

ARHC4-2.5

UNITED STATES OF AMERICA

National Report

**4th Meeting of the Arctic Regional Hydrographic Commission
(ARHC)**

Portsmouth, NH, USA

January 2014

NOAA, Office of Coast Survey
National Geospatial-Intelligence Agency
Naval Meteorology and Oceanography Command

<http://www.nauticalcharts.noaa.gov>
<https://www1.nga.mil>
<http://www.navmetocom.navy.mil>

1 Hydrographic Office/Service

This document provides specific information pertaining to individual products and services of primary interest to the Arctic Regional Hydrographic Commission (ARHC) region.

U.S. domestic and international hydrographic services in the region are primarily conducted by three government agencies: The National Oceanic and Atmospheric Administration's (NOAA) Office of Coast Survey (OCS), the National Geospatial-Intelligence Agency (NGA), and the Naval Meteorology and Oceanography Command (U.S. Navy). A national-level overview of the services, mandates, activities and priorities of these three agencies is provided in Appendix A of this report.

Please consult both the National Report and the Appendix for complete information about national programs and/or other regions. Any specific questions should be directed to U. S. Hydrographic Office representatives or the relevant hydrographic component.

It is important to note that the U.S. Arctic Research and Policy Act (ARPA) defines the Arctic for the United States as illustrated in the Figure 1.

Arctic Boundary as defined by the Arctic Research and Policy Act (ARPA)

All United States and foreign territory north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas, including the Arctic Ocean and the Beaufort, Bering and Chukchi Seas; and the Aleutian chain.¹



Acknowledgement: Funding for this map was provided by the National Science Foundation through the Arctic Research Mapping Application (amap.org) and Contract #0520837 to CH2M HILL for the Interagency Arctic Research Policy Committee (IARPC).

Map author: Allison Gaylord, Nuna Technologies. May 27, 2009.

1. The Aleutian chain boundary is demarcated by the 'Contiguous zone' limit of 24-nautical miles.

Figure 1: Arctic Boundary as defined by the Arctic Research and Policy Act.

The International Hydrographic Organization defines the ARHC as shown in Figure 2.

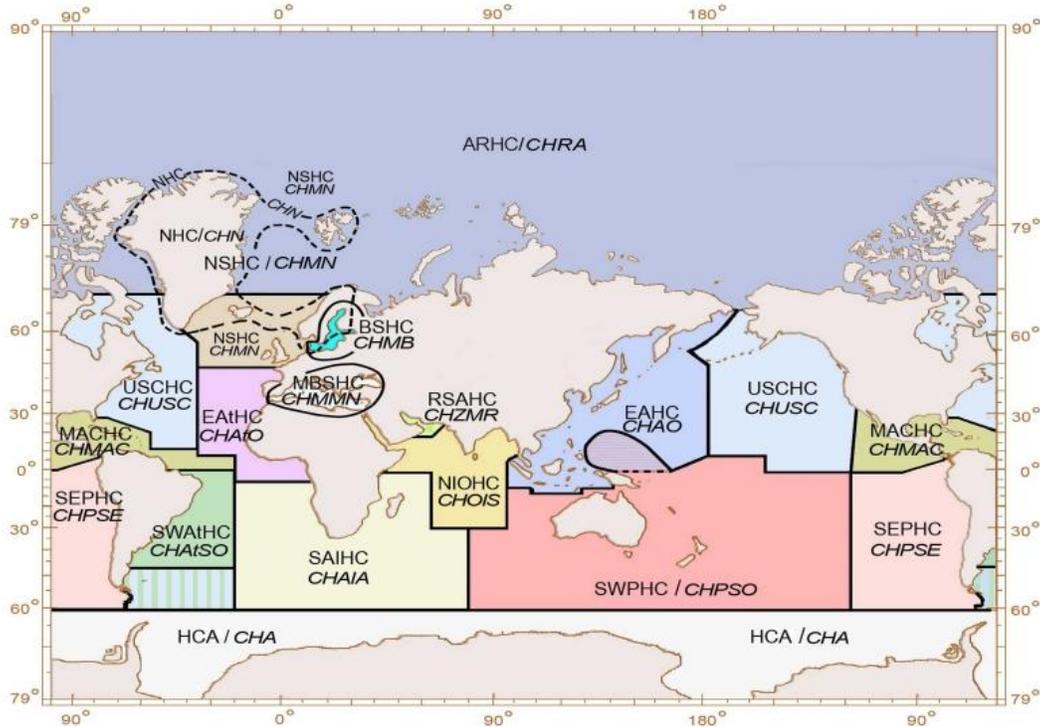


Figure 2: Boundaries of the Regional Hydrographic Commissions.

2 Surveys

A statutory mandate authorizes NOAA to provide nautical charts and related hydrographic information for the safe navigation of maritime commerce as well as providing basic data for engineering, scientific, and other commercial and industrial activities within the nation’s 3.4 million square nautical mile (11.7 million square kilometers) Exclusive Economic Zone (EEZ). The U.S. Navy surveys waters outside the United States.

The *NOAA Hydrographic Survey Priorities* (2012 edition)

<http://www.nauticalcharts.noaa.gov/hsd/NHSP.htm> defines the methodology that NOAA uses to identify survey priorities across the U.S. EEZ. In the mid-1990’s, based on vessel traffic, and the vintage of the existing coverage, all U.S. navigable waters were ranked as having a critical survey need, having a lower priority (scaled 1 – 5), or already having full bottom coverage.

While NOAA has been steadily surveying these areas since their designation, recent developments (like the potential opening of an Arctic passage to commerce) have forced NOAA to re-evaluate their survey priorities by defining a special category for these “Emerging Critical” areas.

~~The Hydrographic Surveys Specifications and Deliverables, <http://www.nauticalcharts.noaa.gov/hsd/specs/specs.htm> provide the requirements necessary to ensure survey data meets Coast Survey charting standards. It is updated each year. Those who acquire hydrographic survey data in accordance with NOS specifications should use the current version.~~

NOAA survey priorities for U.S. waters in the ARHC region are summarized in square nautical miles in Table 1 and square kilometers in Table 1 - metric.

	Navigationally Significant	Critical Areas	Emerging Critical
Alaska (US Arctic)	324,465 nm ² (242,400)	4,169 nm ² (1,774)	3,540 nm ² (none)
National Total (8 regions)	511,051 nm ²	14,055 nm ²	5,601 nm ²

Table 1: NOAA Survey Priorities (U.S. EEZ) in the Arctic Region

	Navigationally Significant	Critical Areas	Emerging Critical	Completed (post 1993 survey)
Alaska	1,114,306 km ²	14,317 km ²	12,157 km ²	66127 km ²
National Total (8 regions)	1,755,097 km ²	48,268 km ²	19,235km ²	133,981 km ²

Table 2-metric: NOAA Survey Priorities (U.S. waters) in the Arctic Region

NOAA Hydrographic Survey Priorities - Alaska 2012

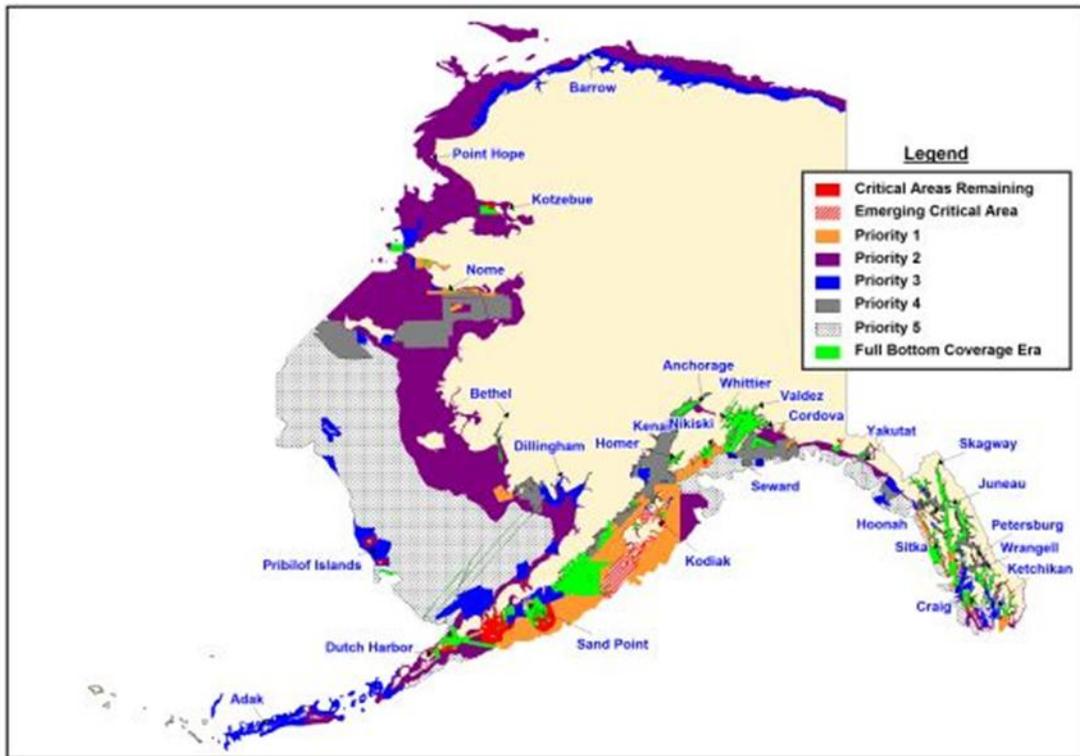


Figure 3: NOAA Hydrographic Survey Priorities- Alaska (2012)

The U.S. Navy surveys waters outside the United States and in the territorial waters of other nations through diplomatic and bilateral agreements.

2013 Survey Plans



Figure 3: NOAA Ship *Fairweather* in the Gulf of Alaska with namesake Mt. Fairweather.

In 2013, the NOAA Ship *Fairweather*, the primary in-house vessel for Arctic surveying, was scheduled to stay in drydock for maintenance, however NOAA's Hydrographic Surveys Division has contracted two surveys in the Arctic totalling 348 nm² (1,194 km²).

Contractors also acquired data around the Krenitzin Islands; this project was a continuation from prior years. While this area is outside the IHO definition of the Arctic it is within NOAA’s definition (see Figure 1 Arctic Boundary as defined by the Arctic Research and Policy Act), and this covers a critical hub for U.S., Asian, and Arctic transportation.

This project covered 104 nm² (357 km²) of survey areas. Located near Dutch Harbor and Unimak Pass, this area gets traffic going to and from Asia (through Unimak Pass), fishing vessels, ferries supporting local communities, support vessels for the oil and gas industry, and vessels bringing supplies and fuel for local communities.

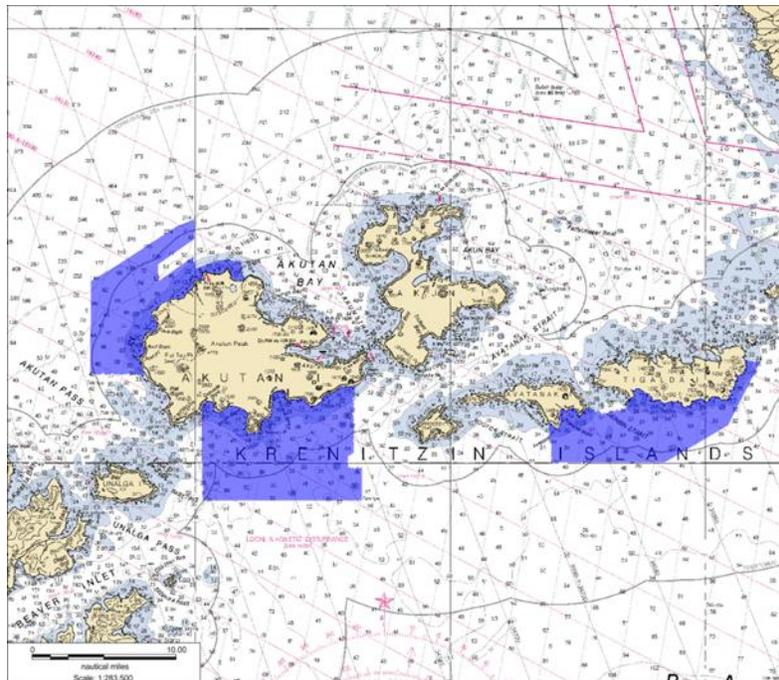


Figure 5: Survey area around the Krenitzin Islands, 2013.

For further details, please contact the Office of Coast Survey, Hydrographic Survey Division Chief, Mr. Jeffrey Ferguson at Jeffrey.Ferguson@noaa.gov.

3 New Charts and Updates

NOAA Charts

NOAA has identified the need for additional chart coverage in the Arctic and has developed the *Office of Coast Survey Arctic Nautical Charting Plan* (Feb 15, 2013) to address this need. This document provides detailed plans for the layout of additional nautical chart coverage and describes the requisite activities needed to build and maintain these charts. The plan can be downloaded at

http://www.nauticalcharts.noaa.gov/mcd/docs/Arctic_Nautical_Charting_Plan.pdf.

ENC and Raster Charts (U.S. domestic waters)

The U.S. produces 36 ENC charts in U.S. waters of the ARHC region and 39 raster charts:

ENC Band	Number of U.S. Charts of domestic waters in ARHC region
1	2
2	2
3	2
4	0
5	30

Scale	Number of US Charts of domestic waters of the ARHC Region
1:1,000,000 and above	4
1,000,000 and 51,000	5
1:20,000 to 51,000	30

The U.S. has plans for thirteen new charts in the Arctic region (see Figure 6) and produced its first new Arctic chart of Kotzebue Sound in 2012 (see Figure 7).

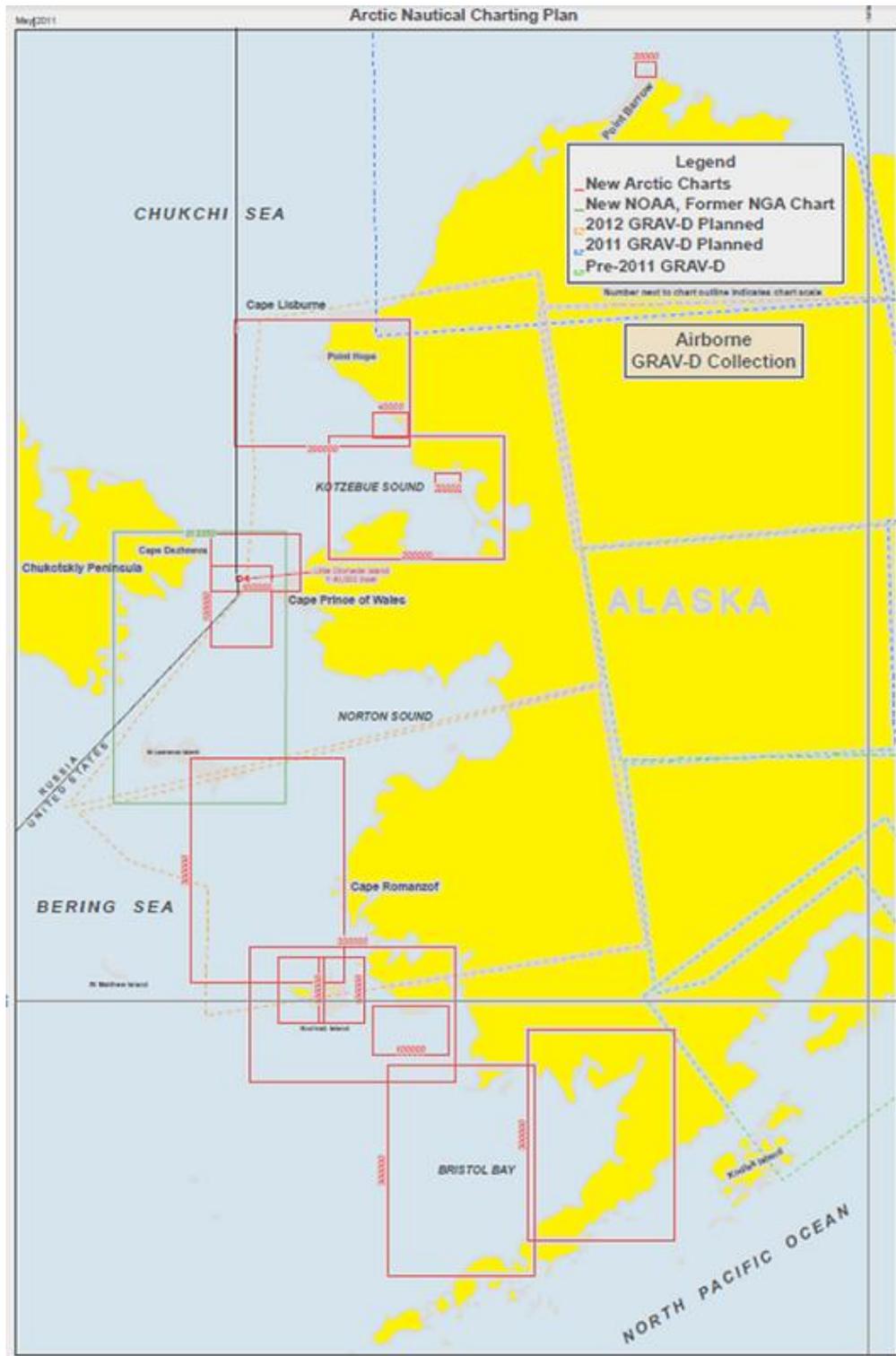


Figure 6: NOAA Charts and gravity surveys (Grav-D) plans for 2013 and beyond

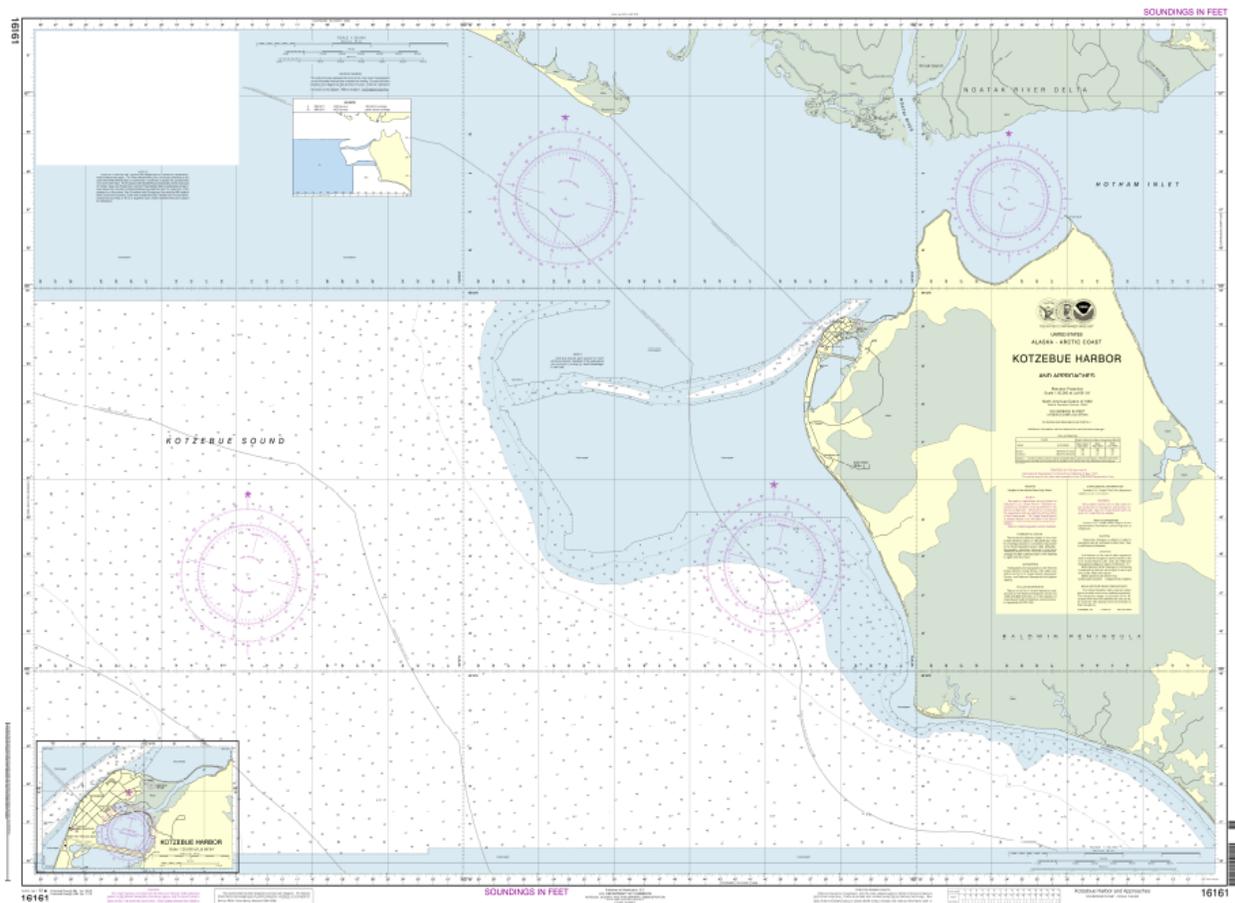


Figure 7: NOAA Chart 16161- Kotzebue Sound, produced from 2011 survey data

ENC Ovelaps

NOAA is actively discussing with the Russian Federation and Canada to address remaining ENC overlap issues (see Table 2).

Band	U.S. Chart	Chart Overlaps
2	US2AK92M (1:700,000)	RU2OGT9 (1:700,000)
2	US2AK91M (1:700,000)	CA273357 (1:250,000)
3	US3 AK80M (1:400,000)	RU3OH0B0 (1:180,000)
	US3AK89M (1:315,300)	RUSOE090 (1:180,000)
		RU3O90B9 (1:180,000)

Table 2: U.S.-Russian Federation/Canada ENC Overlaps

NGA Charts

NGA produces a number of charts for the Arctic region in their subregions 1,3,4 and 9, but NGA has withdrawn many of its charts from public sale. The only charts NGA will continue to distribute to the public are those where NGA is the primary charting authority. These are specifically areas where U.S. conducts the surveys, compiles and issues the chart, and there is no functioning national authority or where NGA has specific authority (e.g. Trust Territory of the Pacific).

INT Charts

INT Chart 814 is produced by the United States and includes a portion of the ARHC between Alaska and the Russian Federation to 68°N. INT Chart 814 corresponds to U.S. National Chart 514. The newest edition is Jan /2004 and is at 1 to 3.5 million scale.

ENC distribution

U.S. ENCs are distributed through PRIMAR, UKHO, Maris, Jeppessen, Chart World, Oceangrafix (NGA) and directly through the NOAA at www.nauticalcharts.noaa.gov.

4 New Publications and Updates

United States 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 regionally focused volumes. Coast Pilot 9 provides information covered by the ARHC.

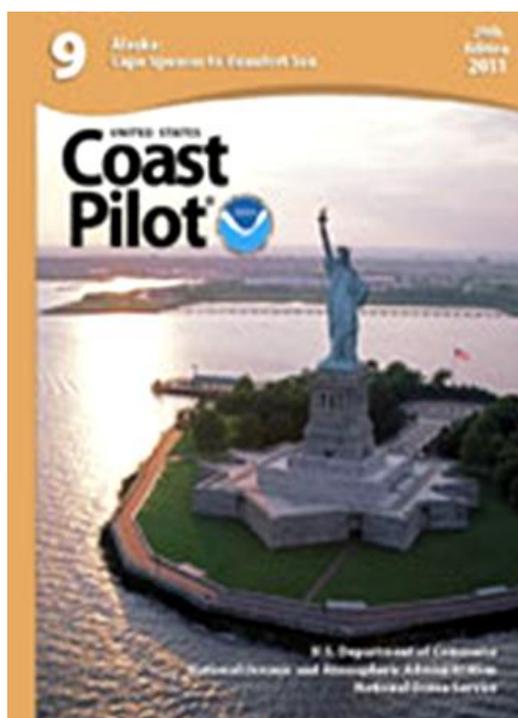


Figure 8: U.S. Coast Pilot 9

The United States Coast Pilot now offers completely updated publications every week. The new PDF version, available free at <http://www.nauticalcharts.noaa.gov/nsd/cpupdates.htm>, automatically incorporates the latest revisions.

Updated Print on Demand (POD) Coast Pilot volumes are available for sale by authorized agents http://www.nauticalcharts.noaa.gov/staff/charts.htm#USCP_POD.

NOAA will continue to print new editions annually for customers who prefer the traditional hardcopy book. The 31st edition of Coast Pilot 9 was published in 2013 and is available in PDF, HTML, and XML digital format¹ at

http://www.nauticalcharts.noaa.gov/nsd/coastpilot_w.php?book=9.

Additional information about the Coast Pilot can be found in Appendix A of this report.

Sailing Directions

Sailing Directions are published by the U.S./NGA in 42 Planning Guide and Enroute volumes as part of a global portfolio of publications. Sailing directions and digital updates can be downloaded from the NGA Maritime Safety website,

http://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_62.

Four volumes of Sailing Directions cover the ARHC region, as listed in **Table 3**.

Publication	Title	Edition Date
Sailing Directions 180	Planning Guide for the Arctic Ocean	10 th Ed 2013
Sailing Directions 181	Greenland and Iceland	11 th Ed 2010
Sailing Directions 182	North and West Coasts of Norway	12 th Ed 2013
Sailing Directions 183	North Coast of Russia	10 th Ed 2013

Table 3: Sailing Directions covering the ARHC Region

Additional information about NGA Sailing Directions can be found in Appendix A of this report.

List of Lights, Radio Aids and Fog Signals

¹ HTML and XML formats of the Coast Pilot are experimental and NOT TO BE USED FOR NAVIGATION.

The NGA *List of Lights, Radio Aids and Fog Signals* is published in seven volumes and contains more complete information about the navigational aids than can be conveniently shown on nautical charts. All of these publications and their digital updates are available to the public and are posted at the NGA Maritime Safety website at

http://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_62.

Three volumes of “List of Lights” cover the ARHC region as shown in Figure 9 and Table 4.

Publication	Edition Date
List of Lights Pub. 115 Norway, Iceland and Arctic Ocean	2013
List of Lights Pub. 110 Greenland, the East Coasts of North and South America and the West Indies	2013
List of Lights Pub 111 The West Coasts of North and South America, Australia, Tasmania, New Zealand, and the Islands of the North and South Pacific Oceans	2013

Table 4: List of Lights, Radio Aids, and Fog Signals Covering the ARHC Region

Additional information about the NGA *List of Lights, Radio Aids and Fog Signals* can be found <http://msi.nga.mil/NGAPortal/MSI.portal>.

5 Maritime Safety Information (MSI)

The U.S./NGA produces navigation warnings in the region of the ARHC called HYDROARCs.

These are broadcast and uploaded to <http://msi.nga.mil/NGAPortal/MSI.portal>. the NGA website in the form of both “Broadcast Warnings”

(http://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_63) and “HYDROARC Reports”

(http://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_portal_page_66)

Notice to Mariners are issued for NOAA charts by the U.S. Coast Guard. NGA produces Notices to Mariners for NGA charts in the area.

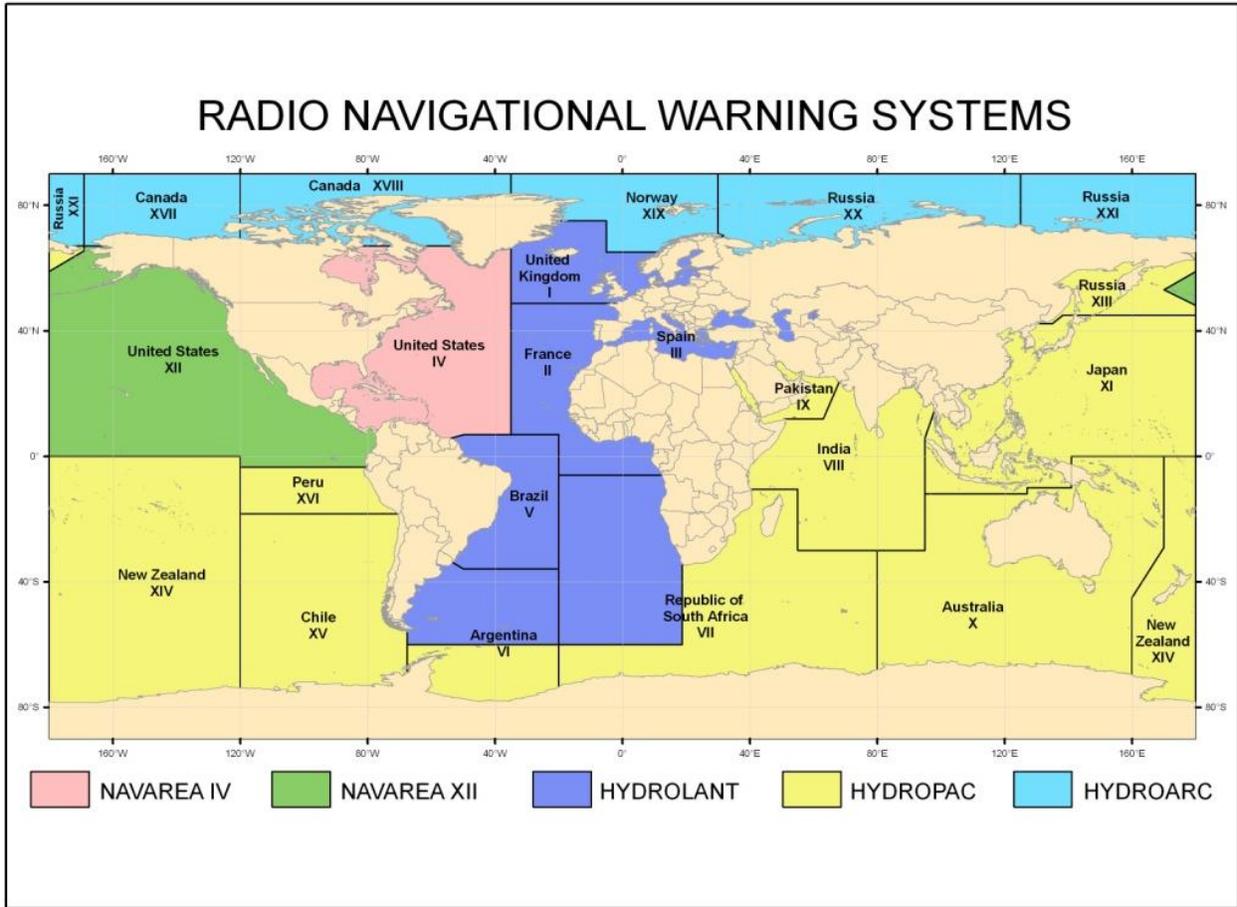


Figure 9: NAVAREA Limits

6 C-55 Update

The U.S. updated its C-55 information with the IHO in Feb 2013. For Region A, U.S. Alaska and Arctic (including the Aleutian Islands), the U.S. reported:

The status of nautical charting with the limits of the EEZ of dependent territories:

Purpose/Scale	A	B	C
Offshore passage/small	100%	100%	82%
Landfall and Coastal passage/Medium	100%	100%	100%

Approaches and Ports/Large	100%	100%	67%
Percentage of Group A showing depths in meters	2.1%		
Percentage of Group A referenced to a satellite datum	100%		

Navigational Information (S-53)

Service	Yes/No
Local Warnings	Yes
Coastal Warnings	Yes
NAVAREA Warnings	Yes
Informational on Ports and Harbours	Yes

7 Capacity Building

A list of U.S. institutions, which provide hydrographic training opportunities, is provided in the Table 4 of Appendix A of this report.

The United States is an active participant in the IHO Capacity Building Sub-Committee (CBSC) and the U.S./NGA directly supports the IHO Maritime Safety Information (MSI) training course. An overview and description of NGA’s training activities in the field of Marine Safety Information (MSI) is provided in Section 7 of Appendix A of this report.

8 Oceanographic Activities

NOAA's Center for Operational Oceanographic Products and Services (CO-OPS)

CO-OPS maintains two tide stations in the ARHC region of Alaska from Point Hope to Beaufort Sea located at Red Dog Dock and Prudhoe Bay. Data from these stations, and all U.S. Tide Data Stations, can be found at <http://tidesandcurrents.noaa.gov/stations.html?type=Water+Levels>.

GEBCO

The United States participates on the IOC-IHO GEBCO Guiding Committee and hosts the IHO Data Centre for Digital Bathymetry at NOAA's National Geophysical Data Center in Boulder, Colorado. The IHO DCDB has recently added an arctic view to its on-line map viewers (<http://maps.ngdc.noaa.gov/viewers/bathymetry>). GEBCO remains actively interested to expand the currently available bathymetric data for the Arctic and distributes these data freely at <http://www.ngdc.noaa.gov/mgg/bathymetry/arctic/>.

Shoreline Mapping

Most of the shoreline in the Arctic along Alaska's northern and western coasts has not been mapped since 1960, if ever, and confidence in the shoreline depicted on the region's nautical charts is extremely low. Less than 10% of Alaska has contemporary shoreline data and less than 1% is mapped annually. In FY2013 NOAA compiled approximately 433 miles / 697 km of Arctic shoreline and 1212 miles / 1950 km of Alaska (including arctic) shoreline. At this time, there are no plans to use NOAA aircraft to conduct large area surveys; however use of the aircraft may be required in port areas or areas in need of more detailed charts.

In the last 10 years eight ports have been updated: Kivilina/Red Dog Mine, Valdez, Anchorage, Dutch Harbor, Ketchikan, Petersburg, Kodiak and Juneau. NGS has also provided shoreline coverage (full or partial) for five Alaska National Parks: Bering Land Bridge, Cape Krusenstern, Glacier Bay, Kenai Fjords and Wrangell-St.Elias.

9 Other

CORS

NOAA's National Geodetic Survey (NGS) manages a national Continuously Operating Reference Station (CORS) network of highly accurate GPS receivers that continuously collects data broadcast by the Global Navigation Satellite System. There are almost 100 active CORS sites in the CORS network for Alaska. However, CORS sites serving the Alaskan Arctic are very few, with only nine sites along the Aleutian Chain, six in the Arctic coastal areas of the Bering Sea, and seven serving the North Slope.

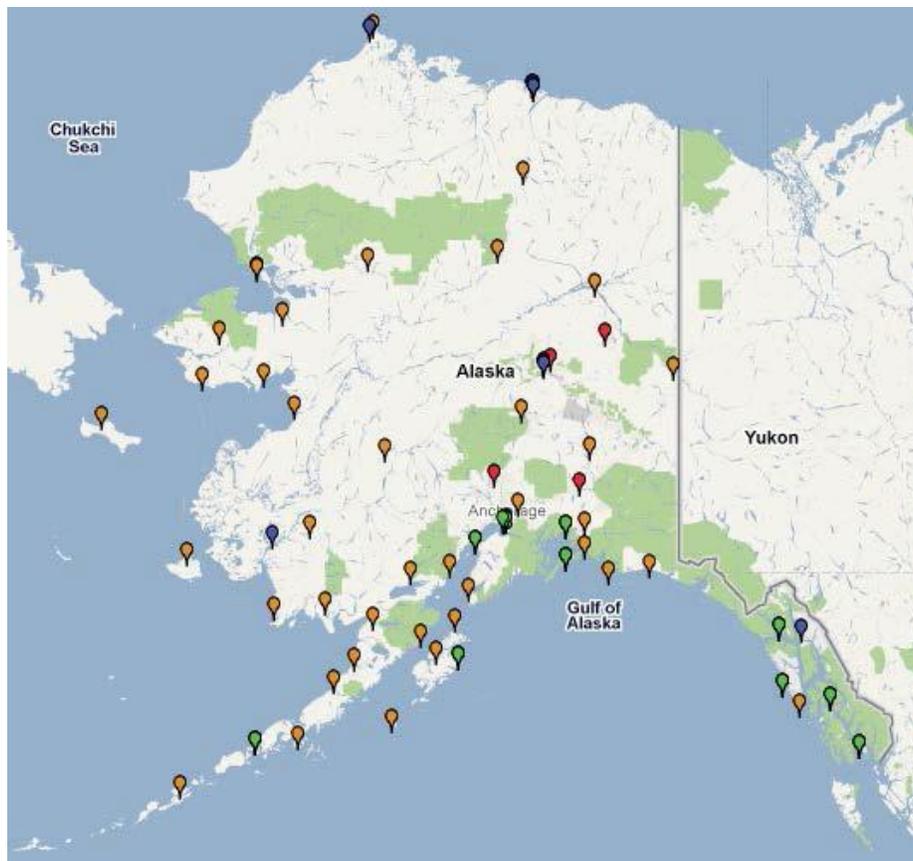


Figure 8. NOAA's Alaska Continuously Operating Reference Stations (CORS) receiver installations.

Other Accomplishments:

- Developed temperature and salinity regional climatologies of the Arctic Ocean at resolutions of 1 degree and 1/4 degree, and at annual and seasonal temporal resolutions.
- Continued GRAV-D airborne surveys in Alaska to improve geodetic control and allow for centimeter-level elevation measurement accuracy vice current state of one meter or worse.
- Completed determination and database loading of county attributes for more than 53,000 survey mark positions for the state of Alaska. In the Arctic, as well as the rest of Alaska, NOAA now attributes survey marks by specific borough, where before these marks were just identified as in “Alaska.” This made searching for published mark locations difficult and unwieldy. Consolidating all the Alaska positions into their respective boroughs promotes efficiency and usefulness to surveying community users.
- Released a new nautical chart for Kotzebue Harbor and Approaches, Chart 16161 which addresses a pressing need for the Arctic regional transportation hub for in northwest Alaska. The new chart, produced from data acquired last year by NOAA Ship *Fairweather*, will help mariners protect life and property in the coastal waters of Kotzebue.
- AOOS conducted STAMP program (Spatial Tools for Arctic Mapping and Planning) for long-term planning and management needs in Arctic. Project underway. Data tool will incorporate physical and biological data sets.

