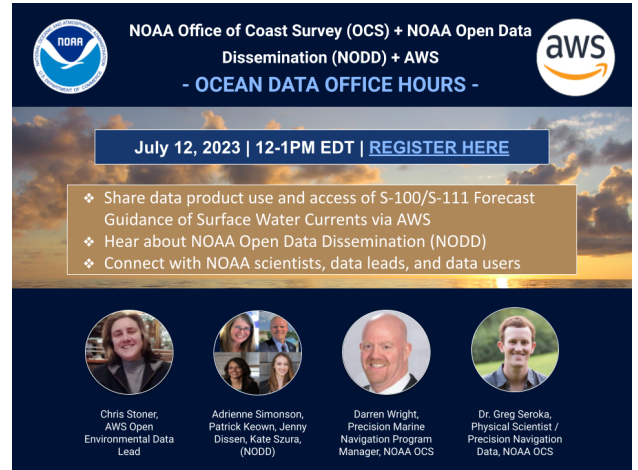


**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours**
July 12, 2023 | 12-1pm

TO: NOS NODD AWS Office Hours Participants
DATE: 12 July 2023 | 12-1pm EDT
FROM: Julia Powell, Darren Wright, Dr. Greg Seroka (NOAA Office of Coast Survey) Adrienne Simonson, Jenny Dissen & Kate Szura (NOAA Open Data Dissemination Engagement and Communication)
SUBJECT: Responses to Questions from S-111 Office Hours



Dear Colleagues,

Thank you again for your tremendous contribution during the NOS NODD AWS Office Hours. Your data related questions and comments raised during the discussion were heard and noted by NOAA.

This document provides brief responses to questions that were identified during the registration and that were raised during the discussion. Names and attributions of individuals and their affiliation have not been documented, unless it is a NOAA speaker.

We recognize the importance of continued engagement and collaboration, and invite ongoing comments via our emails.

Thank you,
Julia, Darren, Greg (Office of Coast Survey)
Adrienne, Jenny, Kate (NODD Engagement and Communication)

Contents for the Summary Notes

- [1. General Agenda of the Webinar](#)
- [2. Questions and Responses](#)
- [3. Office Hours Organizing Team](#)
- [4. Poll Results](#)
- [5. Resources / References](#)

**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours**
July 12, 2023 | 12-1pm

1. General Agenda of the Webinar

OUTLINE FOR THE DISCUSSION

- 12:00 - 12:08 Brief Introductions by NODD, OCS and AWS
- 12:08 - 12:30 Overview of S-100 Model & S-111 Forecast Guidance of Surface Water Currents
- 12:30 - 12:40 Invited Comments by Users of S-100/S-111 via the Cloud
- 12:40 - 12:55 Open Discussion (Please use “Raise Hand” or the chat to raise questions)
- 12:55 - 1:00 Summary Comments/Closing Remarks/Next Steps

2. Questions and Responses

The questions below were identified as part of the registration process and during the Office Hours discussion. Responses are provided in brief where the NOAA team felt information was available.

QUESTIONS RAISED FROM REGISTRATION FORM

QUESTION FROM REGISTRATION	RESPONSE
What frequency of surveys is required to produce relevant “precision marine navigation” data? And what funding mechanism is in place for NOAA to be able to produce charts that support at the S100 standard ?	<p>For bathymetry, a lot of this is dependent upon the characterization of the seafloor. For example, a silty seafloor will need surveys at a greater frequency than one that has a hard bottom. Part of our process is to ingest the best available bathymetry from various partners and turn that into a product for use in navigation systems. For other products, such as S-111 surface currents and S-104 water levels these are derived based on forecast models.</p> <p>A few years back we received a small adjustment to base appropriations to begin to develop products and begin building the program out and we continue to advocate within our agencies’ budget process for additional funds to establish an operational Precision Marine Navigation program to provide an operational product suite to the maritime community.</p>
Timeline	<p>We are aiming for the International Maritime Organization January 2026 deadline for when Electronic Chart Display and Information Systems (ECDIS) can start to utilize S-100 products. However, we are making test and evaluation data available in the interim as we build out the system.</p>

**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours**
July 12, 2023 | 12-1pm

<p>Just here to learn more about NOAA sharing product updates and information on data access via the cloud</p>	<p>Future user questions can be sent to nodd@noaa.gov for general data questions or marinenav.team@noaa.gov for specific S-100/S-111 questions.</p>
<p>Global availability and resolution of S-111</p>	<p>NOAA is exploring releasing S-111 based on its global models, but this would be at a low resolution. In addition, NOAA works within the international community and the global coverage for S-111 may be split up between various other countries. We already provide S-111 Global Real-Time Ocean Forecast System (RTOFS) forecast guidance at about 8.5 km resolution, for the U.S. East and West Coasts. Resolution of S-111 HDF5 datasets from the other Operational Oceanographic Forecast Systems (OFS) are typically 300 m, 500 m, 700 m, or 4 km, depending on the location.</p>
<p>Update cycle and archival of this information</p>	<p>The Operational Oceanographic Forecast Systems (OFS) are typically run 4 times per day (West Coast OFS and Global RTOFS run once per day). The S-111 datasets are provided at these update cycles as well. For now, 2 months of S-111 datasets are archived on the cloud.</p>
<p>Is the NODD working towards a more interactive data model allowing for querying of data instead of files? For example, AWS Redshift may be a solution towards this capability</p>	<p>NODD and OCS is interested in understanding interest from customers on activities like this. Please let us know how this could be beneficial to you and the broader community of users. Ultimately, this will be up to AWS and their appetite to support these services and public offerings related to the Open Data on AWS Program.</p> <p>Question opened during the call to Chris Stoner from AWS. Chris: From AWS perspective, redshift may be an opportunity. Some open-source systems like STAC may be more helpful to draw a bounding box around the data. I think that is the use case here. If that is what you're looking for, opportunities are being explored within SageMaker.</p> <p>User feedback in chat: "Data sets by bounding box, or broken out by waterway geometry would be useful".</p>
<p>S-100 product output data file formats</p>	<p>S-100 is a framework standard that defines different aspects as to what is allowed within an S-100 based product specification. It is at the product specification level that defines what type of output file format and other things that may be used within that product. However, S-100 based product specifications are</p>

**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours**
July 12, 2023 | 12-1pm

	restricted to using what is defined by the S-100 framework and thus only the following encoding formats are allowed: ISO 8211, HDF-5 and GML. It should also be noted that you have to use the instance that is defined within S-100 as there are some extensions to those encodings that make it suitable for the navigation and hydrographic community.
Interested in use of AWS Open Data Registry if relevant...	Link to S-111 on AWS Registry of Open Data: https://registry.opendata.aws/noaa-s111/
S-100 data in GRIB format?	S-100 does not allow for the GRIB encoding so it would not be used for an S-100 based product.
Automated tide zone access	Tide zones, or tidal zones of influence, would likely fit within the S-104 water levels Product Specification. S-104 is looking to support this type of information in subsequent releases/updates.
S-100 Products	Products will be reviewed during the presentation portion of the Office Hours. Presentation is available on the website and will be included with the notes sent out.
How is NOAA managing data capacity in the cloud as data continues to be collected and derivatives of those datasets?	NODD is intended to provide improved access to the most popular and critical NOAA datasets. In partnership with the cloud service providers (CSPs) and the data owners, NODD looks to metrics to determine data use and also incorporates user feedback to determine which datasets should be provided, as well as any retention policies. So users will not find all of NOAA's tens of thousands of datasets via NODD. However, NODD's management of data capacity in the cloud will continue to evolve as we work with our partners to consistently improve the user experience.
Readiness of data, and when we will see roll out of the larger areas in north Atlantic and Pacific like we have seen examples of.	We provide S-111 Global Real-Time Ocean Forecast System (RTOFS) forecast guidance at about 8.5 km resolution, for the U.S. East and West Coasts. NOAA is exploring releasing S-111 based on its global models, but this would be at a low resolution. In addition, NOAA works within the international community and the global coverage for S-111 may be split up between various other countries.

**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours**
July 12, 2023 | 12-1pm

Will this include access to operational model output?	Yes, Operational Oceanographic Forecast Systems (OFS) model output (e.g. surface current forecast guidance) is provided in the NOAA S-111 datasets.
Small business opportunities in AI/ML Space	Link to NOAA's SBIR (Small Business Innovation Research) website for users to learn more about the SBIR program: www.techpartnerships.noaa.gov/SBIR
Priorities in NOAA innovation, data needs, hard problems, etc.	NOAA has funded the Precision Marine Navigation Program to take advantage of the great navigational information that NOAA offers (water level, currents, electronic charts and weather) and put it into an internationally standard format (S-100) in the cloud for easier access by electronic charting system manufacturers and others to create integrated displays for safer marine navigation.
Current modeling or characterization in the salish sea	NOAA is planning on releasing the Salish Sea & Columbia River Operational Forecast System (SSCOFS), which will include forecast guidance of water currents, water levels, water temperature, and salinity. For more information on this model, please reach out to the NOAA Center for Operational Oceanographic Products & Services (CO-OPS). CO-OPS will also be hosting a virtual meeting on September 13-14, 2023 on the SSCOFS. Please register here .
NOAA Big Data Program (BDP) access to NOAA's open data on commercial cloud platforms through public-private partnerships	Links to S-111 on AWS Registry of Open Data (https://registry.opendata.aws/noaa-s111/) & the Amazon Sustainability Data Initiative (https://aws.amazon.com/marketplace/pp/prodview-x2iv4j4hncsvw) Link to NODD datasets list: https://www.noaa.gov/nodd/datasets

QUESTIONS / DISCUSSION FROM THE OFFICE HOURS

QUESTION	RESPONSE
Are these [data sets] assimilating High Frequency	The West Coast Operational Forecast System (WCOFS) does assimilate HF radar currents, satellite SST, and satellite altimetry water level data.

**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours
July 12, 2023 | 12-1pm**

Radar? (from chat regarding slide 20/21)	
Is there a plan for San Francisco Bay Operational Forecast System (SFBOFS) to assimilate HFR?	Requirements gathering by CO-OPS is ongoing. The user is encouraged to reach out to CO-OPS to learn more. Right now we have the West Coast Operational Forecast System (WCOFS) that assimilates HF radar current data.
Is there a plan to get the San Francisco model to assimilate in the SF Bay?	The user is encouraged to reach out to CO-OPS to learn more about their plan. At this time, we just have the West Coast Operational Forecast System (WCOFS), and believe there's a plan to develop and release a similar system for the East Coast, but agree that getting into the ports (e.g. SF Bay) definitely has value.
Is there a plan to provide surface currents at 1m depth? Most search objects/vessels drift at this depth (from Coast Guard Search and Rescue).	This also goes back to development at CO-OPS. May already be producing datasets with this info (please see https://registry.opendata.aws/noaa-ofs/), but for S-111, the focus is currently on 4.5 m below the water surface for navigationally-relevant surface currents. To note, in S-111 the data provider is able to provide surface currents at any depth, or any layer average, below the water surface.
Regarding the frequency of updates for S-100 datasets: what interval should we try to get this data at? How are we going to fund (find?) the surveys?	This depends on the type of data that we're producing. For currents based on model forecasts, we can go back 6-8 hours (i.e. the models are typically run every 6 hours). The goal is to ingest automatically and develop a process that we can ingest core data and turn it around. We don't want the end user to have to wait a month. We want to make the timeline as narrow as possible to get the data to the user. Right now users are getting updates quarterly.
Can you post the link to the HDF viewer?	https://www.hdfgroup.org/
A recent meeting with the Port of South Louisiana showed that they are interested in funding high bathymetry data. If we were to do that, could we provide the data?	That would go through our external source data process. The challenge in the Mississippi is the datums, which we are rapidly working on. Right now we are in a testing and development stage, developing infrastructure.

**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours**
July 12, 2023 | 12-1pm

<p>Could NOAA say something about data readiness? Production vs. Test Status.</p>	<p>We are in full test status right now. NOAA's biggest thing is resolving data issues in the lower MS river and working on API implementation on getting data automatically off AWS. NOAA is also tied to IHO and their standards development for their standards on op specifications. Specs are getting close to the operational model.</p> <p>NOAA has to update metadata, and just launched a project to get this updated.</p>
<p>For the USACE's part, some part of enabling NOAA's ability to process our hydrographic survey data lies within USACE metadata. We are working toward an ISO 19115 metadata standard. In the meantime, NOAA is forced to endure the handful of formats that are currently in use by our districts. Not an easy task. - USACE IENC/eHydro Program, Marine Information Specialist.</p>	<p>Metadata is not in standard format right now depending on the district's hydrographic survey. Working to standardize.</p> <p>May be delays in getting hydrographic survey information into the chart for this reason.</p> <p>NOAA has a tough road right now with the different formats and getting them into the chart.</p>
<p>Is there any reason why the HDF5 format is used instead of netCDF?</p>	<p>Leveraging international standards and what is specified in the S-100 framework standard. HDF5 is for the gridded bathy format, and also used for surface currents and water levels.</p> <p>Don't have every format because systems need to implement, implementation costs high for many types of format, cost then gets passed to the end user. 3 different encoding possibilities. HDF5 is similar to netCDF, netcdf4 uses a subset of HDF5.</p> <p>User community did not propose GRIB as a format so NOAA will not implement this format.</p>
<p>Standard way to chart bridge height is lowest at mean high water. Many decisions are based on these numbers, but there is no easy way for users to see</p>	<p>There is an S-100 standard in S-412 where you can do observations. There are plans to incorporate real time info here (as well as in S-104 water levels). The initial focus is on model output data, but we also want to pull real-time data in, eventually.</p>

**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours
July 12, 2023 | 12-1pm**

<p>what that means. Is there a way with this new standard to do real-time info processing from the S100 dataset for real-time river stage level? Provide numbers in real-time fashion?</p> <p>Lack of real-time comes across as a false display of info.</p>	<p>In an S-100 world, will need to encode all bridges into water data for water level up and down with the bridge.</p> <p>Observations will be incorporated for 2026. Right now it is the model data. It is about all of the data on the same datum. We don't want pilots to have to do complicated datum calculations in their head.</p> <p>A user stated that they would prefer a different view - example that a user could scroll over and a pop-up window could appear for bridge variance. NOS OCS noted this request as a topic to bring up for user accessibility of the data.</p>
<p>User Comments:</p>	<p>-Thank you so much for such an informative office hours. This is a new program for me to learn about. I love the bathymetry and water level models Darren showed at the beginning.</p> <p>-Thanks so much for the presentation folks, it's been really great to see the work you guys have been up to in the S-100 space.</p>

3. Office Hours Organizing Team

Name	Title
Julia Powell	Navigation Services Division Chief
Darren Wright	Precision Marine Navigation Program Manager
Dr. Greg Seroka	Physical Scientist / Precision Navigation Data
Adrienne Simonson	NODD Director
Patrick Keown	NODD Program Manager
Jenny Dissen	NODD Engagement Lead / NCICS / State University
Katelyn Szura	NODD Communications Lead
Jonathan Brannock	NODD Lead Cloud Software Engineer /NC State University
Otis Brown	Director, NC Institute for Climate Studies (NCICS) / NC State University
Chris Stoner	AWS Open Environmental Data Lead

**NOAA Office of Coast Survey (OCS) + NOAA Open Data Dissemination (NODD) +
AWS Open Data Office Hours**
July 12, 2023 | 12-1pm

4. Poll Results

Poll 1		
Question	Answer	Count
Are you aware that NOAA's marine navigation data is/will be available via the cloud?	Yes	24
	No	8
	I Do Because of the Office Hours	6

Poll 2		
Question	Answer	Count
My primary goal for attending today is:	Technical use and access of S-111 data	14
	To learn about cloud access to date (e.g. NODD Program)	13
	Meet and engage with NOAA staff scientists	4
	Learn about AWS access and tools	1

5. Resources / References

- [NOAA Open Data Dissemination | NODD Email](#)
- [NOAA Office of Coast Survey \(OCS\) | OCS Email](#)
- [Office of Coast Survey News](#)
- [S-111 Surface Water Current Forecast Guidance](#)
- [AWS Registry of Open Data NOAA S-111 Surface Water Currents Data](#)

Thank you to our participants for engaging in this discussion!