The NOAA Electronic Navigational Chart (NOAA ENC®) is NOAA’s premier nautical chart product. NOAA is focusing on improving and updating the content of its ENCs with more detailed, larger scale ENC coverage. Traditional paper and raster charts are still updated on a weekly basis with critical changes that are released in U.S. Coast Guard Local Notice to Mariners. Other changes which are routinely applied to ENC charts, such as non-critical changes and data from new shoreline and bathymetric surveys, are no longer compiled onto traditional paper and raster charts.

NOAA will end all production of its traditional paper nautical charts by January 2025. More information about this is on the [Farewell to Traditional Nautical Charts](https://www.coast_survey.noaa.gov/farewell-to-traditional-nautical-charts) webpage. Although traditional paper nautical charts will no longer be available, NOAA will provide users with access to a new form of paper chart created directly from ENC data.

The online [NOAA Custom Chart (NCC)](https://www.coast_survey.noaa.gov/ncc) application creates customized charts as PDF files. Their appearance is different from traditional paper charts, but they have all the latest data found on ENCs. Using this approach ensures consistency between ENC and NCC.

NOAA is working with its current Print on Demand (POD) chart agents to provide the means for customers to obtain printed copies of their NCC charts, similar to how POD charts have been distributed in the past.

NOAA is actively making improvements to the NCC application and is interested in hearing about users’ experiences using NCC and getting suggestions for additional enhancements. You can provide your input through the NOAA Office of Coast Survey’s online [ASSIST](https://www.coast_survey.noaa.gov/assist) customer feedback tool.
Moving around in the map window

The controls in the top left corner of the NCC map window are used to move to the area that you want to build a chart for. Use the Plus or Minus icons or roll your mouse wheel to zoom in and out of the map. The Home icon will zoom out to the default display of North America. If you are using a GPS enabled device, clicking the My Location icon will center the map at your current position. As you type into the Find Address or Place field the auto-completion feature suggests locations to choose from. Select a location from the list or hit return to zoom to the spot. You may have to continue to zoom in to see chart features appear.

Once the chart data is displayed, you can click on the Identify icon and then tap on the map to get more information about a particular feature. An Identify Results window will appear with a count of the number of features found at that location, such as (1 of 10). Use the arrows at the top of the window to cycle though each of the features. The feature being described in the results window will be outlined in light blue. Click the Identify icon again to deactivate it.

A Scale Bar and Coordinate Display are in the bottom left corner of the map window. A value in feet or miles is displayed next to the bar to indicate the distance represented by the length of the bar. The coordinate display shows the latitude and longitude of the mouse. The display may also be frozen by clicking on the icon. The display will then show the position of a pin wherever the mouse is clicked. The default display is in degrees, minutes, and seconds. This can be changed to decimal degrees or degrees and decimal minutes by clicking on the up arrow on the right side of the display and selecting the desired format.

Accessing NCC settings

When NCC opens, these icons are displayed on the left side of the application window. After clicking on one, the associated control panel is opened and the icons move to above the panel. The function of each is listed below.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help Documentation</td>
<td>Links to a two-page Quick Start Guide, this user guide, a how-to video, the U.S. Chart No. 1, chart symbology guide, and version updates.</td>
</tr>
<tr>
<td>Display Settings</td>
<td>Set the sounding units and other aspects of how data is portrayed on the chart.</td>
</tr>
<tr>
<td>Print Settings</td>
<td>Select chart scale, paper size and orientation, and center of the area to be charted.</td>
</tr>
<tr>
<td>Export Queue</td>
<td>Create and view the completed chart.</td>
</tr>
<tr>
<td>Feedback</td>
<td>Provide suggestions for improving the NOAA Custom Chart.</td>
</tr>
</tbody>
</table>
The instructions below describe how to use the various settings to customize your chart. The remainder of the guide is organized around these four basic chart-making steps.

Customizing the display of depth areas to reflect your own vessel’s draft

NCC enables users to set a “safety” value that controls where blue shallow water tints are shown on the chart. Some electronic navigational systems that use ENCs can sound an alarm when a ship is heading towards shallow water, based on the safety contour value that has been entered into the system for the ship’s draft. NCC provides a similar awareness in an analog fashion by displaying a selected “safety contour” with a thick dark line. Generally, seaward of this line is “safe water” and shoreward is “shallow water.” Two and four shade options are also available for tinting shallow water.

NCC does not create new contour lines, it displays existing depth contours compiled into the ENC data that are used as the source to create NCC charts.

Values entered by the user in the Display Settings control panel are used to select an existing depth contour and depth areas to emphasize.

As you consider the appropriate safety value to use for your custom chart, keep these factors in mind. Changes to a ship’s draft can result from its load, speed, and sea conditions. The changing nature of the seabed due to silting and other factors, as well as the relative accuracy of the hydrography in an area, contribute to the risk associated with any given transit. All of these factors should be considered when calculating your vessel’s draft plus a prudent additional cushion to use as the NCC safety setting.
Click on the **Display Settings** icon to open the control panel and find the **Depth Units** control.

The **Depth Units** default is set to *Feet*, though the application may display depths in units of feet, fathoms, or meters. The native unit for ENC data is in meters. When depth units are set to feet or fathoms, the values are rounded down to the next lesser whole depth when the values are converted.

Below the **Depth Units** control is the **Depth Zone Tints** control. The default four shades setting will display sequential shades of blue, with the darkest blue showing the shallowest water and white showing deep water.

When the **Depth Zone Tints** control is set to two shades, the dark blue extends to the safety tint contour. Any deeper water is shown as white.

Two and four shade renderings for a chart with tint settings of 5, 11, and 17 feet are shown below.

Traditional NOAA charts often have depth contours at 6 foot intervals in shallow water and larger intervals in deeper water. For example: 6, 12, 18, 30, 60, 90, etc. Shallow water tint extents (showing one or two shades of blue) vary according to the slope of the bottom and the scale of the chart.

On NCC charts, it is common for soundings and depth contour values to be shown as one foot shallower depths shown on the corresponding traditional paper or raster chart. This is a result of the rounding rules applied when the depths that are stored in meters on ENCs are converted back into Imperial units for NCC charts. **However, one cannot assume that the actual depths are one unit deeper than shown on the chart.**
The image below shows the same area with depths displayed in meters. NCC selects the next deeper contour for the specified setting (shallow, safety, or deep) if a matching contour does not exist.
Almost all of the rendering of the ENC data that is used to create NCC charts is automatic. However, in addition to setting the safety contour value and blue shallow water tints that are discussed above, there are a few other aspects of chart that can be customized. The controls for these settings are on the bottom half of the Display Settings tab, shown at left. This is accessed by clicking on the Display Settings icon.

Labels for the safety depth contour and other depth contours appear with a white halo, as shown below. Contour Labels, as well as Compass Roses, may be toggled on and off.

The Area Symbolization control changes how certain area features, such as anchorages, cable and pipeline areas, restricted and caution areas, and others are depicted. The images below show a fairway, cable area, and a restricted area. The image on the left shows Plain Boundaries. The image on the right shows Symbolized Boundaries. Note that the triangles and the “T-dash” portions of the symbolized boundaries point to the interior of the area.

**What is Chart Scale?**

Scale is the relationship between distance on a chart and the corresponding distance on the ground. This is often expressed as ratio, such as 1:10,000. Nautical charts and ENCs are broken into six categories, based on their scale. Small scale charts, such as Overview and General charts cover large areas – like the North Pacific Ocean – and show the least amount of detail. Large scale charts, such as Harbor or Berthing charts, cover small areas – like a harbor or even just a particular set of wharfs or piers – and show the greatest amount of detail. Coastal and Approach charts are in the middle. These categories are referred to as a chart’s “Intended Use” in NCC and correspond to the six ENC “Usage Bands.”
“Legacy” ENC data, that is, data that has not yet been reschemed, was compiled in over 100 different scales and the range of scales for each intended use overlaps to some extent with the range of scales used in adjacent intended use categories. Reschemed ENCs are compiled in just 11 scales. The table below shows the scales for each Intended Use. When a particular Intended Use is selected by the users, the scale of the data used by NCC is based on whether it is from a legacy ENC cell or a reschemed ENC cell.

<table>
<thead>
<tr>
<th>ENC Usage Band No.</th>
<th>Intended Use</th>
<th>Legacy NOAA ENC Scale Ranges</th>
<th>Reschemed NOAA ENC Scales</th>
<th>Level of Detail Shown on Charts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview</td>
<td>1:10,000,000</td>
<td>1:1,120,000</td>
<td>Less</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1:587,870</td>
<td>1:2,560,000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>General</td>
<td>1:1,534,076</td>
<td>1:1,280,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1:240,000</td>
<td>1:640,000</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Coastal</td>
<td>1:600,000</td>
<td>1:320,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1:150,000</td>
<td>1:160,000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Approach</td>
<td>1:150,000</td>
<td>1:80,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1:25,000</td>
<td>1:40,000</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Harbor</td>
<td>1:51,639</td>
<td>1:20,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1:5,000</td>
<td>1:10,000</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Berthing</td>
<td>1:12,000</td>
<td>1:5,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1:2,500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The actual settings for the scale and size of the NCC chart are made in the Print Settings control panel, which will be discussed later. However, there some controls in the top half of the Display Settings tab, shown at left, that can help you optimize the scale, position, and level of detail to be presented on your chart. These are accessed by clicking on the Display Settings icon.

Unlike many online map applications that display greater detail nearly anywhere a user chooses to zoom in, nautical chart coverage does not have larger scale coverage everywhere.

When creating a custom chart, you must be aware of the scale of the underlying ENC data from which NCC charts are generated. Attempting to make a large scale NCC chart where only small scale ENC data exists will yield poor results.

NCC provides a way to determine where different scales of data coverage are available. The Data Extents control toggles the display of a red “minimum bounding rectangle” (MBR) surrounding each ENC. An MBR is the smallest rectangle that can completely enclose the data from a particular ENC.

The Data Extent Text control governs which information about each ENC is displayed in the top left corner of each MBR. This includes the scale, the ENC name, both, or neither. An example displaying ENC scales is shown below.
The **Intended Uses** control performs two functions. First, it controls which ENC band extents are displayed in the NCC map window. The stack of overlapping red boxes, such as those shown in the image above, can be difficult to interpret. To reduce this clutter, uncheck the “All Datasets” box and check the box for the intended use that you wish to make a chart for. The image below shows only the MBRs for the approach intended use / ENC usage band 4.
The **Intended uses** settings also control what ENC data is displayed in the NCC map window, *as well as the data that is portrayed on the custom chart*. It is recommended that the **All Datasets** box be checked before a chart PDF is created, as described in the “View and download finished custom chart” section. This enables NCC to fill in any areas with smaller scale ENC data, if data at the scale specified in the **Print Settings** is not available, such as in the example below.

Although most ENCs are somewhat rectangular and all reschemed ENCs are strictly rectangular, the data for some ENCs is irregularly shaped and does not completely fill its MBR. The “L” shaped ENC data coverage for McNeil Island in Puget Sound, WA is an example of this case. The NCC display of the MBR for this ENC cell is shown below at left. The actual extent of the ENC data coverage is shown in blue tint on the right.

*Left image shows NCC displaying 1:80,000 data with the minimum bounding rectangle for a 1:20,000 scale ENC. Right image shows actual ENC footprint in blue tint. Area without blue tint is covered by 1:80,000 scale ENC data.*

Below, the image at left image shows a 1:20,000 NCC chart of McNeil Island, WA created with the **Harbor** Intended Use box checked. The northeast quadrant of the chart shows only the low resolution NCC base map. The image at right shows the same chart created with the **All Datasets** box checked. The missing data has been filled in with the next closest smaller scale data available the 1:80,000 ENC data from the approach intended use/ENC usage band 4.
Click on the Print Settings icon to open this control panel. Enter the denominator of the representative fraction (without commas) for the scale chart that you want to create in the Scale field. For example, for a 1:40,000 scale chart, enter 40000.

Several International (ISO 216) and North American (ANSI/ASME Y14.1) standard paper sizes may be selected from the Page Size pulldown menu for your chart. The proportions of these paper sizes are shown on the following page.

A Portrait (vertical) or Landscape (horizontal) chart format may be selected from the Orientation pulldown menu.
Relative sizes of international and North American paper sizes available in NCC
Paper size and chart scale both affect the size of the area covered by your custom chart. Larger paper or a smaller scale will both increase the size of the chart’s “footprint” on the ground, while use of smaller paper sizes or a larger scale will shrink the chart’s footprint. Some experimentation may be necessary to find the balance of coverage (footprint size) and level of detail (scale) that you want.

Once the scale, size, and orientation setting have been made, click on the Create New Extent icon. This will activate the crosshair cursor with a “Click to add an extent” prompt. Move the cursor over the NCC map window and click at the center of the location you want to create a chart at.

NCC will take a moment to calculate the appropriate chart footprint for the scale, paper size, and latitude specified. Please be patient – this could take 10-15 seconds.

A red box, showing the extent of your custom chart, is displayed when the calculation has completed. The chart scale, as well as the length and width of the area covered on the Earth, in meters, are displayed within the box.

View and download finished custom chart

To create, view and download your custom chart, click on the Export Queue icon. This control panel shows a list of all the chart extents that have been created. Clicking on any chart in the list will zoom to the selected chart in the NCC map window and highlight it with a darker shade of red. You can name your chart by replacing the default text, “Chart_1.” The text that you enter will appear at the top of the custom chart.

As in the Print Settings control panel, a chart selected from the Export Queue list may be repositioned by clicking on the Move Custom Extent tool and then using the mouse to click-and-drag the chart.

To delete charts, select one or more charts from the export queue and then click on the Delete Extent tool or hit your keyboard’s delete. Click “OK” in the “Are you sure you wish to delete selected products?” prompt.

To create a PDF file of your custom chart. Select one or more charts from the list and click the Export Charts tool. A bar and timer will indicate the progress of the chart being created. This process may take one or two minutes per chart. An Open button will appear when the export is complete. Click the button to open the chart in a new browser tab. Use your browser’s download or save-as function to save the chart PDF file to your computer.
The first page of the PDF file holds the custom chart in the size and orientation that you selected. The second page of the PDF holds the Zone of Confidence Diagram. Subsequent 8.5” x 11” pages contain notes that a traditional nautical chart would show within the chart itself. NCC collects all of these notices in one place.
The age and accuracy of hydrographic survey data used on nautical charts varies. Depth information is based on data from the latest available hydrographic survey, which in many cases may be quite old. **Zone of Confidence (ZOC) Diagrams** are provided on NOAA Custom Charts to assist mariners in assessing hydrographic survey data and the associated level of risk to navigate in a particular area. ZOC diagrams show the extent the hydrographic surveys used to compile the ENC data used on the NCC chart. Different shades of blue are used to indicate one of five quality categories (A1, A2, B, C and D) assessed for the data in each “zone.” Areas for which the data quality has not yet been assessed are shown as white. An accompanying table provides a description of each category.
For further assistance or to suggest improvements for the NOAA Custom Chart application, click the feedback icon. This opens the NOAA Office of Coast Survey’s online ASSIST customer feedback tool.

If you have a question or suggestion concerning a particular NCC chart that you are trying to create, please tell us where the chart is of and attach the NCC chart PDF or a screenshot of the area, if possible.