Update story on ENC NOAA Charts

by Ralph Heimlich

The problem with technology is that it is always advancing. In the Jan/Feb 2019 edition of the ***The Chesapeake Paddler***, I discussed a method for using NOAA Raster navigation charts in Google Earth to produce customized nav charts for kayak trips. Unfortunately, later in 2019, NOAA announced that it would "sunset" traditional paper and raster digital navigation charts beginning in 2021 and completely by 2025. The new technology that will replace paper and digital chart images is called **Electronic Navigational Charts (ENCs).**

The ENC product format is specified by the International Hydrographic Organization (IHO). Each ENC is a digital database that stores the location and shape of charted features as pairs of latitude and longitude coordinates. This is known as "vector format" data. Database records associated with each feature provide detailed information, such as the feature's color, shape, height, purpose, quality of position, and other attributes. The data contained within ENCs can be used by electronic navigation systems, called chart plotters, to enable safer voyage planning and route monitoring. This includes initiating warnings and alarms when a ship is heading into shallow water or toward other dangers to navigation. Updated ENC revision files are available weekly. When ENC revision data is loaded many navigation systems apply these updates automatically. ENCs will continue to be produced and enhanced after all raster format charts are canceled. While this is great news for commercial mariners and operators of larger recreational vessels, most kayakers don't use chart plotters while underway, or even have one. This article provides information for kayakers on how to access and use ENC charts in two ways.

NOAA Online Custom Chart Tool—First, NOAA has developed an online custom chart tool that accesses and uses ENC charts. It is online at https://devgis.charttools.noaa.gov/pod/. A detailed user guide is available, and a quick start introduction is provided at https://devgis.charttools.noaa.gov/pod/NOAACustomChartQuickStartGuide.pdf. After zooming in to your area of interest using either the "+" and "-" icons on the tool or your mouse wheel, you need to check some settings for printing your chart. The print settings icon lets you specify the scale of the chart and the size and orientation of the paper you will be printing it on. Scale is the relationship between distance on a chart and the corresponding distance on the ground, expressed as ratio, such as 1:10,000 (1 inch equals 10,000 feet). 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." Kayakers are mostly concerned with the Approach charts for near-in coastal waters and the Coastal charts for a more synoptic overview, or a scale range of 1:100,000 down to 1:20,000.

ENC Usage Band No.	Intended Use	Legacy NOAA ENC Scale Ranges	Rescheemed NOAA ENC Scales	Level of Detail Shown on Charts
1	Overview	1:10,000,000 1:587,870	1:5,120,000 1:2,560,000	Less
2	General	1:1,334,076 1:240,000	1:2,280,000 1:640,000	
3	Coastal	1:600,000 1:150,000	1:320,000 1:160,000	
4	Approach	1:150,000 1:25,000	1:80,000 1:40,000	
5	Harbor	1:51,633 1:5,000	1:20,000 1:10,000	
6	Berthing	1:12,000 1:2,500	1:5,000	More

In terms of page size, very few of us have home printers capable of more than letter and legal size paper. Some printers may be able to take a larger sheet (poster size) and break it down into blocks of letter-size sheets for printing your own chart book. Check your printer's settings to see what it can do. I prefer landscape orientation because of the way the chart lies on my kayak deck.

Based on your chosen printer settings, the "create new extent" button will let you place a red-shaded area the size of the resultant printed chart wherever you position the cursor on the chart shown in the tool. You can use the "move extent" button (green page with a hand in it) to reposition the

printed chart extent to capture what features you are interested in for your trip. Below is an example of two extents, one portfolio and one landscape, in the area around the mouth of the St. Mary's River.

Next, you work with "export chart" button to view the export queue. For each of the charts listed in the queue, you can delete it, reposition it, or export it. Click on the chart listing to work with each extent and it will be highlighted in the chart tool, so you won't get confused about which is which. Exporting takes a while, so don't get impatient. The one in this example took 53 seconds. When the "open" button appears, click it and the chart image will be displayed in your browser on a new screen as a .pdf file. You should download it to a file location on your computer where you can print or work with it. Chart 2 for the selections shown here includes scale bars, projection info, date created, and latitude and longitude grid markings.
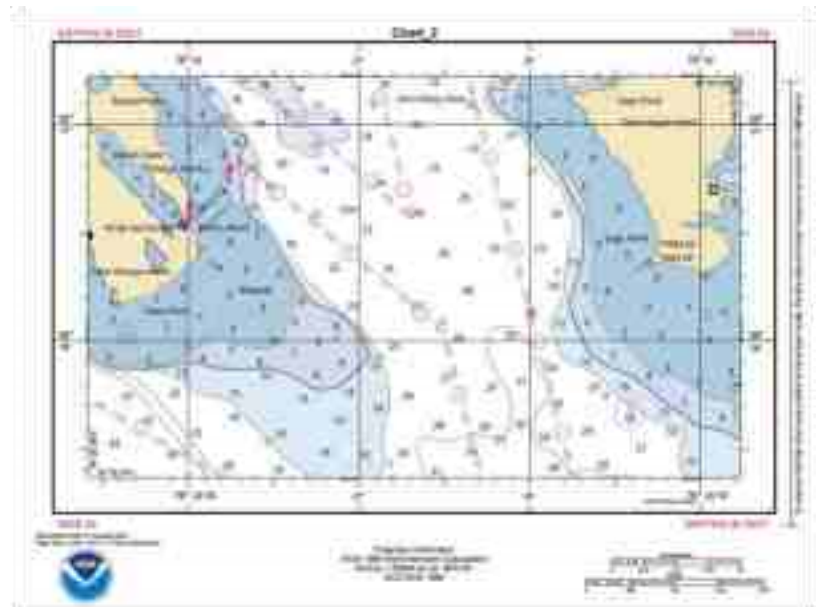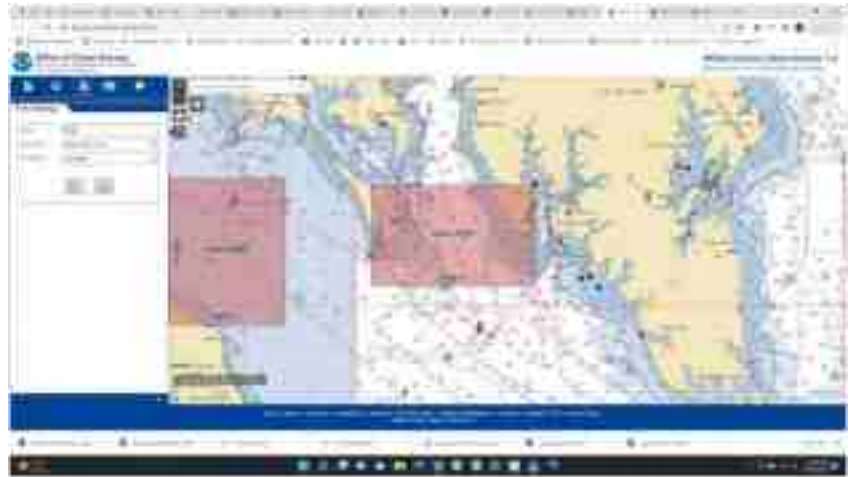
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You should play around with different scales and schemes of printing to get a set of charts for your trip that balances the number of sheets you have to print, the detail you want, and synoptic overview you need to put yourself in context while paddling. I like to print an overview chart at a larger scale (say 1:100,000) , and then a series of smaller scale charts for detail along the intended route. Be sure the detail charts overlap enough that you can tell how they fit together. I print on TerraSlate 5 mil laser "paper" that is waterproof and can go on my deck without a map case (25 sheets for $20 on Amazon). If you are printing with an ink jet printer, beware: The ink is water soluble and will run even when printed on waterproof paper.

OpenCPN Chart Plotter—I said that large ships and big yachts have onboard chart plotters, but the open source revolution has even reached down to the world of digital navigation. You can download and install a desktop open source chart plotter from OpenCPN that is useful as a planning tool and to print NOAA ENC charts. There are versions for Windows, Mac, and several flavors of Linux OS. I suspect that the Mac version can operate on the IPad and there is an Android version that might work on beefier smart phones, but I don't know how useful it would be on such a small screen and the storage requirements for charts could be significant. If you want a hand-held device for navigation, you should go with a GPS equipped with NOAA BlueChart navigation charts. There are two levels of user manual: Beginning and Advanced. The basic functions you would likely use on the desktop are to load charts, manage the display, chart tracks for planned trips, and drop markers or points of interest (POI).

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You load charts using the **Options (gear wheel) icon** on the LHS. I found it easy to do as follows:

Navigate to https://charts.noaa.gov/ENCs/ENCs.shtml which displays groups of ENCs by Coast Guard District, State, and region.

☠Select your download (I selected all the ENCs for Maryland).

☠When you click on the link, a .zip file is downloaded

☠Clicking on the .zip file in the download bar of your browser creates a directory in the download file

☠Clicking "Extract All" unzips the files.

☠I suggest moving this directory from Downloads to some file structure of your own. I use a directory called "Charts" and the MD ENCs are a subdirectory within it.

Once you've done this, go to the **Options button**, and under the Charts tab and the Chart files tab, click add directory and navigate to the subdirectory you created above to add those charts.

You can manage the display in two places. Under the **Options button** and the Display tab, you can manage how the display refreshes. I basically haven't messed with this or needed to. Under the Vector Chart Display tab, you can manage what information from the chart file is shown.

The **Create Route button** (pencil and segmented line) lets you plot a planned route. Clicking on the icon closes the buttons and gives you the "pencil" to start plotting your route. The route is a series of points from your launch to your destination. Each leg shows you the true bearing, distance in nautical miles, and coordinates and cumulates the total distance. Clicking on the Route and Mark Manager (set of papers) let's you look at planned routes you've laid out, give them names, and get more info, like ETA's to waypoints at the planned speed. This can help you plan a paddle, including the distance covered, where you should be looking for landmarks, and an approximate time frame at an assumed rate of speed. You can use the Waypoints tab to create a new point of interest (POI) that may or may not be on your planned route and label it. For example, you can mark something to point out as you paddle past, or mark a good lunch spot. Click on the chart where the POI is located, right click for properties and you can change the symbol used. Then click on the Waypoints tab to fill in the name of the POI and other info. As usual, the plans are only good until you actually launch!

On the example I created here, I've planned a trip in the vicinity of the mouth of the St. Mary's River, launching at the St. George Ramp (Piney Point Recreation Area) and proceeding down St. George Creek to Russell Point, then across the creek mouth and up the St. Mary's River to Cherryfield Point, Edmunds Point, Windmill Point, Chancellor Point, and on to our destination at St. Mary's City. [You may need to change the zoom on your .pdf app to see the detail in these charts and tables better] The properties are shown in the table. Ignore the first waypoint as it is from your vessel's assumed location, which is off the chart.

Look closely at the chart and you will see two POI I added, an airplane for Webster Field, and a coffee cup icon at Chancellor's Point for a lunch stop. They are points of interest and not part of the waypoints for the route.

The final basic operation is to print the chart and any associated route planning. Clicking the Printer icon gives you choices of which printer, number of copies, etc. You may want to print to a .pdf file and save it to your library of charts. It can be printed to paper from the .pdf file. You can print the information in the Routes and Markers tab by looking for the Print button on the properties tab.

I hope this is useful for planning kayak trips. Send me your feedback at heimlichfamily@comcast.net.