for a fix on a lateral aid due to a position 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 was purchased after 2002, it may have WAAS. Check your set’s operating manual. You may be pleasantly surprised. Regular GPS reading are of lower quality. Usually, GPS/SA units are acceptable for Class III PATONs, but not Class II lateral PATONs or charted locations.

1. During the pre-underway check the navigational 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 GPS accuracy.
 - Verify that the horizontal datum in the GPS matches the horizontal datum on the nautical chart that you are using during the chart-updating project.
 - Check that the distance unit of measure on the GPS is set to nm-nautical miles or knots (kts).
 - Check 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. (And be sure to have “Swung the Compass” before using it for CU activities.) Alternatively, the coxswain and facility owner may decide to use True courses/bearings, in which case, a TVMDCAW correction table should be made available during the mission.
 - 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. (Except under the circumstances explained under “Navigation Setup”.)
2. Explain how you determined and/or calculated the fix alongside the ATON.
 - Make a note of the procedure to include it on your final report.
3. Take the Fix when 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.
 - If laying close aboard presents too much of a hazard, an alternative technique is to slowly run a N-S line (on the safer side) and record the latitude when abeam. Then run an E-W line and record the longitude when abeam.
 - If the object you are locating is ashore and you are on-scene, describe exactly where you placed the handheld GPS unit for the fix. For example: “the center” (when possible), “the NW corner”, “the bottom right side of the letter ‘C’”. Try to get a taped (or other) distance) of the dimensions of the object. Note: If the object is larger than 100’ square and your unit is WAAS-enabled, you might take multiple GPS fixes.
4. Show quality control support for each fix, such as EPE and/or HDOP readings that you record from the GPS during the process of taking the fix. This practice documents the quality of your fix.
 - Record the make and model of the GPS equipment that you used to determine the fix on your final report.
 - Always show the date and time when you take and report every fix.

GPS Precaution Note: Be alert to the potential problems with GPS described above in “GPS Validation” and “GPS Interference Problems” Note in your report the size of any area you experienced interference or degradation of fix quality.

Guideline for taking and reporting depths

The depth is expressed in the same unit of measure (feet, meters or fathoms) as that used for the vertical datum (soundings) designated in the General Information Block on the nautical chart. Descriptions of the different equipment is in Tools/Equipment (page 14). If possible, use the equipment requiring the least corrections and providing the most accuracy. See specifics listed by equipment, below.

Corrections to Soundings – easy and difficult

Professionals that conduct sounding surveys have equipment (and procedures to calibrate it) that we mostly do not have. You can circumvent most of these errors by using a leadline or sounding pole. If either of those is used, a periodic comparison should be performed against a survey tape (or other steel or fiberglass tape in good condition).

The other depth correction to make is water level height. If operating on a lake or river, contact the nearest controller for that water body (Army Corps of Engineers, etc.), view the nearest water level staff for the water level correction, and/or access the information from online sources USGS WL Gauges: <http://water.usgs.gov/> select your state or region or NOAA/NWS River Gauges: <http://water.weather.gov/ahps/>.

If you are on a tidally influenced body of water, it is best to use real tides based on a NOAA CO-OP water level gauge (or other acceptable water level gauge that is tied into the National Water Level System). Predicted tides can be off by 0.2-2.0'; river heights by over 6'. If you are using real tides, locate the closest/appropriate water level gauge. Copy down the times and heights of highs and low covering your operating period. Then:

- Calculate the appropriate time and height offsets for your locale (from the CO-OP gauge)
- Compute hourly heights per Chapman/AuxNav materials (Hint: substitute the predicted hi/low heights/times with the “real” ones to enter. See (Appendix 4) to practice computing tide corrections.
- Compute the reduced depths by subtracting the water level height and adding the transducer depth

If you are using a leadline or sounding pole, your corrections are done. However, when using an echo sounder, professionals also apply correctors for the following:

- **Sound Velocity Errors:** If the uncorrected depths are over 20 feet, consider conducting a bar check to compute velocity corrections. They can result in errors of ~0.5' in 40'.
- **Transducer depth check:** Using a sounding pole, a leadline or sounding bar check to correct the depth for the location of the transducer, if necessary, and compare the result to the OPFAC's echo sounder reading.
- **Settlement & Squat:** If depths are being taken at any (>DIW), consider computing a settlement and squat height correction table (tied to engine RPM's). Settlement & squat can change uncorrected depths from -1.0' to +1.0' on small craft.

Besides accounting for these errors, professionals also used equipment that records continuously (to ensure that the shoalest peaks are captured). Understand that all these errors must be accounted for. *NOAA will only accept and chart the shoaler depths.*

Use of Sounding Equipment

Sounding Pole – 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.

Leadline – A reading is taken when the weighted line is touching bottom and the line is taut and vertical. Sometimes, bicycle wheel drops are constructed to make deployments easier.

Echo Sounder – Non-recording: The set must be continuously monitored and recorded manually. Recording: The set also produces a graphic profile on paper, representative of the vessel's track. Output is continuously monitored and annotated for time, but may be analyzed at a later time.

1. During the pre-underway check of the OPFAC, check that the depth's units of measure on your echo-sounder is set to the same units 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's unit of measure on the chart, on the echo sounder, and on the GPS are the same.
 - Use a leadline or a sounding pole to check that the echo sounder is operating properly.
2. Explain the method used for taking the depth alongside the aid on your report.
 - List the equipment that you used—echo sounder, leadline, 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, report the distance from the sounder's transducer to the waterline.
4. Always record the date and time for each 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 correctors can be downloaded/computed for real and predicted tides. When using predicted tides, be sure that the Almanac in your GPS is referencing the nearest 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 leadline: (Observed Depth minus the Height of Tide = Estimated Depth at Datum).
 - If the depths are over 20' and/or the vessel is underway, consider applying velocity and/or settlement and squat corrections.
 - Compare predicted tides to actual tides to see if there is a difference greater than a half-foot. If so, consider creating and using real tide correctors.
7. Compare the "estimated depth at datum" to the charted depth

Bar Check (to calibrate echo sounders)- Operators generally lower it over the bow (easier to do) and walk it back to where the transducer is. If they take only one reading (less than a foot below the transducer) it is used to verify the transducer depth. If they then proceed every 5 feet, down to 30 feet (at slack water), the numbers can be used to construct a velocity correction table. (Too complex for almost all members.)

Guidelines for Reporting Depths in a Depth Survey Line (complex)

There are occasions where a single depth reading will not resolve the observation. While this guideline was developed for this situation, this activity is not generally recommended. It should only be undertaken by those with additional training and suitable equipment. Many additional errors are

created that must be accounted for. (See warnings in “Corrections to Soundings – Easy and Difficult” above.)

The base procedure defines a survey line. If you need to cover a wide area, such as coverage of a channel that has shifted, you can combine a series of lines, 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 indicated above 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 survey lines 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 gridline of your survey.
4. Take and record a Fix at each starting position and record the height-of-tide.
 - Record the Height of Tide from the GPS’ Almanac Screen (or previously computed from Tide Tables). Be sure reference the nearest substation.
5. Maneuver the OPFAC along the pre-determined course line at no more than five knots, while recording:
 - The time, depth at the starting point of the gridline, and vessel rpm. Start the stop watch.
 - Continue to record depths every three seconds along the gridline while maintaining a constant speed/rpm.
6. At the end of the string or gridline:
 - Stop and record the time; and take/record a Fix at the end of each gridline.
 - Note the computed 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.
 - If you are using a recording echo sounder, include a copy of the graph with your report. Mark the start and end points of each line 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 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 planned gridline. Always, show all three readings on your Chart Updating reports. Option 2: Perform post processing after field operations, and include corrections for real tides, settlement and squat, and velocity (steps b and d).
 - Add the correction for the transducer to the observed depth.

- Compare predicted tides to actual tides to see if there is a difference greater than a half-foot. If so, consider creating and using real tide correctors.
- Subtract the Height of Tide. If the Height of Tide is a negative figure, add it.
- If the depths are over 30' and/or the vessel is underway, consider applying velocity and/or settlement and squat corrections.

10. Compare the observed depths to the charted depths and make a recommendation.

Plotting (Chart Sections)

Make sure you have at least 2 Lat/Long lines to be able to scale-in the geographic positions of your fixes. If your boat's chart plotter allows screen shots, be sure you have an accurate way to plot objects. Also attempt to plot 2 Lat/Long lines per page.

- Use of an online chart viewer screen shot in your post-processing. NOAA offers Continuous Chart Viewers for both electronic (NOAA ENC) and traditional (NOAA RNC) charts. Both provide Lat/Long readings as well a variety of base map backgrounds for the nautical chart.

NOAA has created a Seamless Raster Navigational Chart Server & Web Map Services of all 2,100+ raster navigational charts and their insets. The charts display as a seamless mosaic with the map collar or neat line—the information around the chart providing scale and notes—removed. Also, the map service displays only those charts appropriate for the viewing scale and map extent requested. This ready-to-use map service lets both GIS and non-GIS users see chart information in the context of their own data, without having to download and integrate multiple charts for their area of interest.

The seamless NOAA RNCs within the Web map service are updated monthly and represent the most recent version of the RNCs and their respective Notice to Mariners at the time of the update.

- Whatever version you use, be sure to label the chart section (if the information is not included in the cut-out) with the Chart number, edition number and date, and at least one latitude and longitude. If the chart section is not at the chart scale, note that also.
- Whichever type chartlet you create, make sure to plot chart updating object's positions legibly and accurately.
- Label them with an item number (same as the NS CU Worksheet). The cartographers understand that your plotted position is approximate, whereas the GPS is much more accurate (per the EPE or HDOP).
- Circle existing chart updating items boldly and label them with an item number.
- Use the same item numbers in your NS CU Worksheet, and any other supporting documents.

Chartplotter and GPS Navigation Software

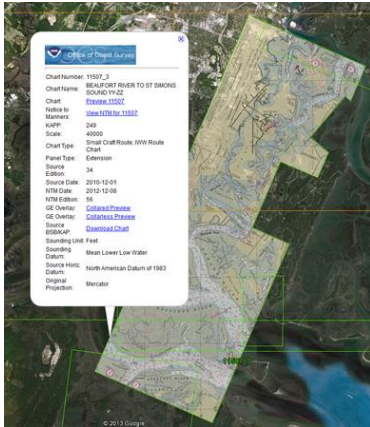


Open Source Chart Plotter Navigation Software (OpenCPN) is a free software project to create a concise chart plotter and navigation software, for use underway or as a planning tool. The software is available for use on PC's and MAC OSX computers (note: cannot be used with IPAD's). You can download the software and charts for FREE and use them locally as a chart viewer.

With the addition of a GPS dongle (listed below) your laptop can become a fully operational chart plotter and with weekly updated chart databases available from NOAA/NOS you will have one of the most powerful tools for assisting the Coast Guard and NOAA in our ATON/PATON verifications and Chart Updating programs.

The most recent stable version, OpenCPN 4.2.0, was published on February the 3rd 2016 and can be downloaded from www.opencpn.org/ocpn/download. To learn more go to www.uscgaa.com then click on OpenCPN tab

Using the Raster Navigational Charts Google Earth Tool



NOAA has created a map service of all 2,100+ raster navigational charts and their insets. The charts display as a seamless mosaic with the map collar or neat line—the information around the chart providing scale and notes—removed. Also, the map service displays only those charts appropriate for the viewing scale and map extent requested. This ready-to-use map service lets both GIS and non-GIS users see chart information in the context of their own data, without having to download and integrate multiple charts for their area of interest.

The seamless NOAA RNCs within the Web map service are updated monthly and represent the most recent version of the RNCs and their respective Notice to Mariners at the time of the update.

A Google Earth file of all the charts and insets is also available and is updated monthly along with the map service updates. Clicking on a chart outline gives you information about that chart, such as title, scale, and date updated. Plus, you have the option to overlay in Google Earth a collared or a collarless version of the chart by clicking on the respective preview link.

http://nosimagery.noaa.gov/rnc/NOAA_RNCs.kmz

Introduction to NOAA's ASSIST Report System

Coast Survey has created fillable PDF files which allow the observer to enter report detail information directly into each PDF file. Upon completion of the appropriate PDF form, you must upload the PDF form and other associated supporting documents into ASSIST.

Note: NOAA's ASSIST does not provide credits for reports at this time. No function for reporting to or review by DSO-NS is available at this time. You should submit copy of NOS conformation e-mail (page 46) to your DSO-NS and SO-NS.

For the USCG Auxiliary there are two different PDF reports. Choose the appropriate fillable PDF form related to the nature of your discrepancy:

Nautical Chart Feature Corrections:

If you have entered data into this PDF file, Figure 8, upload the PDF file and other associated files to NOAA ASSIST. Associated files must not include any special characters other than the underscore symbol. Spaces in file names are prohibited.

Filename: chart_updating_nautical_features.pdf

For submission of a Nautical Features Report through the NOAA ASSIST, the following file formats are permitted for upload: .bmp, .dat, .doc, .docx, .gif, .jpeg, .jpg, .pdf, .ppt, .pptx, .tif, .tiff, .txt, .xls, .xlsx, .xyz.

Nautical Chart Items:

Artificial Reef	Public Ramp
Bridge	Pier/Dock
Dam	Pile/Dolphin
Depth Legend	Platform
Discrete Point Data	Rock
Duck Blinds	Shoal
Fish Stakes	Sign/Marker
**Geographic Name	Submerged Cable
Landmark (stack, tower, spire, tank)	Wreck
Obstruction	
Overhead Cable	
Note Change (Includes telephone numbers and any other charted text)	

**Must include GNIS confirmation in report

Coast Pilot Items:

If you have entered data into this PDF file, Figure 9, upload the PDF file and other associated files to NOAA ASSIST. Associated files must not include any special characters other than the underscore symbol. Spaces in file names are prohibited.

Filename: chart_updating_coast_pilot.pdf

For submission of a Coast Pilot Report through the NOAA ASSIST, the following file formats are permitted for upload: .bmp, .dat, .doc, .docx, .gif, .jpeg, .jpg, .pdf, .ppt, .pptx, .tif, .tiff, .txt, .xls, .xlsx, .xyz.

**USPS & USCG Auxiliary Cooperative Charting Report
Nautical Features Report**

Observer Information

*Required Field

Observer Name* Observer E-mail* Organization* Certificate Number or Auxiliary ID*

Nautical Chart Information

Nautical Chart Number* Edition Date ENC Number Edition Date

Report Information

Report Location* Investigation Date* Special Investigation?

Coast Survey Comments (internal use only)

Report Feature Descriptions

Feature 1 Description*

Data Type* Action* Danger to Navigation Tide Level

Observed Depth Unit Method of Investigation* Time of Observed Depth Date of Observed Depth

Latitude* Longitude* Lat/Lon Datum* Feature 1 Support File Name

DD MM.MMM or DD MM SS.SS DDD MM.MMM or DDD MM SS.SS

Feature 2 Description*

Data Type* Action* Danger to Navigation Tide Level

Observed Depth Unit Method of Investigation* Time of Observed Depth Date of Observed Depth

Latitude* Longitude* Lat/Lon Datum* Feature 2 Support File Name

DD MM.MMM or DD MM SS.SS DDD MM.MMM or DDD MM SS.SS

Version 1.0.0, May 2016

Figure 8

USCG Auxiliary Cooperative Charting Report Nautical Features Report Instructions

This is the fillable .pdf report or worksheet that may be appended to the NOAA ASSIST <https://www.nauticalcharts.noaa.gov/customer-service/assist/> . Use the appropriate fillable .pdf form (*Nautical Features Report or Coast Pilot Report*) to record discrepancies.

Under NOAA ASSIST you may upload one or more files in addition to this fillable .pdf form. *Do not change the file name of the this fillable .pdf file.*

These fillable .pdf reports are available from <http://www.uscgaux.info/content.php?unit=P-DEPT&category=ns-forms-and-manuals> in addition to instructions and PowerPoint guidance.

Note: If you print out this fillable.pdf form, for use on patrol, the boxes around the drop down selections will not print.

Observer Information

Observer Name*	Member Full Name (first and last)
Observer E-mail*	Primary Email address used for Auxiliary contact
Organization*	Pick from drop down menu (USPS, USCG Aux)
Certificate Number or Auxiliary ID*	Member ID number

Nautical Chart Information

Nautical Chart Number*	NOAA Nautical Chart Number (should be largest scale)
Edition	Edition Number
Date	Date of last LNM correction (DD/MM/YYYY)
ENC Number	ENC Number
Edition	Edition Number
Date	Date of last LNM correction (DD/MM/YYYY)

Report Information

Report Location*	NOAA Chart name and/or place name
Investigation Date*	Date of visit (DD/MM/YYYY)
Special Investigation?	Pick from drop down menu (YES if investigation was requested by USCG or NOAA, otherwise NO)
Coast Survey Comments	NOAA internal use only (<i>Do not fill this box</i>)

Report Feature Descriptions

Feature 1 Description*	Brief description of feature you're reporting on, what the discrepancy's is and the corrective action needed.
------------------------	---

Data Type* Pick the feature from the pull down menu:

- Artificial Reef
- Boat Ramp
- Bridge
- Dam
- Depth Legend
- Discrete Point Danger
- Duck Blinds
- Fish Stakes
- Geographic Name (must include GNIS entry)
- Landmark
- Note Change
- Obstruction
- Overhead Cable
- Pier / Dock
- Pile / dolphin
- Platform
- Rock
- Shoal
- Sign / Marker
- Submerged Cable
- Wreck
- Other

Action* Pick the charting action to be taken from the pull down menu:

- Add
- Delete
- Change
- Relocate
- Change and Relocate
- Damaged/Missing
- Correct as Charted

Danger to Navigation Pick from drop down menu (YES, if without the corrective action taken the feature will pose a danger to navigation, otherwise NO)

Tide Level The current drop down menu asks you to pick from:

- Flood Tide (current, not used)
- High Tide
- Ebb Tide (current, not used)
- Low Tide
- Unknown

Note: NOAA is considering the option to enter a Tide level value computed by the observer.

Observed Depth	The depth of water at the time of observation
Unit	Select from the drop down menu the unit of measure:
	<ul style="list-style-type: none"> • Feet • Fathoms • Meters • Other
Method of Investigation*	Select from drop down menu what was used to obtain the depth:
	<ul style="list-style-type: none"> • Visual • Lead Line • Echo Sounder • Pole Sounding • Other
Time of Observed Depth	Enter the time using standard 24-hour clock and include the time zone of the observation
Date of Observed Depth	Enter the date the depth was taken (DD/MM/YYYY)
Latitude*	DD MM.MMM or DD MM SS.SS
Longitude*	DDD MM.MMM or DDD MM SS.SS
Lat/Lon Datum*	Select from the drop down menu the Datum set in your GPS/WAAS or other unit:
	<ul style="list-style-type: none"> • NAD 83 • NAD 27 • WGS 84 • Unknown

Note: Consideration is being made to include information on positioning equipment

Feature 1 Support File Name Enter the file naming convention to be used on your report, such as *Name_New_Boat_Ramp*.

List the files i.e. *name_new_boat_ramp_001.pdf, name_new_boat_ramp_002.jpg*, etc. for this item in the box for Additional Information at the end of this form.

The only caveat is the associated files must not include any special characters other than the underscore symbol. Spaces in file names are prohibited.

Repeat the **Report Feature Description** section process for additional Feature 2 - 5 Description's observed for the chart listed.

Currently if have more than five separate features reported on the same chart you will have to complete another Feature Report.

**Required Field*

**USPS & USCG Auxiliary Cooperative Charting Report
Coast Pilot Report**

***Required Field**

Observer Information

Observer Name* Observer E-mail* Organization* Certificate Number or Auxiliary ID*

Coast Pilot Information

Coast Pilot Number* Edition Chapter Page Paragraph

Text Changes*

Report Item Information

Observed Item* Report Location* Date Observed* Time Observed

Report Latitude Report Longitude Datum Tide Information
DD MM.MMM or DD MM SS.SS DDD MM.MMM or DDD MM SS.SS

Support File Name (.pdf, .jpg, .tif, .pptx, etc.)

Additional Information

Coast Survey Comments (internal use only)

Version 1.0.0, May 2016

Figure 9

USCG Auxiliary Cooperative Charting Report Coast Pilot Report Instructions

This is the fillable .pdf report or worksheet that may be appended to the NOAA's NOAA ASSIST <https://www.nauticalcharts.noaa.gov/customer-service/assist/>. Use the appropriate fillable .pdf form (*Nautical Features Report or Coast Pilot Report*) to record discrepancies.

Under NOAA ASSIST you may upload one or more files in addition to this fillable .pdf form. *Do not change the file name of the this fillable .pdf file.*

These fillable .pdf reports are available from <http://www.uscgaux.info/content.php?unit=P-DEPT&category=ns-forms-and-manuals> in addition to instructions and PowerPoint guidance.

Observer Information

Observer Name*	Member Full Name (first and last)
Observer E-mail*	Primary Email address used for Auxiliary contact
Organization*	Pick from drop down menu (USPS, USCG Aux)
Certificate Number or Auxiliary ID*	Member ID number

Coast Pilot Information

Coast Pilot Number* Pick from drop down menu the USCP number and region:

- USCP 1 - Atlantic Coast: Eastport ME to Cape Cod, MA
- USCP 2 - Atlantic Coast: Cape Cod, MA to Sandy Hook, NJ
- USCP 3 - Atlantic Coast: Sandy Hook, NJ to Cape Henry, VA
- USCP 4 - Atlantic Coast: Cape Henry, VA to Key West, FL
- USCP 5 - Gulf of Mexico, Puerto Rico and Virgin Islands
- USCP 6 - Great Lakes and their connecting waterways
- USCP 7 - Pacific Coast: CA, OR, WA, HI and Pacific Islands
- USCP 8 - Alaska: Dixon Entrance to Cape Spencer
- USCP 9 - Alaska: Cape Spencer to Beaufort Sea

Edition	Edition Number
Chapter	Reference the Chapter number
Page	Reference the page number located at top left or right of each page
Paragraph	Reference the paragraph Number located a top left of paragraphs
Text Changes*	Include the line changes in the allotted space

Report Item Information

Observed Item*

Pick the item most associated feature from drop down menu:

- Anchorage
- Bridge
- Channel
- Ferries
- Geographic Names (must include GINS entry)
- Harbor Regulations
- Hazard to Navigation
- Landmarks
- Magnetic Variation and Anomalies
- OVHD Power Cables
- Pilotage
- Port Facilities
- Routes
- Small Craft Facility Information
- Tides and Currents
- Towage
- Weather and Ice
- Other

Report Location*

NOAA Chart name and/or place name

Date Observed*

Date of visit (DD/MM/YYYY)

Time Observed

Enter the time using standard 24-hour clock and include the time zone of the observation

Report Latitude*

DD MM.MMM or DD MM SS.SS

Report Longitude*

DDD MM.MMM or DDD MM SS.SS

Datum*

Select from the drop down menu the Datum set in your GPS/WAAS or other unit:

- NAD 83
- NAD 27
- WGS 84
- Unknown

Note: Consideration is being made to include information on positioning equipment

Tide Level

The current drop down menu asks you to pick from:

- High Tide
- Low Tide
- Unknown

Note: NOAA is considering the option to enter a Tide level value computed by the observer.

Support File Name

Enter the file naming convention to be used on your report, such as *Name_New_Boat_Ramp*. (.pdf, .jpg, .tif, .pptx, etc.)

Additional Information

List the files i.e. *name_new_boat_ramp_001.pdf*, *name_new_boat_ramp_001.jpg*, etc. for this item in the box for Additional Information at the end of this form.

The only caveat is the associated files must not include any special characters other than the underscore symbol. Spaces in file names are prohibited.

Coast Survey Comments (internal use only) Do not fill this box

**Required Field*

Reporting of Particular Feature Types

1. Certain features should be submitted in one report without combining them with other feature types. You can submit multiple features of the same type in one report.
 - Bridges
 - Artificial Reefs (Fish Havens)
 - Overhead Cables
 - Submerged Pipelines
 - Submerged Cables
2. Submission of the feature types listed above requires the Marine Chart Division to request USACE permits and/or as-built surveys prior to charting the feature(s). By separating the feature(s) in the reports, the feature(s) to be investigated by Marine Chart Division are not combined with other features that do not require solicitation of information from government agencies.

Geographic Location

1. When using a GPS device to calculate the Lat/Lon coordinates for a nautical feature, please ensure that your GPS unit is set to either NAD83 or WGS84 horizontal datum. After measuring the coordinates from the GPS unit, plot the coordinates on the nautical chart; do the GPS coordinates plot in the correct location on the chart?
2. Enter the Lat/Lon coordinates into NOAA ASSIST in a consistent format and indicate the horizontal datum associated with the coordinates (NAD83, WGS84, etc.)

Additional Requested Tasks

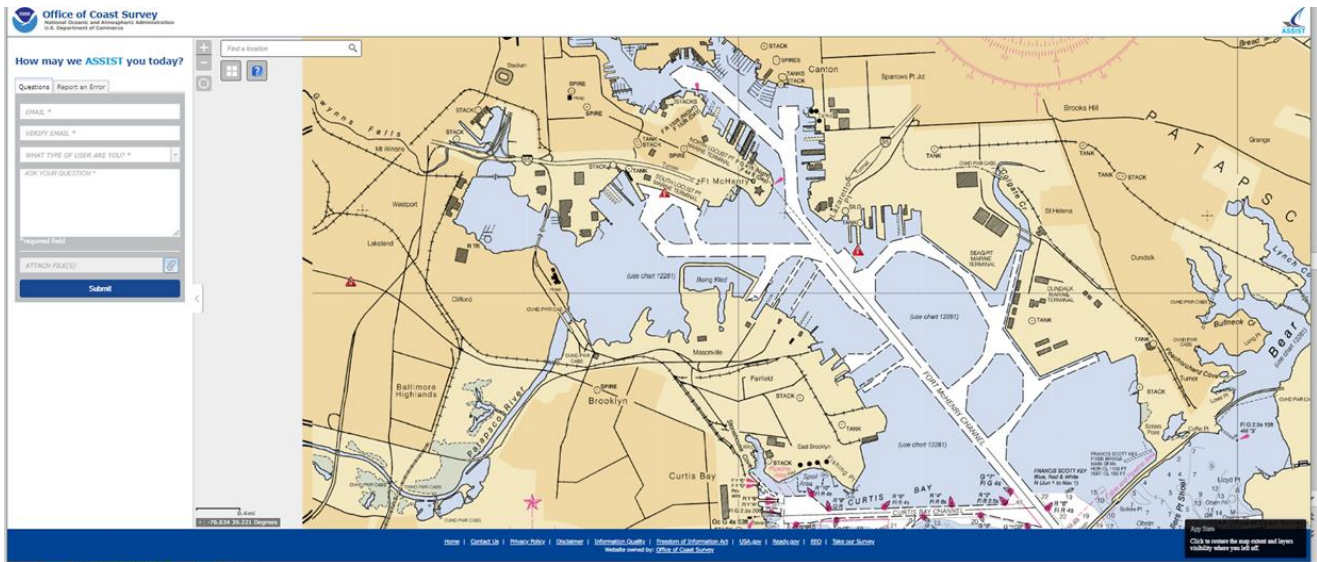
1. If a charted overhead cable is observed to be nonexistent during your field observation, then take the following actions:
 - In the report, include the name of the power company that has jurisdiction in the area of the cable.
 - If the overhead cable is charted, but no longer visible, then look for any indication that it may have been replaced with a submerged cable. If such a replacement has occurred, then the power company may have installed signage on the shorelines; record the contact information from the sign(s) and include it in the report.
2. If any of the following features are observed as uncharted or incorrectly charted within a marina basin or in close proximity to a commercial dock, then contact the facility operator and request as-built surveys, hydrographic surveys, or other documentation in order to support your observation. Attach such documentation through the Nautical Discrepancy Report System.

Wreck
Shoal
Obstruction (pile, dolphin, stake, etc.)
Rock

Platform
Breakwater, Jetty
Individual pier or pier complex
Miscellaneous features

NOAA's ASSIST Report System

On November 16, 2018, NOAA released ASSIST, a new system for submitting questions and reporting nautical chart errors to NOAA's Office of Coast Survey. This replaced the previous NOAA Inquiries and Discrepancy Reporting System. Please bookmark one of these URL's for your convenience. NOAA's ASSIST Report System is found by going to the Auxiliary, Prevention Directorate, <http://www.uscgaux.info/content.php?unit=P-DEPT&category=navigation-systems> and select Chart Updating from the menu on the left. Follow the link to <https://www.nauticalcharts.noaa.gov/customer-service/assist/>.



NOAA's ASSIST Report System Default Home Page

When reporting a nautical chart discrepancy/error the ASSIST Home Page appears on your screen, select the tab for Report an Error. Enter your Email address and verify. Choose the format for your position (DD-decimal degrees, DDM- degrees & decimal minutes, DMS - degrees, minutes, seconds). Type in the position of the discrepancy or click on the icon to pick a position from the chart. From the "What Type of User Are You" menu, select Boating Organization, then USCG Auxiliary from the drop downs. Any Auxiliary member can access NOAA's Nautical Discrepancy Report System, there is no password requirement. If you have all your information and worksheets, continue with Describe Your Error.

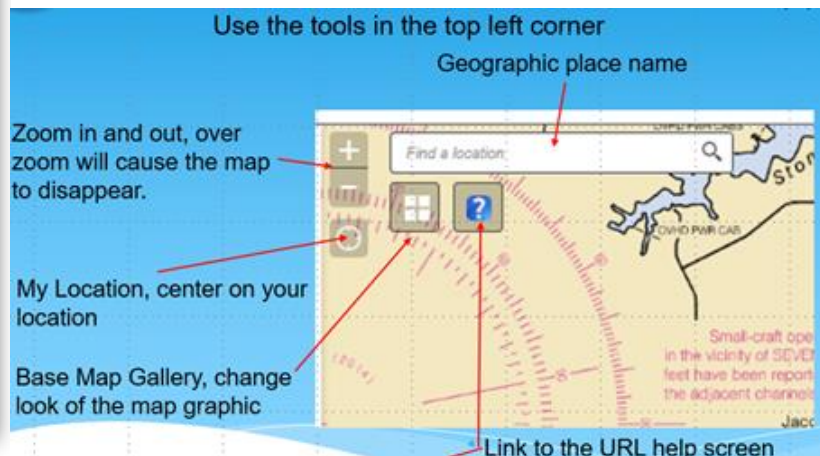
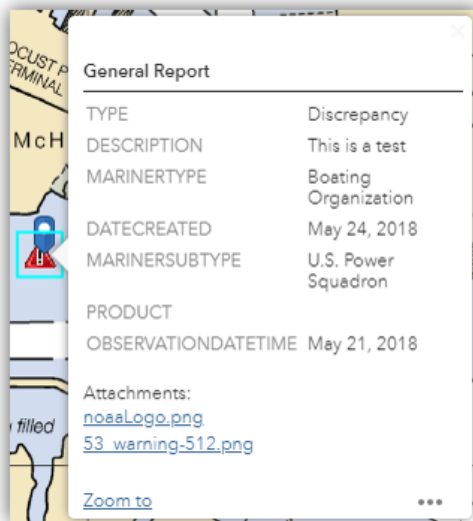
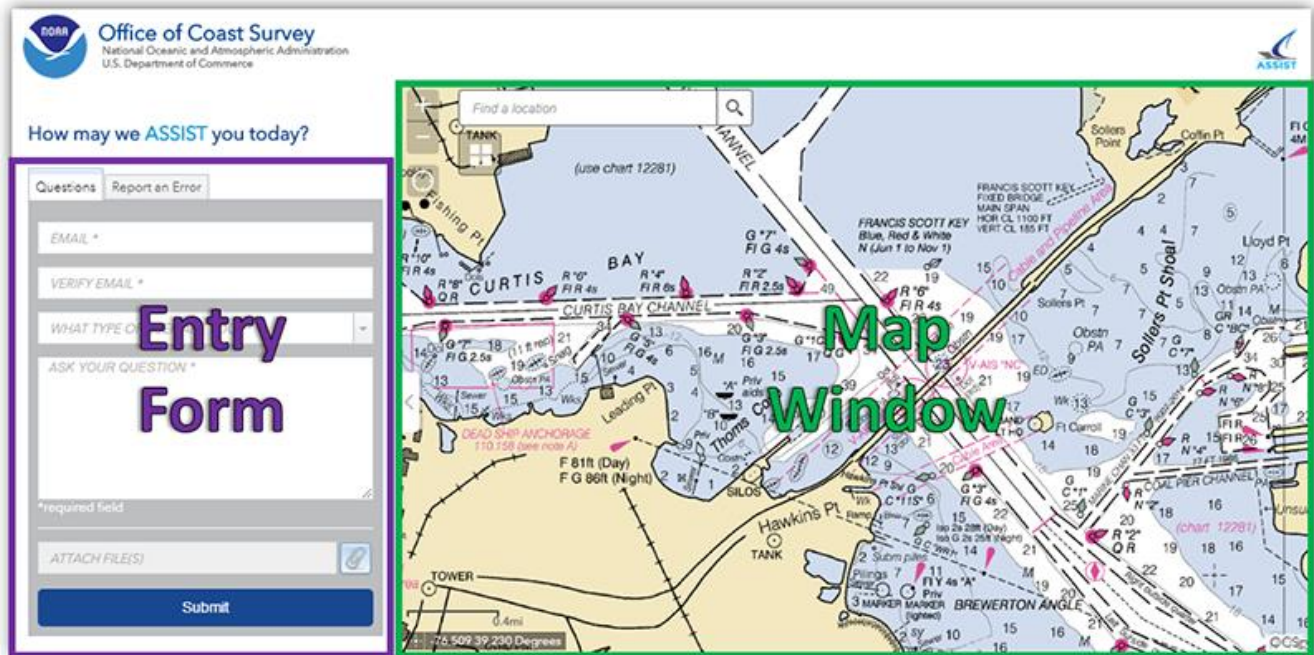
Select the product type (NOAA ENC, NOAA RNC, US Coast Pilot or Other Products) provide the Chart Number or Volume Number or describe the alternative product. Now click the box to attach supporting images or other files that support your chart discrepancy. Lastly enter the date of your observation and press the Submit button at the at the bottom of the page.

Note: Remember before you hit the "Submit" button, this is not a "Practice Website" where you can practice or conduct training. If you create a fake or test report you may simply identify "This is a Test" in the "Describe Your Error" box in the Entry Form.

Note: Multiple products (Chart, Coast Pilot® Print On Demand, BSB, etc.) may NOT be entered on the same report. Each product requires a separate report.

How to use ASSIST

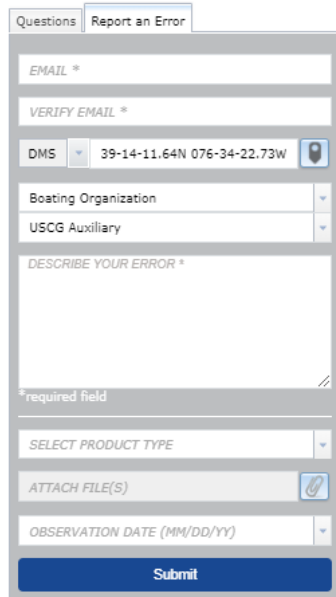
ASSIST can be accessed from a computer or mobile device, such as a smartphone or tablet. ASSIST is divided into two parts – an entry form and a map window. The entry form is used to enter information about the question, comment, or error. Required questions are denoted with an asterisk (*) – all other questions are optional. Users also have the ability to attach files, such as images or PDF, to their submission.



The map window can be used to identify the location of an error, or to see errors that have been reported by others. Information about previously reported errors can be seen by clicking on any red triangle in the map window. No personal information (names or e-mail addresses) will be displayed.

Create a New Error Report

How may we ASSIST you today?




To report an error, first select the “Report an Error” tab on the entry form. In addition to the information that is required to submit a question, it is also necessary to provide the position of the error and the product that you are using. You can also enter the date that the error was observed. Positions can either be entered manually, by typing in the coordinates or by selecting a location on the map.

To enter the position manually, first choose the preferred format and enter the coordinates as shown:

DD decimal degrees (ex. 39.24N 076.56W)

DDM degrees & decimal minutes (ex. 39 14.19N 076 33.36W)

DDS degrees, minutes, and decimal seconds (ex. 39 14 11.40N 076 33 21.60W)

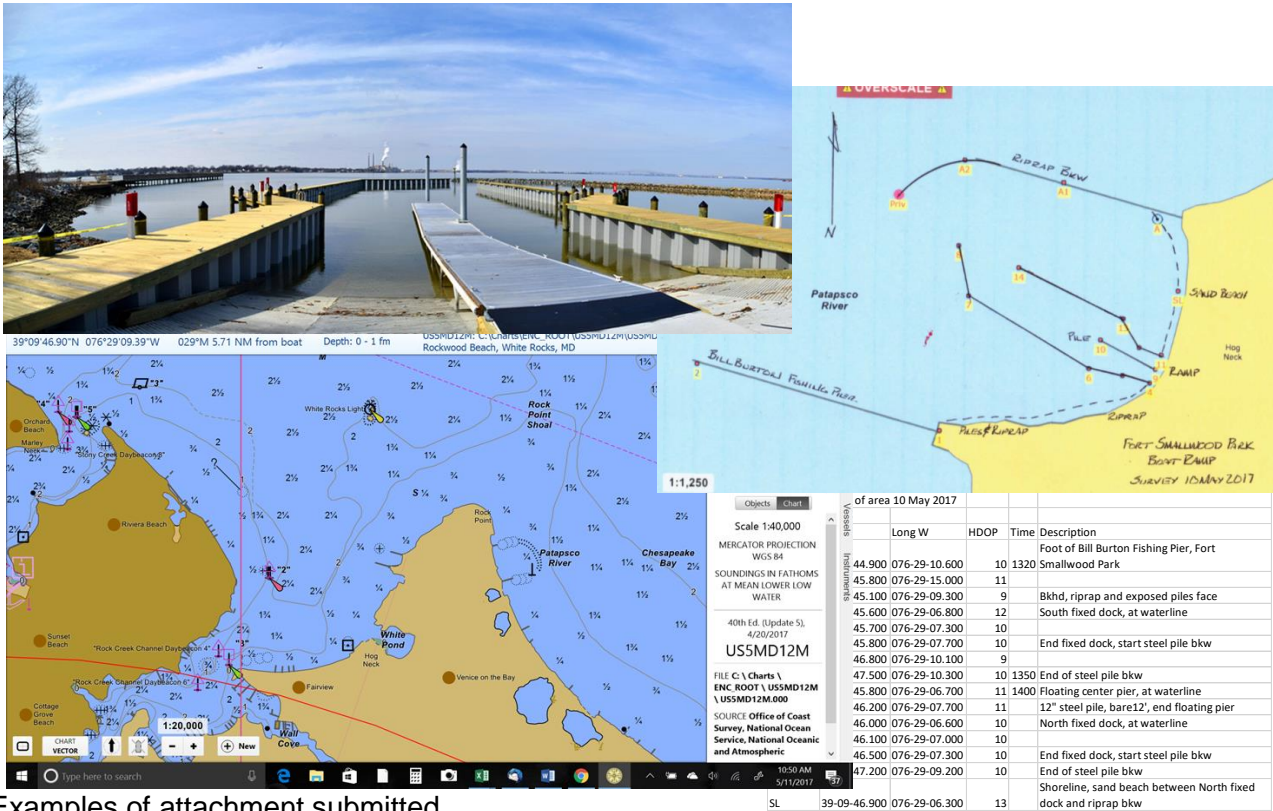
To enter the position via the map, first click the point icon . The entry form will disappear and the map window will expand. Use the tools in the top right corner to pan and zoom, then click on your desired location. A new blue symbol will show up where you clicked and the position of your point will be automatically populated in the user form.

To return to the user form without selecting a point, click the arrow on the left side of the map window.

Briefly describe what corrections are needed (Add pier, Delete tower, Revise the name, etc.) in the “Describe Your Error” box. If you have supporting information you may bring attention to them in this box.

Select a Product Type from the drop-down menu, this is where you designate a Chart Update from a Coast Pilot Update.

If you used Cooperative Charting Report Nautical Features or Coast Pilot Report fillable PDF form to record information about the discrepancies, you may use this information to fill in the product information. The drop downs change according to product type, i.e. “US Coast Pilot”, only asks for Volume Number, “Chart Plotter” asks for manufacturer model and version)

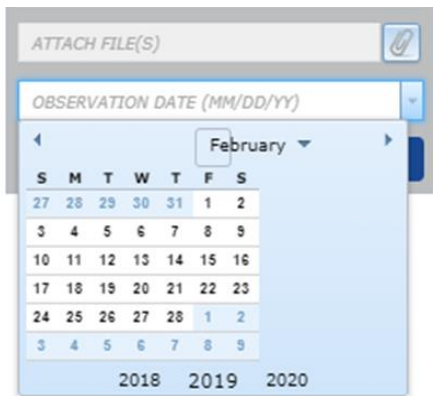


Examples of attachment submitted

Locate the paperclip icon in the “Attach Files” window and navigate to the folder in your computer directory where you have stored your supporting files. Click the file and then the Open button to upload the files. You may upload multiple files.

NOTE: Add all supporting files at one time from their directory. To check the files you entered just hover your pointer over the box and the files will show in the pop-up window. Don't click on the box again to add more files, your previous uploaded files will disappear.

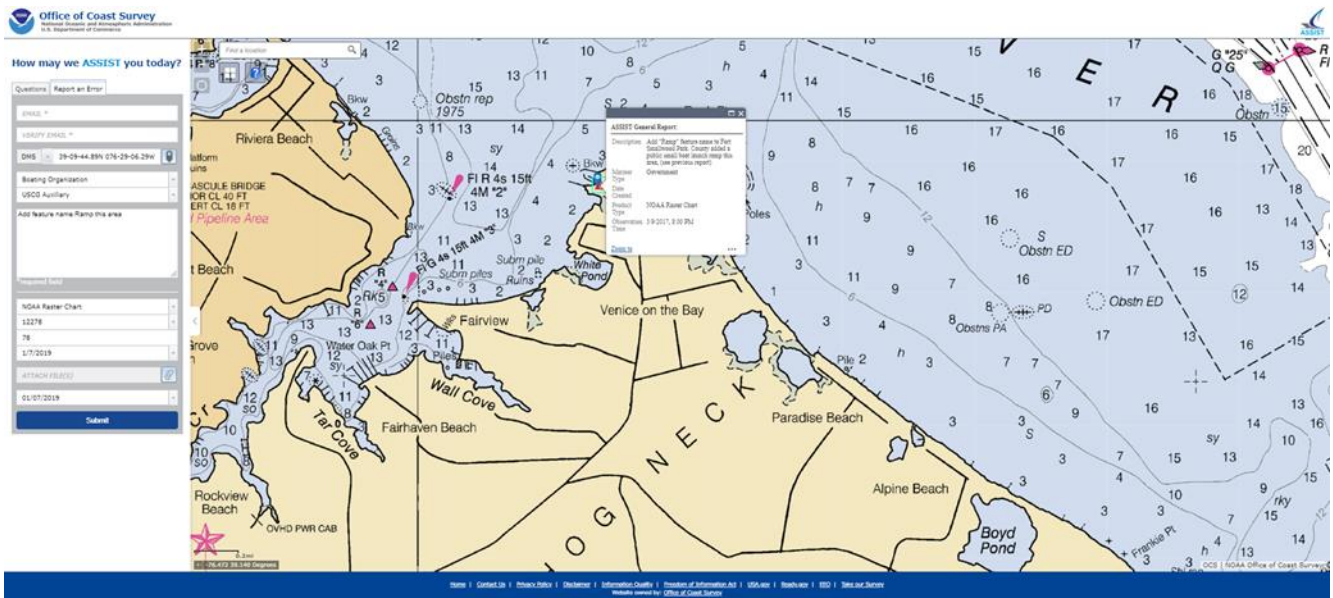
NOTE: If your supporting file is not acceptable, then the file will not upload.



You also enter the date, from the calendar drop down, that the error was observed or work performed.

After selecting the “Submit” button, the following window will appear which summarizes your submission.

Note: Each submission made will replace the previous submission, so if you make a submission on an item and later another submission is made on the same item the ASSIST General Report window will replace all previous submissions.



Example of ASSIST Error submission

After you hit the submit button, you will receive an e-mail from nautical.charting@noaa.gov informing you that your submission has been sent and providing you with the disposition of your report and an inquiry number which can be used to track your submission.

OCS Inquiry: 32979

Original message: Add "Ramp" feature name to Fort Smallwood Park. County added a public small boat launch ramp this area, (see previous report) 12278. REF ASSIST 2765

OCS response: Thank you for your inquiry. The changes have been made to the largest scale Raster chart and ENC. They will be available in the next update.

Charting Actions

How long will it take for Coast Survey to update and publish a discrepancy to the chart depends on the Nature of the discrepancy, need for information from another organization and the workload of cartographic production teams.

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USACE Chart Discrepancy Reporting System

Auxiliarists may also help the U.S. Army Corps of Engineers (USACOE) in updating nautical charts and publications. Conduct chart updating missions to verify the accuracy and completeness of information published on charts and related navigation publications.



HOME > MISSIONS > ECHARTS > CHART DISCREPANCY REPORTS

Echart Menu

- Inland Chart Books
- Inland Electronic Navigational Charts
- Product Downloads

Chart Discrepancy Reports

Inland Electronic Navigational Chart (IENC) program has developed a Chart Discrepancy Reports site for chart end users to report any issues that may exist with published IENCs. Members of the maritime community, recreational boaters, and cooperating government employees are encouraged to establish an account at the [Chart Discrepancy Reports](#) site and begin conveying chart information to the IENC team.

Reports Entered Directly in the Production Cycle

This new tool allows IENC production managers to field reports from chart users and push those reported discrepancies directly to data managers responsible for maintaining accuracy in the IENC data.

Electronic Chart Discrepancy Reporting, Not Paper Chart Discrepancy Reporting

'Chart Discrepancy Reports' users are asked to submit reports about existing electronic charts. While many mariners continue to use paper charts on the water, reports about paper charts will not be accepted on the Chart Discrepancy Reports site.

Growing our Partnerships

The Inland Electronic Navigational Chart (IENC) program has relied heavily on its many partners over the years for reliable feedback on the IENC product. Continuing those partnerships is important to the IENC program and the U.S. Army Corps of Engineers. The IENC program hopes that this new reporting tool will allow for greater numbers of chart users to become involved in making sure our charts are as accurate as they can be.



What You Can Do Now

Click [here](#) to visit the new Chart Discrepancy Reports site, establish an account, and get started!

<http://www.agc.army.mil/Missions/Echarts/ChartDiscrepancyReports.aspx>

Begin by registering as a “Government Employee, U.S. Coast Guard Auxiliary”. You are updating as an individual with your own specific Auxiliarist account with the USACE. This process is for Inland Electronic Navigational Charts (IENCs) sometimes called echarts.

Home Login
Signed in as:

Reference Links

- About Our Program >
- Help >
- Contact Information >

User Registration

Register a New User Account

Email Address

User Type
Government Employee, US Coast Guard Auxiliary ▾

Password Verify Password

Your password must be at least 8 characters long. It must contain at least 1 uppercase letter, 1 lowercase letter, 1 numeral, and 1 special character (!@#\$%^&* _ +). It cannot contain any spaces.

UNNL 6 For verification, please enter the code you see:



US Army Corps of Engineers

IENC Chart Discrepancy Reporting System

menu
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Home Login
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- About Our Program >
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User Registration

✔ Your login **tbaylor@ameritech.net** has been successfully created. The next step is to follow the activation link we just sent to your email address, which will enable your user account.



US Army Corps of Engineers

IENC Chart Discrepancy Reporting System

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Home Login
Signed in as:

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- About Our Program >
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- Contact Information >

Welcome to the IENC Chart Discrepancy Reporting System

The IENC Chart Discrepancy Reporting System provides registered users the opportunity to report inaccuracies in and problems with IENC charts.

Do You Need An Account?

If you are not a registered user, click the button below.

Registered Users:

If you are a registered user, log in here.

Text Version • Public Inquiries • Disclaimer • Privacy & Security • FOIA • IQA • Accessibility



US Army Corps of Engineers
IENC Chart Discrepancy Reporting System

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Activate Your New User Account

Your account is now active.

[Login to file reports.](#)



US Army Corps of Engineers
IENC Chart Discrepancy Reporting System

menu

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Home New Report

Logout

Signed in as: tbtaylor@ameritech.net

Reference Links

- About Our Program >
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- Contact Information >

Welcome to the IENC Chart Discrepancy Reporting System

The IENC Chart Discrepancy Reporting System provides registered users the opportunity to report inaccuracies in and problems with IENC charts. The table on this page lists the reports that are accessible to you.

- » To show closed reports, deselect the **Hide Closed Reports** checkbox under the table.
- » To access a report, click the report number in the table. This action will switch you to the report page.
- » To file a report, click **New Report** in the top menu bar.

No Reports Exist.

Hide Closed Reports

Chart Update AUXDATA Submittal

Chart Updating missions are reported on the 7030 Activity Report-Mission under mission code 41, Other Federal Agencies support.

41 FEDERAL SUPPORT - Hours spent providing operational/non-operational support to other federal agencies, such as Customs or Corps of Engineers, as requested and authorized by the Coast Guard.

Given that there is an MOU between NOAA and the Coast Guard Auxiliary authorizing Auxilarists to support NOAA's chart updating activities, that MOU provides the authority to perform chart updating missions, and to use mission code 41 to report the activity, without any further tasking being needed.

01A MARITIME OBSERVATION (MOM) -Time spent on a mission conducted under Coast Guard orders with an Auxiliary Operational Facility and a qualified Auxiliary Coxswain/Pilot/Crew/Communicator with any required crew, recording information about ships, facilities, and critical infrastructure as directed by cognizant Coast Guard authority; identifying hazards or potential hazards in ports or waterways; reporting port, waterway, or coastal activity/incidents that affects the safety of the area or jeopardizes the critical infrastructure.

Any other reportable work you do for NOAA that cannot be categorized under Mission Code 41 will go on the 7029 form under Mission Code 99E.

Individual's duty for the patrol

Aids Verifiers report ATON activity conducted during a patrol on a separate 7030. as the U/W time is already reported, Nat'l allows a total of 1 Hour for completing the 7030 & 7054. Mission code change required for each mission code (30, 31, & 32).

Some Districts allow the Individual CU work to do a second 7030 with starting time after the patrol for 1 hour for recording Cat 41 preparation time they did for the patrol" is not per National policy, "All other time they must use 7029" is National policy.

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.

Appendix 1

Responsible/Knowledgeable Sources

Start by contacting them. See if you can obtain accurate update information. If that is not possible, follow the suggestions listed by feature type.

1. Applicable (Facility) Owner or their Engineering office
2. US Army Corp of Engineers (USACE) Civil Works, Regulatory/Permits Office
3. US Army Corp of Engineers (USACE) Civil Works, Navigation Office
4. Applicable Facility Owner/Port/Harbormaster or their Engineering office
5. State/County/City Department of Transportation or their Engineering office
6. State/County Department of Marine Transportation / Ferry Company or their Engineering office
7. State Wildlife Agency
8. USCG Integrated Support Division (at District, Area Command, etc.)
9. Board of Geographic Names, GNIS <http://geonames.usgs.gov/pls/gnispublic/>
10. FCC Towers list <http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistrationSearch.jsp>
11. CFRs (Code of Federal Regulations)
 - a. 33 CFR 110 (and CP Chapter 2) for Anchorage information
 - b. 33 CFR 117 (and CP Chapter 2): bridge operations, not positions
 - c. 33 CFR 207: locks and dam operations, not positions
12. Maritime Professionals (Harbor/Bar Pilots, Merchant Ship/Tug Captains, etc.)

Reportable Nautical Chart Features

Airports, Strips, and Aero-beacons



Knowledgeable Source: 1

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.

Note: FAA has positioning requirements for airports (14 CFR, Subpart J). Obtain drawings that 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. Obtain the name of the owner, the POC-person of contact, a telephone number, and an e-mail address. Report any Federal Regulations regarding rules to the approach to the area. Also, check the Coast Pilot for references to the airport.

Anchorage



Knowledgeable Source: 11.a

Verify normal or emergency anchorages. Review Coast Pilot, Chapter 2 for official boundaries of anchorages. Often the structures used to define anchorage boundaries have been torn down making the official boundaries difficult to verify. Check the Coast Pilot for these reference errors. Take fixes to validate the boundaries. Check these positions by plotting them on a nautical chart. Take

digital photos from a high point if you need to substantiate changes. If the facility meets the criteria for a SCF update, include a *NS-Small Craft Facility Program Worksheet* with your *CUWeb Report*. Otherwise, submit the data as a *CUWeb Coast Pilot Update*.

Bridges

Knowledgeable Sources: 5, 2

NOAA wants reports of bridges that are new, removed, changed, renamed, under construction, or in ruins. Take fixes for both extremities. Also show vertical and horizontal clearances if span is still intact. Include digital photos to substantiate your report. Look for the engineering office of the bridge's owner (a DOT, etc.) to obtain needed charting



information. If you cannot obtain drawings, create/attach a chartlet and a copy of the local roadmap where the bridge is located. Include the official name of the bridge and the name of the bridge owner for 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.

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 on the nautical chart between as built and authorized clearances. 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.

Review the text chapter of Coast Pilot to verify clearance numbers. Also, validate Chapter 2's section (from 33 CFR 117) on posted regulatory sign/s for compliance with Federal Law. Every lift bridge has Federal Regulations (see above) that list 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. Prepare any needed Bridge Safety Check/Survey report for the bridge.

Cables



Knowledgeable Sources: 1, 2

Cables over or under navigable waters, where depths are shown on the nautical chart, are charted. Try to get drawings from the owner's engineers or District USACE. If a cable is not charted, include the name of the owner, a contact person (POC), a telephone number and the e-mail address. NOAA will need this to verify the specifications of the structure. Estimate the vertical height of the cable at the lowest point over the channel in your report and provide fixes for the support towers. Plot the extent of the cables on a chartlet. Provide photos to prove your report. 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



Knowledgeable Sources: 4, 2

Newly dredged waterway channels and modifications to existing channels, as approved by local authorities, private firms, and individuals, should be depicted on nautical charts. Some waterway channels may be of a purely local nature, but if shown on the chart, would benefit mariners in general. If possible, report who performed the dredging and for whom it was done.

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.

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

Chart Symbols & Abbreviations



One of the major checks to 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, and the charted position should match the Light List position. Note1: These abbreviations should also be complaint with IALA (as listed in Chart No 1.) Note2: Do not confuse off-station reporting (to CG Sector/Group) with charted position errors.

Any discrepancies on the symbols, abbreviations, and charted position are reportable in NOAA's Nautical Discrepancy Report System. Pay particular attention to the color and font of the buoy symbol. *(example shows discrepant font for a floating aid)*

Coast Guard Stations



Knowledgeable Source: 8

Report new, discontinued, or changed stations. Locate changes to docks and piers. Indicate prominent features such as towers, flagstaffs, or buildings that are visible from seaward. Since these features are on government-owned property, they can be plotted on a nautical chart (although, post-911 policy has changed on when Stations are charted – check first). Include fixes, plot new or non-charted features on a chartlet. Show photos from off shore to substantiate their chartability. Also, check the Coast Pilot for references.

Construction, New

Knowledgeable Sources: 1, 2

In areas where massive new construction or reconstruction is occurring, new facilities emerge and old facilities are modified, demolished or obscured. Such occurrences are suitable for chart updating. Try to obtain drawings (through the project owners) from project engineers, etc.

Cribs & Water Intakes



Knowledgeable Sources: 1, 2

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 new or changed visible and submerged facilities. Include the size, depth alongside, type of construction, a fix; and a photo. Try to obtain drawings and/or position information from the structure's owners. Plot the object on a nautical chart.

If submerged, provide the depth over the facility.

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. Substantiate your report with photos. Send a copy of your report to the local CG Sector.

Dams



Knowledgeable Sources: 1, 2

All modern dams have stringent engineering requirements. Get copies of drawings for the dam. For new or modified dams, report the type of dam, its lights and any other prominent features. Indicate dangers such as sudden water release schedules or other navigational dangers associated with the dam. Provide fixes on (or include a drawing that has) the boundaries

of the facility. Plot the fixes on a nautical chart. Indicate whether the dam determines the head of navigation for the waterway. Report and document any protective log booms that may be deployed in the area (if they are not temporary).

Dikes and Levees



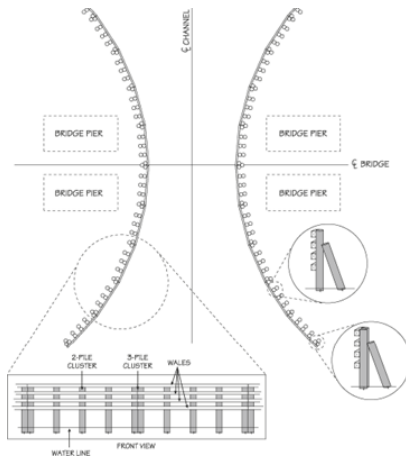
Knowledgeable Source: 1, 2

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 new or modified dikes or levees. If drawings cannot be obtained, 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 to prove your report.

Dolphins or other Pilings.



Knowledgeable Sources: 1, 2

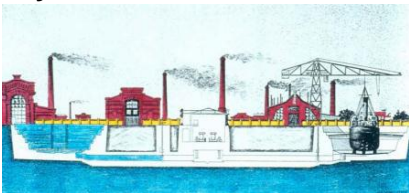
Report new, altered, (or mis-charted) visible or submerged dolphins and pilings. Show GPS quality control to prove the accuracy of the fixes. Of all chart updating input, accurate data pertaining to submerged objects are the most critical and difficult to obtain, define, and report. Include the following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

Object definition such as dolphin, pile, submerged pile and **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 recommendations for taking fixes as presented in this procedure.

Depths over objects should be corrected to charted datum. Follow the recommendations for taking depths in this procedure. Multiple depths may be needed depending on the scope and size of the hazard. Take extra caution when maneuvering near or over submerged object.

Dry Docks



Knowledgeable Sources: 1, 2

Report new or discontinued dry-docks. Provide the corporate name, the POC--person to contact, telephone number, the email address, and the equipment available at the dry dock. Plot the extent of the dry dock (length, width) on a chartlet. Provide digital photos. Data regarding dry docks are also good Coast Pilot 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



Knowledgeable Source: 2

Report verification fixes for dumping ground boundaries. **Federal regulations regarding the use of dumping grounds have been revoked.** Because irregular depths should be expected, 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



Knowledgeable Source: 6, 2

Report new or altered ferry facilities - the type of ferry, dock facilities, and schedules. Include a brochure if possible to substantiate 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 whether the Coast Guard permits the lighting. Also, notify the local CG unit of the condition of the lights. 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. USCG 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 will be retained as charted until its removal has been confirmed by an established authority (e.g. field investigations by the National Ocean Service (NOS), USACE, USCG Local Notice to Mariners, a harbormaster or port authority or the company that operated the ferry).

Fish Farms



Knowledgeable Sources: 7, 2

Report new/changed information on fish farms boundaries and any lighting. They are often lighted with private aids to navigation - usually special purpose aids, painted yellow and, if lighted, show yellow lights. Report light type, color, characteristics, and height. Fish farms follow the same permitting rules as fish havens and are not

permitted to private parties; rather to municipalities by USACE, who sets their boundaries and reports them to NOAA for charting.

Fish Havens

Knowledgeable Sources: 7, 2

Report new or changed obstructions, lights, fixes of boundary locations of the area blocked or covered by the fish haven. The photo shows a buoy marking a boundary position for a fish haven. Many of these buoys are private aids. Check the Light List for their light's assigned positions or take the AT/LON from a nautical chart. Also, submit a report to the local CG Sector. Report light colors, characteristics, and rhythms. 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.

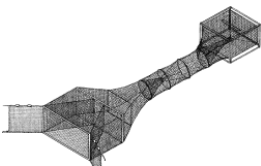
Fish Stakes



Knowledgeable Sources: 7, 2

Report new or changed visible and submerged stakes located outside of their charted trap area. Take fixes to define the extent of the fish stake area, and plot it on a chartlet. Indicate whether and how the area is lighted. Provide the light color and characteristics with your report. Also, report your observations to the local CG Sector. 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.*

Fish Trap Areas



Knowledgeable Sources: 7, 2

Show new or changed limits of areas covered by fish traps with fixes. Plot them on a chartlet. Report the light colors and characteristics. Also, report your observations to the local CG unit. If the trap is observable above water, submit photos to substantiate your report.

Fish trap areas are areas established by the USACE, or State or local authority in which traps may be built and maintained according to established 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. Fish trap areas are marked with special purpose aids and, if lighted, with yellow lights. Corrections to the position of these PATONs are made through the LNM-Local Notice to Mariners to NOAA.

Geographic Names, Knowledgeable Sources: 9

BGN-GNIS online at: <http://geonames.usgs.gov/pls/gnispublic/> Report omitted, missing, incorrect, or misspelled names. 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. 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, you must submit the proposed name to GNIS. Forms are provided on the GNIS database <http://geonames.usgs.gov/pls/gnispublic/>. You must complete the GNIS form and submit 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.

Groins



Knowledgeable Sources: 1, 2

Groins are walls built perpendicular to the shoreline. They are designed to trap sand that is moving along the shore due to the along-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 downstream beaches of sand. Report

new or changed groins - the type and whether visible, submerged groins, or in ruins. If submerged, report the depth(s) over the obstruction, corrected for the water level height. Show fixes at each end and at any bends. Plot the fixes on a chartlet. This is a good photo opportunity to support your observations.

Harbormaster and Port Offices, Knowledgeable Source: 1

Report the new or changed locations of local harbormasters, Port, and/or other waterway administrative offices and docks. Check the Coast Pilot for references. Provide telephone numbers and other data relating to the location and access to these facilities.

Jetties and Breakwaters



Knowledgeable Sources: 4, 2

Jetties 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 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 new or changed structures - the **type**, whether **visible, submerged**, 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.

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. Pre-check the area at low water so you are aware of any hazards that may be close to the surface.

Landmarks



Knowledgeable Source: 1

Prominent objects or features are charted on nautical charts for use in navigating. Such objects can include tall or large, distinctive structures, such as smokestacks, spires, towers, flagpoles, lights, buildings, and natural formations of rocks, cliffs, trees, hills, etc.; noticeable structures on a hill or promontory that distinguish the hill from others in the immediate vicinity. An outcropping of rocks in a generally sandy area may show clearly at a distance. A strip of sandy beach on a generally rocky shore or a tree-covered shore makes excellent landmarks. Once-prominent landmarks become obscured by new construction (or may have been demolished). Note: Flagstaffs and towers on private property are usually not plotted on a nautical chart. Many landmarks have already been located by geodetic surveyors and are listed in the online NGS Datasheet listing at:

<http://www.ngs.noaa.gov/cgi-bin/datasheet.pr1?Type=DATASHEETS>



Radio Broadcasting Tower

Look there first before taking a GPS position that is less accurate. More recently, with the increased use of cellular telephones, many new microwave towers have been established which are ideal landmarks due to their height and lights. The FCC requires them to be located to within 5 meters (horizontally and vertically). Other towers only require 1 Second of accuracy (although many are more precise than that).

Tower information can be downloaded from FCC's website at:

<http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistrationSearch.jsp>

Report new or discontinued towers. Indicate the call letters of the radio station. Estimate the **height** of the tower. If the tower is **lighted**, indicate the light color, the position, the height and the characteristics of the lights.



Church Spire, Stacks, Chimneys

On 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 email address. Take accurate fixes for each stack and plot them on a chartlet.

Report new, removed, destroyed, or submerged landmarks. Report only prominent new ones that can be seen from seaward. Take photos off shore to substantiate that the landmark should be charted. If large enough, take fixes at the edges of the footprint of the structure. Provide an estimate the height of the structure. Include official information referencing the removal of objects when 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 landmark features. Are they still there? Has new construction or tree growth obstructed the 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 landmasses than on the deep sea. Generally, the effect of a local magnetic disturbance diminishes rapidly with distance, but in some locations, there are multiple sources of disturbances and the effects may be distributed for many miles.

Observations at a location where 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, Knowledgeable Sources: 1, 2, 3 (depending on ownership)

Check Coast Pilot (for your area) and Chapter 2 (33 CFR 207) for the Federal regulations on the opening of locks. Check that the traffic signal is operating correctly. Also report about the light configurations, light colors and rhythms. Check the regulatory signs for compatibility to the Federal Regulation.

Log Booms



Knowledgeable Sources: 1, 2

Report the extent of the log boom with fixes along the outer edges, and report 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 booms placed in waterway to contain leaking pollutants. Be sure to report the reason for the boom in your report. If they are temporary, say so and do not have them charted! Check the Coast Pilot for references to booms and their use.



Marina, Marine Facilities and other Small Craft Facilities

Knowledgeable Sources: 1, 2, 4



April 2015, NOS will no longer accept Small Craft Facility information. However, NOS will still accept as-built drawings for new marinas

Report function removed from CUWeb

Only facilities that meet the following five criteria will be charted

1. Open to the public
2. Sell gasoline or diesel fuel
3. Have a pump out facility
4. Have transient berths or moorings
5. Give an approach depth and an alongside depth

Marine Railways



Knowledgeable Sources: 1, 2, 4

Report new, updated, or discontinued facilities. Record the vessel length and tonnage capacity. Record the name of the owner, contact person, 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 SCF Report or a Coast Pilot update report. Submit photos to document your information.

Measured Mile – Trial Courses, Knowledgeable Source: 1, 2, 4



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

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

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 miles are often surveyed in by either the hosting agency (city, etc.), a state survey office or NOAA/NGS. (See Landmarks for more.) Report new or changed mile makers (after interviewing the owners). Measured mile features are good Coast Pilot updates.

New Chart Requirements, Knowledgeable Sources: 4, 6, 12

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

Obstructions & 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. New dangers should be reported to your USCG District dpw and local CG Sector ASAP via phone/fax/email as directed. Note: Do not report temporary dangers to NOAA. Dangers to navigation are also good Coast Pilot updates.

Piers, Docks and wharves



Knowledgeable Sources: 1, 2, 4

Reports new or changed bulkheads, wharfs, docks, and piers, etc. Before reporting, verify chartability by using "How to Determine Whether an Object is Chartable?" Show fixes for each item and plot on a chartlet. This is a good photo opportunity. Check the Coast Pilot (or USACE Port Series) for wharf uses and ownership. Much of this data is often out of date.

Piles



Knowledgeable Sources: 1, 2, 4

Report new or changed visible or submerged piles. Show single or multiple groups. Include fixes for each pile and plot them on an attached chartlet. Accurate data pertaining to submerged objects are the most critical and difficult to obtain, define, and report. Include the following data: 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 height of tide.

Pipelines Knowledgeable Sources: 1, 2

Report on new or changed pipelines. Obtain estimates of the overhead or submerged clearances and material transported. On overhead pipelines, estimate and report the vertical clearance from MWH. 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 NOAA, 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 NOAA.

Platforms (All types), Knowledgeable Sources: 1, 2

Report new or changed platforms include the type, markings and lights.

Ramps



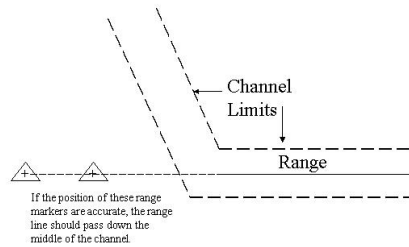
Knowledgeable Sources: 1, 2, 4

Report new or changed ramps. Indicate type, surface material length, and whether it is a private or public. Ramps can be a Chart Update, a Coast Pilot update, or be part of a *SCF Program Worksheet*. 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.

Ranges, Knowledgeable Sources: LL, USCG ATON Office / dpw

Review: 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.

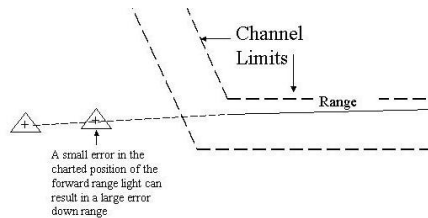


Correct range line in channel

The Problem

Now that mariners are navigating with GPS/WAAS and differential GPS (DGPS), 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 GPS/WAAS or DGPS on a system that uses electronic charts, either raster or vector, it may 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 can 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.
- Poor registration of the chart by the digital chart maker.



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 uncharted (or changes to) visible or submerged rocks and the depth over the rock (corrected for tide to MLLW) if the depth difference is over 2 feet. Note: Not all rocks are charted, i.e., if they are inside a charted "Foul Area" or too close to other charted rocks.

Do not 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 where the tide range is 10 to 12 feet. If the water level range is only a few feet, this may not be a prudent procedure.

Ruins



Verify the ruins position and symbol against the nautical chart. Take any needed fixes to document the area. Take digital photos to substantiate. 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 their project report adds credibility.

Sewer / Outfalls



Knowledgeable Sources: 1, 2

Report new outfalls - 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 new or changed visible or submerged shoals at various stages of the tide. Correct your depth readings for the height of tide in order to determine the full of the 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. Consider using real tides to reduce to datum (see pages 17-18 and Appendix 4),.

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.

Snags or Hangs

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

Wrecks



Report uncharted 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.

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-7054 ATON Report* to your local CG Sector or agency that is responsible for the ATONs and PATONs in your area. The local CG Sector will communicate with the District dpw Office who will notify NOAA through notices and corrections published in the Local Notice to Mariners. See the (Master) AV PQS for details.

Federal Channel Projects:

A Federal project depth is the design dredging of a channel constructed by the US Army Corps of Engineers (USACE). 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 water depth in a Federally controlled channel. NOAA gets this information from USACE.

Note: Charting agencies are very reluctant to remove charted obstructions from the chart, partially for protection from any legal action. They desire indisputable proof of such removals before they will remove them. Try to obtain 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 to substantiating such removal.

Appendix 2

Differences Between RNCs and ENC

The NOAA Office of Coast Survey (OCS) produces two kinds of digital charts; Raster Navigational Charts (RNCs) and Electronic Navigational Charts (NOAA ENC®).

A Raster Navigational Chart is an accurate digital image comprised of pixels, displayed on an electronic screen. Each pixel has a unique color or it has no color. The pattern of the colored and the empty pixels gives shape to the individual features of the chart. To better understand the nature of raster charts, we examine the process that creates them.

Like all color printed materials, charts are printed from color separated negatives. In 1994, OCS began to scan all of the negatives used for chart printing. From this library of digital files, cartographers are able to update charts efficiently utilizing Computer Aided Design (CAD), a software commonly used for drafting. From these files, paper charts continue to be printed. The digital files make it possible to provide navigational information to the public through two new products: Print on Demand (POD) paper charts and raster navigational charts (RNCs).

To become a raster navigational chart, cartographers add a system of geographic reference to the digital image. The system enables the cartographer to update charts accurately. Using the formatted images in electronic display systems called Raster Chart Display Systems (RCDS), mariners receive accurate real-time vessel positions.

However, raster charts are mere images. There is no digital difference between pixels in a pattern that represent a buoy and that which represents a submerged wreck. Therefore, using an RNC, mariners must rely on human intelligence to interpret the images for navigation decisions.

An Electronic Navigational Chart (ENC) is navigational features in a vector format. That is achieved by digitizing each feature's geometry into a specific object. NOAA cartographers collect the vector features according to a data standard, called the S-57 format, recognized by international treaties obtained through the International Hydrographic Organization (IHO). The navigational objects are maintained in a database, with additional information about their real world characteristics: geographic position, shape, color, the age of the data, etc.

Mariners navigate with an ENC, using an Electronic Chart Display and Information System (ECDIS) that interprets the stored data. In addition to providing real-time vessel position, the ECDIS allows the mariner to select features to display that enhance navigating with his particular vessel characteristics, and in specific weather and marine traffic conditions. Mariners program these parameters into their ECDIS system that can produce visual and audible alarms to warn of dangers.

The NOAA Office of Coast Survey, the United States Hydrographic Office, is exclusively responsible for producing and authorizing ENC data in U.S. territorial waters. An ECDIS must use authorized ENC data. However, ENC data may be used by any system that interprets S-57 format. The federal government authorizes private electronic chart vendors to produce other vector products using NOAA ENC data, and to convert it to their own proprietary format.

The federal government authorizes private firms to scan NOAA paper charts and download NOAA raster files to produce other navigational products. The public is invited to download raster and electronic navigational charts for free.

The following exhibit portrays examples of the two types of charts, with a bulleted list of characteristics that distinguish them.

Chart Updating Training Guide Ver. 2.5 2019

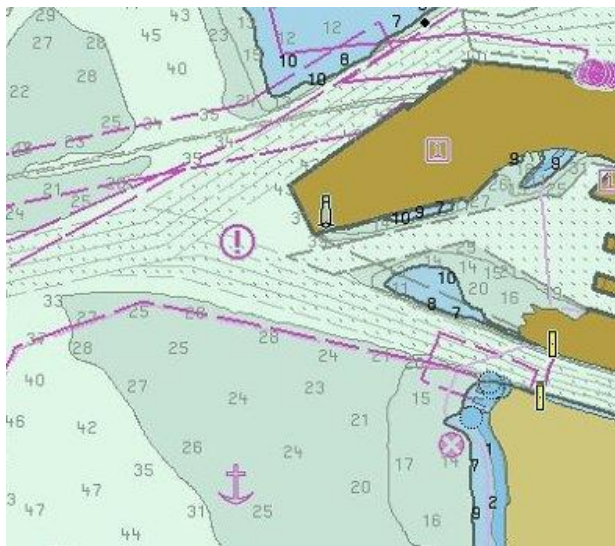
RASTER NAVIGATIONAL CHART (RNC)



RNC Characteristics

- Looks like paper chart; familiar to paper chart users
- RCDS software integrates real time GPS with chart image
- Can be updated with weekly raster patches
- No inherent safety warning capability
- Does not have the capability to show denser data when zooming in
- Cannot suppress specific charting features
- Cannot rotate text

ELECTRONIC NAVIGATIONAL CHART (ENC)



ENC Characteristics

- Vector Database
- Each chart feature has attribution
- Has different look and feel than paper chart
- Categories of data can be suppressed by software. For example, just show depth contours and suppress specific text.
- "Zooming in" has capability to show denser data
- Chart image can be rotated and text will remain upright
- Electronic chart systems can issue warnings of impending danger ahead

Print-on-Demand Paper Charts

NOAA's paper nautical charts are available as "print-on-demand," up-to-date to the time of purchase. Buy charts from a NOAA-certified agent.



Key features

- Updated with critical corrections. Coast Survey reviews charts weekly, and applies all critical corrections specified in Notices to Mariners.
- Sold by NOAA-certified agents. Order anytime; charts will be shipped by the next business day.
- Options available. Coast Survey mandates navigational standards for printed charts. Beyond meeting standard requirements, chart agents may offer options for premium services.

Where can you purchase print-on-demand paper charts?

Certified agents. (NOAA does not sell charts or other navigational products.) When you order a chart, the agent prints and ships NOAA's latest version of the chart. Some agents or their sub-agents maintain small pre-printed supplies of high-turnover charts.

What charts are available as print-on-demand paper charts?

NOAA maintains over a thousand nautical charts, and almost all of them are available as print-on-demand charts. Some agents will also print bookcharts and folio charts; check with the chart agent.

Make sure your charts are authentic

NOAA applies all navigational content to each chart and is responsible for it. NOAA-certified agents do not alter the images; they print and distribute the chart images provided by NOAA. As a premium service, some agents may print user-specified overlays of tracklines and designated areas.

NOAA nautical charts are produced under the authority of the National Oceanic and Atmospheric Administration's National Ocean Service. <http://www.nauticalcharts.noaa.gov/pod/index.html>

PDF Nautical Charts

NOAA provides about a thousand high-resolution printable nautical charts as PDF files. The PDF nautical charts are exact images of NOAA's traditional nautical charts. Just as with Print-on-Demand (POD) and NOAA raster navigational charts (NOAA RNC®), Coast Survey checks each chart weekly, and applies all critical corrections, so you are assured of getting the newest information when you download the PDF.

Most charts can be printed from any plotter capable of plotting 36" width to achieve 1:1 scale (see graphic below).

View PDF files with free PDF readers such as Adobe Reader. If you do not already have this viewer installed on your computer, you may obtain it at no cost from the Adobe Reader webpage. Search the internet for other free PDF readers.



Chart scale example

Chart Updates (LNM and NM Corrections)

NOAA updates their nautical charts with corrections published in:

- U.S. Coast Guard Local Notices to Mariners (LNMs),
- National Geospatial-Intelligence Agency Notices to Mariners (NMs), and
- Canadian Coast Guard Notices to Mariners (CNMs).

NOAA's Chart Update Service

From this site, you can access the same chart updates that NOAA uses to update their Print-on-Demand paper charts, Raster Navigational Charts (NOAA RNC®), and Electronic Navigational Charts (NOAA ENC®). This site also provides advance notification of chart updates affecting hazards to navigation and other information considered essential for safe navigation, including:

- Channel conditions,
- Bridge and cable clearances, and
- Regulatory changes that NOAA has identified and forwarded for publication in both the LNM and the NM.

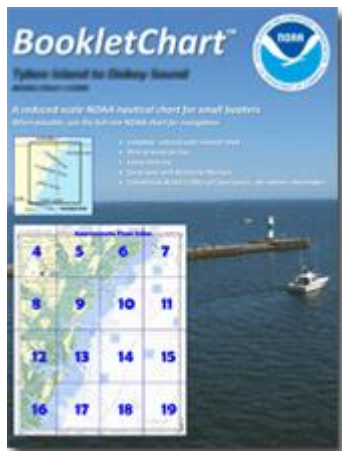
Enter http://www.nauticalcharts.noaa.gov/mcd/updates/LNM_NM.html then to the bottom of the page and select Go To Chart Updates - Please read the NOAA Chart Update Disclaimer carefully. The next page asks you to Accept the terms and conditions The next page you enter the chart number.

Temporary changes to aids to navigation, special published announcements, and other important information affecting navigational safety are not available on this site.

While information provided by is intended to assist in the updating of nautical charts, it must not be used as a substitute for the United States Coast Guard, National Geospatial-Intelligence Agency, or Canadian Coast Guard Notice to Mariner publications.

The information available on this site is derived from the National Ocean Service's Critical Chart Corrections database (CRIT). CRIT is an in-house chart production tool, and may contain some naming conventions, textual abbreviations, or acronyms that are unfamiliar to the general public. Channel tabulations, depth legends, depth notes, and chartlets may not be included in chart update listings prior to January 2000, due to ongoing development of CRIT throughout the 1990s.

BookletChart™



The NOAA BookletChart™ is a product that you can print at home for free. BookletCharts are made to help recreational boaters locate themselves on the water.

The BookletChart is reduced in scale and divided into pages for convenience, but otherwise contains all the information of the full-scale nautical chart. Bar scales are also reduced in scale, but are accurate when used to measure distances in a BookletChart. Excerpts from the United States Coast Pilot are included. Most chart notes are consolidated on a single page for easy reference. Emergency information for the charted area is printed on the back cover.

BookletCharts are updated every week with Notices to Mariners.

The Bookletchart Page Index shows the general layout of the chart among the printed pages; it does not show the exact area of coverage for any particular page. Differences between the index page (showing general coverage) and each page's actual coverage are unavoidable.

For the best display, try to print on both sides of the paper. If your printer does not support duplex printing, staple single-sided pages back-to-back. If you are viewing the BookletChart electronically, enable two-page viewing. In Adobe Acrobat, use the View – Page Display menu option.

Appendix 3

Additional Government Web Links:

USCG District Waterways Management Branch: (P/ATON, WAMS, Lighthouses, LNM, Bridges). Auxiliarists' PATON and Bridge assignments and reports are from/to Chief office.
<http://www.uscg.mil/XXX/dpw/default.asp> (insert your local District number in place of the XXX, i.e. d13)

U.S. Army Corps of Engineers: USACE reports depth information regarding federally maintained navigation channels to NOAA. The USACE is responsible for conducting condition surveys, predredge surveys, and post-dredge surveys in these important waterways. The Corps provides survey results to NOAA. NOAA evaluates these surveys and then issues chart updates by way of USCG Local Notice to Mariners and NGA Notice to Mariners. The USACE also provides NOAA with engineering permits that may reflect new construction along waterways. NOAA then obtains "as-built" drawings that will be applied to the appropriate nautical charts. The Northwestern Division covers all of WA and ID, most of OR, and part of MT. Their link is:
<http://www.nwd.usace.army.mil/home.asp>

National Geophysical Data Center (NGDC) of NOAA's National Environmental Satellite, Data and Information Service (NESDIS) is the archive and distribution center for Office of Coast Survey digital hydrographic and bathymetric data. NGDC can provide digital or paper copies of hydrographic survey data and bathymetric data at nominal cost.
<http://www.ngdc.noaa.gov/mgg/bathymetry/relief.html>

National Geodetic Survey (NGS): a sister component in NOS to the Office of Coast Survey. NGS provides Coast Survey with high accuracy shoreline data used for updating charts. (NGS was also covered earlier in this Study Guide for the horizontal and vertical datum information that it provides.)
http://www.ngs.noaa.gov/RSD/shoredata/NGS_Shoreline_Products.htm

Canadian Coast Guard (NOTMAR): The Canadian Coast Guard publishes corrections to Canadian charts. Some of these corrections may affect U.S. charts in areas where there is overlapping coverage.
<http://www.ccg-gcc.gc.ca/eng/CCG/Notmar>

Center for Operational Oceanographic Products and Services (CO-OPS): provides the national infrastructure, science, and technical expertise to monitor, assess, and distribute tide, current, water level, and other coastal oceanographic products and services that support NOAA's mission of environmental stewardship and environmental assessment and prediction. CO-OPS provides operationally sound observations and monitoring capabilities coupled with operational Nowcast Forecast modeling. <http://tidesandcurrents.noaa.gov/>

<http://tidesonline.nos.noaa.gov/> will allow you to obtain tidal predictions computed by CO-OPS for more than 3000 water level stations. The publication of full daily predictions is limited to fewer stations. These stations with full daily predictions are referred to as "reference stations".

The remaining stations are referred to as "subordinate stations". Tidal predictions for the subordinate stations can be obtained by applying specific differences to the times and heights of tides of the specified reference stations. This new service allows tide predictions to be generated for up to 2 years in advance, provides a graphical display as well as tabular listing of the predicted tides, has options for downloading or printing, and a number of other features.

Appendix 4

Computing Height of Tide at any time

The approximate height of a tide at any time between its high and low water can be found by using "Table 3" of the Tide Tables, "Height of Tide at Any Time", or the height can be obtained graphically by using the Tidal Height Graph (not reviewed here).

First, setup a sheet to record tide station corrections. Immediately below is AUXNAV's.

Substation: _____ Date: _____ Ref. Station: _____ Substation #: _____ HW Time Diff: _____ Diff of Hgt. At HW: _____ LW Time Diff: _____ Diff of Hgt. at LW: _____	Look up these values from Table 2, "Tidal Differences and Other Constants." This section can be omitted if the desired location can be found in Table 1, "Daily Tide Predictions", of the <i>Tide Tables</i> . Height differences denoted with an asterisk are to be multiplied rather than added to reference station height.																																										
Calculations: Ref. Station: _____ Substation: _____ <table style="width: 100%; border: none;"> <thead> <tr> <th style="width: 15%;">Condition</th> <th style="width: 15%;">Time</th> <th style="width: 15%;">Height</th> <th style="width: 15%;">Condition</th> <th style="width: 15%;">Time</th> <th style="width: 15%;">Height</th> </tr> </thead> <tbody> <tr> <td>LW</td><td>_____</td><td>_____</td> <td>LW</td><td>_____</td><td>_____</td> </tr> <tr> <td>HW</td><td>_____</td><td>_____</td> <td>HW</td><td>_____</td><td>_____</td> </tr> <tr> <td>LW</td><td>_____</td><td>_____</td> <td>LW</td><td>_____</td><td>_____</td> </tr> <tr> <td>HW</td><td>_____</td><td>_____</td> <td>HW</td><td>_____</td><td>_____</td> </tr> <tr> <td>LW</td><td>_____</td><td>_____</td> <td>LW</td><td>_____</td><td>_____</td> </tr> <tr> <td>HW</td><td>_____</td><td>_____</td> <td>HW</td><td>_____</td><td>_____</td> </tr> </tbody> </table>	Condition	Time	Height	Condition	Time	Height	LW	_____	_____	LW	_____	_____	HW	_____	_____	HW	_____	_____	LW	_____	_____	LW	_____	_____	HW	_____	_____	HW	_____	_____	LW	_____	_____	LW	_____	_____	HW	_____	_____	HW	_____	_____	Look up heights and times for reference stations in Table 1, Daily Tide Predictions. Add or subtract time differences for substations to Table 1 times for reference stations. Calculate the height at the substation from the height of the tide at the reference station plus or minus the height difference tabulated above, unless denoted with an asterisk — in which case, the tabulated factors should be multiplied by the heights of the corresponding tides at the reference station. Keep in mind that the time differences may place the required reference tide on the day before or after the date in question for the substation. Remember, times given in tables are standard zone time, not daylight savings time. Subtract 1 hour from daylight savings time to calculate zone time.
Condition	Time	Height	Condition	Time	Height																																						
LW	_____	_____	LW	_____	_____																																						
HW	_____	_____	HW	_____	_____																																						
LW	_____	_____	LW	_____	_____																																						
HW	_____	_____	HW	_____	_____																																						
LW	_____	_____	LW	_____	_____																																						
HW	_____	_____	HW	_____	_____																																						
Height of Tide at Any Time: Location: _____ Time: _____ Date: _____ Duration of Rise or Fall: _____ Length of time between high and low tides that bracket desired time Time from Nearest Tide: _____ Use the lesser of the times from the last tide, or time until the next tide Range of Tide: _____ Difference in height between tides on either side of desired time: re that subtracting a negative number is logically equivalent to addition Height of Nearest Tide: _____ Height of tide closest to desired time Tabled Correction: _____ From Table 3 Height of Tide at Time: _____ Add above correction if nearest tide is low water, subtract otherwise Charted Depth: _____ Determined from chart Depth of Water at Time: _____ Add tide height to charted depth to calculate depth at required time																																											

Next, look-up in Table 1 the times/heights of low and high tide for the tidal Reference Station for the day of interest. (Taking care to ensure daylight savings time is applied, if needed.) Look-up, then apply the offset time/height correctors from Table 2 to the closest subordinate station.

Table 3, Height of Tide at Any Time, is made up of two sections: time and range. Time. —Subtract the time of low water from the time of high water, or vice versa, to obtain the elapsed time (duration) between the two tides to the nearest hour (h) and minute (m). You will enter "Height of Tide at Any

Time" with this time. Note that the duration times listed in the far-left column only cover durations between 4 hours (4 00) and 10 hours 40 minutes (10 40). When the duration is less than 4 hours or greater than 10 hours 40 minutes, you must adjust the duration time before using the table.

1. If the elapsed time is GREATER than 10:40, you must use one-half the duration period and then double the correction value. 2. If the elapsed time is LESS than 4 hours, you must double the duration period and then use one-half the correction value. When the tide is nearer high water, the correction value is subtracted. When the tide is nearer low water, the correction value is added.

Range. —To obtain the range of the tide, subtract the height of low water from the height of high water. You will enter the range section of "Height of Tide at Any Time" with this height difference if it is 20 feet or less. Note that the table's maximum range is 20 feet. When the range of the tide is greater than 20 feet, but less than 40 feet, you must halve the range before using the table, and then double the correction value. When the range is greater than 40 feet, enter the table using one-third of the range, then multiply the correction by 3. The same rule applies to the height correction value as it does for time: the correction is subtracted when the tide is nearer high water, and added when nearer low water.

A practice example from AUXNA V Chapter 8 is shown immediately below.

Daily Predictions

		January											
		Time			Height			Time			Height		
		h	m	s	ft	cm	h	m	s	ft	cm		
1	F	0001	-0.8	-24	16	0642	3.9	119					
	Sa	0642	4.8	146		Sa	1234	-0.1	-3				
2	F	1255	-0.7	-21	17	1903	3.3	101					
	Sa	1906	3.9	119		Su	0028	-0.2	-6				
3	Sa	0054	-0.8	-24	18	0724	4.0	122					
	Su	0732	4.8	146		Su	1311	-0.3	-9				
4	Sa	1343	-0.7	-21	M	1946	3.4	104					
	Su	1956	4.0	122		0110	-0.4	-12					
5	Su	0143	-0.7	-21		0806	4.1	125					
		0821	4.6	140		1349	-0.4	-12					
6		1429	-0.6	-18		2028	3.5	107					
		2045	3.9	119									

Newport on Jan 1

Tidal Differences

Reference No.	Station Name	Location	POSITION	
			Latitude	Longitude
1085	Nobska Point	MASSACHUSETTS-cont. Vineyard Sound Time meridian, 75° W	north	west
			41° 31'	70° 39'

DIFFERENCES				RANGES		Mean Tide Level
Time		Height		Mean	Spring	
High Water	Low Water	High Water	Low Water	ft	ft	
ft	m	ft	m	ft	ft	ft
0.4	2.0	0.9	0.6	1.5	1.8	0.8

closest subordinate station

Appendix 5

Chart Updating 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 USCGAUX Chart Updating Study Guide,” serves as a guide to the use of the Coast Pilot(s).

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

The CG Auxiliary Chart Updating Program involves:

- “Nautical Chart” updating
- “Coast Pilot” updating

Following is a list of most common items that observers should be alert for any significant changes between the real world and the chart depiction:

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.

Bulkheads New or improves shoreline, show on chartlet

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.

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.

Fish Havens Indicate condition – obstruction,

artificial fish haven. Indicate limits, show 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 marina and provide position and as built drawings.

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.

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

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

Range Charted range position error.

Rocks Visible or submerged. Single or

cluster. Use extreme care obtaining positions
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.

Spoil Areas Indicate extent with fixes

Stacks and Chimneys Markings, lights and construction. Show fix.

Tanks and Towers Indicate type, position and whether they are visible from sea, show fix

USCG Stations Report new, discontinued or change in facilities.

Wharves New or improves shoreline, show on chartlet

Wrecks Visible or submerged at tide, lake or river stage, show fix.

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