NOAA Nav-cast Transcript
How to obtain NOAA ENC-based paper nautical charts after NOAA ends production of traditional paper charts
Capt. Chris van Westendorp and Colby Harmon
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Colby Harmon: [00:01] Welcome everyone to NOAA Nav-cast, our quarterly webinar series that highlights the tools and trends of NOAA navigation services. I am Colby Harmon, a cartographer and project manager with the Marine Chart Division of NOAA's Office of Coast Survey. I am here today with NOAA Corps Captain Chris van Westendorp, Chief of Coast Survey's Navigation Services Division. This afternoon, Chris will present an overview of NOAA's program to gradually sunset the production of traditional paper nautical charts and discuss some improvements that are being made to NOAA's premiers electronic navigational chart product. Then, I will walk through how to use the NOAA Custom Chart prototype. This application provides mariners, recreational boaters, and other chart users with a new, customizable type of paper chart.

Capt. Chris van Westendorp: [00:53] Thanks Colby. With the advent of GPS and other technologies, marine navigation has advanced significantly over the past few decades. We see an increasing reliance on the NOAA electronic navigational chart – the ENC – as the primary product used for navigation and decreasing use of traditional raster chart products. That is, paper charts and raster charts which are digital images of paper charts stored as pixels. In November 2019, NOAA announced it is starting a five-year program to end all traditional paper and raster nautical chart production. At the same time, we are providing mariners with a new style of paper chart based on our premier ENC product data.

For nearly 200 years, NOAA's Office of Coast Survey has produced traditional paper nautical charts. However, since 2008, sales of traditional paper charts have dropped by half, while ENC sales have quadrupled. Originally only available as paper charts, several other raster digital chart formats, based on the paper chart images have been developed. NOAA plans to end production of all forms of these raster charts during the sunsetting process, and is now focusing efforts on keeping up with the demand for ever more detailed ENC coverage. ENCs provide the most efficient means of delivering updated navigational information to the public, while paper and raster chart production is increasingly difficult to synchronize with the corresponding ENCs.

Additionally, the International Maritime Organization now mandates that all large commercial vessels on international voyages use ENCs exclusively. In 2016, the U.S. Coast Guard started allowing regulated commercial vessels on domestic voyages to use ENCs in lieu of paper charts. Recreational boaters are also increasingly using electronic chart displays.

NOAA is undertaking a three-pronged sunsetting process to ease the transition to ENC-based products while continuing to support safe navigation. The sunsetting process includes:

- Improving data consistency and providing larger scale ENC coverage
- Providing access to paper chart products based on ENC data
- And ultimately, shutting down all traditional paper and associated raster chart production

NOAA is in the midst of a multi-year program to improve and replace its ENC coverage of 1,200 irregularly shaped ENC cells, compiled in 130 different scales, which were based on the shapes and scales of the corresponding paper charts from which they were originally digitized. This image of the

raster tab of the NOAA Chart Locator – our online chart catalogue - shows the current paper chart coverage in the west end of Lake Superior. The prior ENC coverage had very similar layout and the largest scale ENC coverage between Thunder Bay and Duluth, like the paper charts, was 1:120,000.

The new reschemed ENC product suite will consist of a standard gridded layout of ENCs, compiled in just a dozen standard scales. The new ENC coverage will generally be at the same or larger scale than previous coverage and increase the number of ENC charts, or cells, from 1,200 to about 9,000. Thus, the level of detail and consistency will improve significantly among ENCs. This image of the ENC tab of the NOAA Chart Locator, shows the new, reschemed ENC coverage in the same area. Note that these 19 new ENC cells replace the previous 1:120,000 scale coverage with larger 1:80,000 scale ENCs.

NOAA is now providing access to paper chart products based on ENC data, through the NOAA Custom Chart prototype and through third-party commercial data providers. The online NOAA Custom Chart (or NCC) application enables users to create their own charts from the latest NOAA ENC data. Users may define the scale and paper size of custom-made nautical charts centered on a position of their choosing. NCC then creates a geospatially referenced Portable Document Format (or GeoPDF) image of a nautical chart. Chart notes and other marginalia are placed on a separate PDF page. Users may then download, view, and print the output. This provides an easy way to create a paper or digital backup for electronic chart systems or other GPS enabled chart displays. A comparison of NOAA Chart 16204 and the corresponding NOAA Custom Chart covering Port Clarence, Alaska is shown here. Although it looks a bit different from a traditional NOAA chart, NCC charts show the latest data as compiled in the NOAA ENCs. The NCC prototype is in the early phases of development and many improvements are planned.

The five-year process to end all traditional paper nautical chart production will shut down all other raster chart products and services associated with traditional NOAA paper nautical charts, including:

- Print-on-demand or POD paper nautical charts
- Full-size and BookletChart™ PDFs
- NOAA raster navigational charts or RNCs
- The NOAA RNC tile service
- And NOAA's online RNC viewer

The expected cancellation date of these products and services is January 2025.

NOAA is coordinating details of the sunsetting effort with its primary charting partners, such as the US Coast Guard, the Army Corps of Engineers, and the National Geospatial-Intelligence Agency. Other federal agencies are involved through our participation in the Committee on the Marine Transportation System, Future of Navigation Integrated Action Team.

We are also working with some of our largest traditional paper nautical chart print-on-demand vendors, that is NOAA's POD chart agents, to develop ways in which they will be able to provide large format plots of charts created with the NCC application in a manner similar to the way POD agents now sell standard traditional NOAA paper charts.

In the future, POD agents may also be able to provide a limited set of about 300 predefined coastal scale charts (about 1:75,000 to 1:130,000 scale) that will be generated by NOAA using the NOAA Custom Chart application on a recurring basis. These would have footprints similar to the current paper charts in this coastal scale range and users will likely be able to order these using the old traditional paper-chart chart numbers. This service model is still being developed and will only be available for about a quarter

of the existing traditional paper chart product line. However, users will still be able to create custom charts covering other traditional paper-chart footprints on their own.

A Federal Register Notice announcing the start of NOAA's process to sunset paper and raster chart production was published on Nov 15, 2019. Comments regarding the raster sunset program and the NOAA Custom Chart application may be submitted through NOAA's online ASSIST feedback tool. Comments and recommendations will help shape the manner and timing in which the product sunsetting process will proceed. So far, over 300 comments have been received from the public regarding NOAA ending traditional paper nautical chart production. Many comments express a desire to continue having access to paper charts, especially as a backup for electronic navigation equipment. NOAA believes that the new NOAA Custom Chart web application and future agreements with existing NOAA POD chart agents to print large format charts output by NCC will meet the needs of these customers. Although the official comment period for the Federal Register Notice ends on Feb 1st, NOAA will continue to accept comments after that date and is especially interested in the public's ideas for improving the NOAA Custom Chart application.

More information about the end of raster chart production is available in the "Sunsetting Traditional NOAA Paper Charts" document. The "Transforming the NOAA ENC" document provides a wealth of information about rescheming and other improvements to the NOAA ENC product suite.
Both of these documents may be downloaded from the Office of Coast Survey website under the "Publications" pull-down menu. And now, I will turn the nav-cast back over to my colleague, Mr Colby Harmon, who will demonstrate the NOAA Custom Chart application.

Colby Harmon: [10:25] Thanks Chris. The NOAA Custom Chart portion of today's presentation will include:

- How you can make recommendations to NOAA for improving the application
- Basics of creating an NCC chart
- How to customize your chart
- How to get a paper copy of your chart
- And plans for future enhancements

The app is on the NOAA Office of Coast Survey website at nauticalcharts.noaa.gov. Once on the Coast Survey Homepage, click on the NOAA Custom Charts link in the "General Use Charts" bar to open the app. We are continually making improvements to the NOAA Custom Chart App, but it's still a prototype. During the prototype phase a disclaimer is displayed when the application is launched that states all products created are for demonstration purposes only and are not to be used for navigation. Click OK in the dialog box to accept this limitation and the application will open. When the application is fully developed this disclaimer will be removed.

This slide (slide 14) shows the basic timeline for the raster chart sunset program. We started prototyping the NOAA Custom Chart application well before announcing plans to end raster chart production last November. Also, as mentioned in the "Sunsetting Traditional NOAA Paper Charts" document, we will be seeking feedback on the NOAA Custom Chart application, and the raster sunset program in general, for about a year before NOAA starts cancelling traditional paper charts. When the initial development is complete, the NOAA Custom Chart application and ongoing coordination with our print-on-demand chart agents will provide a convenient replacement for traditional paper charts and an easy means to obtain ENC-based paper charts.

The point we want to stress here is that cancelation of traditional paper nautical charts will not start until we believe the NOAA Custom Chart application is fully functional. We are also confident that NOAA will be able to fully complete the shutdown of traditional raster and paper nautical chart production by Jan 2025.

Once you've tried the NOAA Custom Chart app, click on the feedback link at the top of the screen to open the NOAA ASSIST form and share any suggestions that you may have for improving the application.

You can also use the NOAA's online ASSIST feedback form to comment on, ask a question about, or report an error regarding any other NOAA nautical product or service.

So let's go over the application's basic operations. There are three icons on the left side of the application window. Each opens a separate panel used to:

- define what the chart will look like,
- set the chart's paper size and scale,
- or export the custom chart into a PDF file.

I will explain how each of these panels work. As with many applications, there is a number of ways that the program enables users to accomplish any given task. I'll be showing you a way that I think works the best for me. I encourage you to experiment with the apps' controls and settings to determine what works best for you.

First, move to the area that you want a chart of. Click the "Display Properties / Print Settings" icon. Click and hold the left mouse button to pan. And use the plus and minus buttons or your mouse wheel to zoom in and out.

You can customize your chart to show safe water for your specific craft. The safety contour value is based on your vessel's draft plus an additional safety factor of your choosing. The NOAA custom chart application will highlight that depth contour value (or the next deeper depth contour, if the available ENC data doesn't have that particular depth contour line compiled). Generally, water inland from this extra thick contour line will be shallower than the safety contour value setting, and deeper, safe water will be seaward of that line. Different depth areas also receive different shades of blue, depending on depth values entered by the user.

The safety depth contour value – and a few other depth values, input by the user in the "Depth Contour" tab under Display Settings, are used to change how depth areas are shown on the chart. The darkest blue tint is used to portray the shallowest water. If the four depth shades option is used, the darkest tint is shown between the shoreline and the "shallow" value entered by the user. Different shades are shown between the "shallow" depth, "safety" contour depth value, and the "deep" depth set by the user. Open water beyond that is shown in white. If the two depth shade option is selected, then the chart will show just one shade of blue and white, as shown here on the right. At this point you should set all the other Display Settings in the Miscellaneous tab before moving on to setting your chart scale in the print properties panel. However, I want to quickly go through the basic chart making steps now and I'll cover the other display settings later.

To set the chart scale and size, click the "Define a Product / Print Properties" icon. Enter the ratio of the chart scale you want into the "scale" field without any commas. For example, for a 1:40,000 scale chart

enter “4 0 0 0 0”. Select a standard paper size from the “Page Size” list. Select either portrait or landscape from the “Orientation” list. Click the “Apply” button.

Click the “Create a new extent” icon. Place the cross-hairs of the cursor at the center of the area that you want a chart of. Click the mouse once to set the center and see the footprint of the chart that will be created. Several chart extents can be set at a time and then exported later. It’s important to remember that whatever display or print settings that you have selected will be saved with each chart extent. If you change any settings, they will only apply to new extents, not to any previously established chart extents.

If your chart isn’t exactly where you want it, you can adjust the location. Click the “Move an extent” icon Move the cursor over the chart extent that you want to move. Then click and drag the chart to the desired location.

To create the chart, click the “Export Products / Export Queue” icon. In the queue box, click in the chart name field and replace “Chart_1” text with an appropriate name for your chart. Click on the “Export products” icon (this looks like a printer now, but will likely change in the future). A progress bar will display and an “Open” link will appear when the chart is completed. This could take 2 or 3 minutes, depending on the size of the chart. Click on the “Open” link – I usually right-click to open the chart in a new browser tab.

To save the chart PDF to your computer, click the “download” or “save” icon, or select “save as …” in your browser’s “file” menu. You may then view or print the chart with Adobe Acrobat or another PDF viewer.

If you want to delete a chart extent, you can do this while in the Export Queue. Click on the “Export Products / Export Queue” icon if you aren’t in the queue already. Click on one of charts listed in the Export Queue box. The chart will be highlighted in the map window. Click on the “Delete” icon Click “OK” when prompted to delete the chart extent.

This is what a 1:40,000 scale NOAA Custom Chart of Martha's Vineyard, Massachusetts looks like. It is built from 1:40,000 scale ENC data. The NOAA Custom Chart portrayal of the chart data currently uses the symbols found on Electronic Chart Display and Information Systems (or ECDIS) used by large commercial vessels. However, NOAA is making several changes that will make the NOAA Custom Chart app easier to use and the output look more like a traditional NOAA paper chart. Other improvements on the way include replacing many of the ECDIS symbols with the more familiar of NOAA symbols that have been used in the past to represent aids to navigation, such as, buoys, beacons, and lights. There will also be improvements to how chart notes are assembled and printed And better methods for managing the placement of compass roses As well as a simpler, more intuitive user interface.

On traditional NOAA paper nautical charts, notes are distributed throughout the chart image. The NOAA Custom Chart app organizes notes differently.

The NOAA Custom Chart app assembles all chart notes on a separate 8 ½” x 11” page positioned after the chart image in the chart PDF file. Other chart components, such as source diagrams, will also be placed on these “notes pages.”

So let’s go over some advanced settings that you can use to customize your chart.

These are all in the “Display Properties / Display Settings” panel. Under the miscellaneous tab there are several settings that will help you understand the nature of the underlying ENC data that the NCC charts are created from. This information is not displayed on the finished NCC chart. The “Data extents” and “Display frame” settings allow you to display the extent and scale of the ENC data that is available for you to use to create a NOAA Custom Chart.

One important thing that you will want to do is to pick a chart scale that is close to the scale at which the available ENC data was compiled. Here’s one way to easily see the scale of the ENCs in an area:

- 1st set the data extent settings to “On,” “CSCL,” and “Upper Left.” This will display the outlines of ENC cells in magenta with their compilation scale.
- Next check the box for the usage scale band of the chart that you want to create. Overview is the smallest scale, and harbor and berthing are the largest scale ENCs.
- Finally, un-check all three of the “Display Categories” boxes. This will remove the ENC data from the NOAA Custom Chart window so it will be easier to see the ENC cell outlines.
- After you see the scale of the ENC data that is available in your area of interest, you can make a more informed decision about what scale you want your custom chart to be.

Once you have evaluated the ENC data, re-check all the “Display Categories” boxes to turn the display of the ENC data back on.

There are many settings that control how the ENC data is displayed on your custom chart.
The Color Scheme, Attribute Description, Honor SCAMIN, and Isolated dangers setting are used in ECDIS to control various aspects of the electronic navigational display and are unnecessary for the NOAA Custom Chart. These settings will be removed in a future version of the application. Use “Depth units” to select displaying depths in meters, feet, or fathoms. Use the “Area symbolization” setting to show area features, such as anchorages, with either “plain” or “symbolized” boundaries. I suggest using symbolized boundaries, which provides a better indication of what the area features are. To show compass roses on your chart, toggle this setting to “On.” The ECDIS “isolated danger” symbol, a magenta octagon with a white “X” is used in ECDIS systems to show dangers shallower than a ship’s safety contour. This symbol will be removed from future versions of the NOAA custom chart, so that the underlying danger, such as a wreck symbol can be seen clearly.

To have depth contours and the safety depth contour labeled on your chart, keep these toggles set to “On.” Aids to navigation, such as buoys, may be displayed with “Paper chart” symbols or “Simplified” geometric shapes. Select “Paper Chart” for a more familiar representation of aids to navigation.
The two color depth shades toggle controls whether depth areas are portrayed with 2 or 4 color tints, as I described earlier.

As discussed earlier, the scale bands settings control which scales of ENCs are displayed in the NOAA Custom Chart map window. The display categories settings control different sets of features that can be turned on and off in an ECDIS navigation system. We recommend that these are all checked on whenever you create a custom chart.

These text group settings control various sets of text that can be displayed or suppressed when creating your custom chart. You are encouraged to experiment with turning these on and off to see how the display is changed. That’s a lot to cover in a short time, but I hope it can get you all started with experimenting with creating your own custom charts.

Capt. Chris van Westendorp: [24:55] Thanks, Colby, for that informative demonstration, and thank you for joining this Nav-cast. Please submit any questions or comments through NOAA's online ASSIST tool.

A recording of today's presentation, the slides, and a transcript will be available on the Office of Coast Survey website in about a week. Go to www.nauticalcharts.noaa.gov/about/nav-cast.html.