U.S. Arctic Nautical Charting Plan

Draft for Public Comment – Comments due by Oct 1, 2015 – See Page 7

A Plan to Support Sustainable Marine Transportation in Alaska and the Arctic

Office of Coast Survey
Marine Chart Division

June 5, 2015
Coast Survey Steamer *Hassler*
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Forward for the 2015 Edition ( Don't skip this! )

For the first time, the U.S. Arctic Nautical Charting Plan now provides information about existing, recently added, and proposed new Electronic Navigational Chart (ENC) coverage in U.S. Arctic waters. Existing coverage is shown in a series of graphics depicting the extent of different usage (or scale) bands of ENC coverage. Recently added and proposed new ENC coverage is based on existing or proposed raster ("traditional paper") chart footprints. The final extent and display scale of the ENCs may vary slightly from their corresponding raster chart counterparts.

This edition of the U.S. Arctic Nautical Charting Plan also provides a sharper focus on the descriptions of recently published first editions of charts proposed in the original 2011 plan and ongoing plans for new nautical chart coverage. Details about the various sources of data that go into making a nautical chart have been removed. The primary purpose of the plan is to propose new chart coverage in the Arctic and to encourage feedback from stakeholders on the extent, scale and other aspects of the proposed new coverage.

Please be sure to read the new "How to Use This Document" section and "How to Provide Feedback on the U.S. Arctic Nautical Charting Plan." These provide details on how information in the document is organized and how you can submit questions, comments and recommendations regarding the Plan.

1 "Traditional" chart formats include the centuries old paper nautical chart, as well as digital images of paper chart information, such as Raster Nautical Charts (RNCs) and Portable Document Format (PDF) versions of charts. These forms, made up of dots of ink or pixels on a display screen, are collectively known as "raster charts." The "new" or "non-traditional" format of NOAA nautical charts is the Electronic Navigational Chart (ENC). ENCs, made up of digital files that describe chart features using geographic coordinates for points, lines and areas, are in "vector," as opposed to "raster," format. More information about the differences between raster and vector charts is available at http://www.nauticalcharts.noaa.gov/mcd/learn_diffRNC_ENC.html.
How to Use this Document

This document provides information about existing, recently released, and proposed new charts and ENCs in the following three sections:

1. Proposed New Electronic Navigational Chart (ENC) Coverage
2. Progress Report on Publishing New Charts
3. Proposed New Raster (Traditional) Charts

The top of each section is set apart with a red banner.

The ENC section describes how ENCs are organized into "Usage Bands" and provides information about existing, recently released, and proposed new ENC coverage. The proposed coverage is based on the proposed footprints and scales for raster charts that are described in detail in the raster chart section.

The Progress Report section provides information about the three raster charts from the Plan that have now been published and a link to the Online Viewer for each chart.

The Proposed New Raster Charts section provides detailed specifications for each of eleven proposed new charts. Please review this section carefully and provide any recommendations for improving the design of any of the charts by following the instructions for providing feedback below.

How to Provide Feedback on the U.S. Arctic Nautical Charting Plan

You are invited to comment on the U.S. Arctic Nautical Charting Plan through NOAA’s Nautical Discrepancy Report System at http://ocsdata.ncd.noaa.gov/idrs/discrepancy.aspx

- In the “OTHER PRODUCTS” box, enter “U.S. Arctic Nautical Charting Plan.”
- Enter your comments, suggestions or questions in the “DESCRIPTION OF DISCREPANCY” box.

Feedback may also be sent to:

National Ocean Service, NOAA (N/CS2)
Attention: U.S. Arctic Nautical Charting Plan
1315 East West Highway
Silver Spring, MD 20910-3282
Introduction

The Arctic’s wealth in natural resources is matched only by its inherent beauty. Alaska has 6,640 miles of coastline, much of which lies north of the Alaska Peninsula. It is a treasure that contains considerable economic resources, including oil, natural gas, fisheries, and minerals. Off the Alaskan coast, the Bering and Chukchi Seas lead to the Northwest Passage past Canada and the Northern Sea Route past Russia, routes that could significantly reduce the time and cost of transiting between the Pacific and Atlantic Oceans.

To ensure sustainable marine transportation throughout the Arctic, the infrastructure that supports safety, environmental protection, and commercial efficiency must be enhanced. Modern nautical charts of the appropriate scale can provide the foundation for improving transportation in the area. They will also supply the base geospatial data used by federal, state, and local entities in fishery stock assessments, coastal zone management, energy exploration, and other uses.

Additional NOAA nautical chart coverage will enhance the American Arctic Marine Transportation System by depicting shoreline, depths, hazards and recommended routes throughout the region. Currently, charting data in much of the Arctic is inadequate or nonexistent. According to the U.S. Coast Pilot, much of the Bering Sea area is “only partially surveyed, and the charts must not be relied upon too closely, especially near shore. The currents are much influenced by the winds and are difficult to predict; dead reckoning is uncertain, and safety depends upon constant vigilance.”

The U.S. Arctic Nautical Charting Plan also supports the recommendations of the Interagency Ocean Policy Task Force and NOAA’s Arctic Vision & Strategy.

Office of Coast Survey

The Office of Coast Survey is the nation’s oldest federal science agency, established as the “Survey of the Coast” by President Thomas Jefferson in 1807. Coast Survey has the responsibility for charting U.S. and territorial waters to the limits of the Exclusive Economic Zone, an area of about 3.4 million square nautical miles. Throughout that vast expanse, Coast Survey and its sister navigation services offices provide the navigation products and assistance that reduce the risk of marine accidents and support the nation’s economy.

Automatic Identification System (AIS) Data

Ships using the Automatic Identification System transmit their position and other information several times per minute. The Coast Survey has found these position reports useful in determining ship transit patterns and uses this data as one of many inputs when considering where to create new nautical charts. A "heat map" of recent AIS data is shown on page 9.

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5 NOAA, NOAA’s Arctic Vision & Strategy, at www.arctic.noaa.gov/docs/arctic_strat_2010.pdf
Coast Survey Steamer *Bibb*
ENC cells are categorized into "usage bands" based on their scale and intended use. This section describes the existing and planned new ENC coverage within each of the bands. The scale ranges and names of the ENC usage bands, as implemented by NOAA, are shown in the table below.

<table>
<thead>
<tr>
<th>Number</th>
<th>Usage Band Name</th>
<th>Scale Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview</td>
<td>Smaller than 1:1.5M</td>
</tr>
<tr>
<td>2</td>
<td>General</td>
<td>&gt; 1:600K to 1:1.5M</td>
</tr>
<tr>
<td>3</td>
<td>Coastal</td>
<td>&gt; 1:150K to 1:600K</td>
</tr>
<tr>
<td>4</td>
<td>Approach</td>
<td>&gt; 1:50K to 1:150K</td>
</tr>
<tr>
<td>5</td>
<td>Harbor</td>
<td>&gt; 1:5K to 1:50K</td>
</tr>
<tr>
<td>6</td>
<td>Berthing</td>
<td>Larger than 1:5K</td>
</tr>
</tbody>
</table>

Overview Coverage – ENC Band 1
Complete ENC Usage Band 1 coverage is available over all Alaskan waters. The green tinted area in the graphic below shows the extent of the existing eight overview usage band ENC cells in Alaska. Their scales vary from about 1:1.5 million to about 1:5 million.
General Coverage – ENC Band 2
There is a significant gap in ENC Band 2 coverage in western Alaska, centered on Norton Sound. However, Chart 16006, shown at right, covers this area at a scale of about 1:1.5 million. Data from this chart will soon be used to produce ENC Cell US1AK95M. The dark blue tinted area in the graphic below shows the extent of the existing general usage band ENC cells in Alaska; the additional ENC coverage provided by this new cell is outlined in blue. This will complete the ENC Usage Band 2 coverage for the entire state.
Coastal Coverage – ENC Band 3
Six new coastal scale charts and ENCs are planned for the Alaskan Arctic waters. These ENC cells will complete the Usage Band 3 coverage in western Alaska from Point Hope to Bristol Bay and for all of the Aleutian Islands.

The blue tinted area in the graphic on page 14 shows the extent of the existing coastal usage band ENC cells in Alaska. The new chart footprints, which will also define the extent of the new ENC coverage, are outlined in blue.

New ENC coastal coverage will also be available for St Matthews Island when data from the inset on the existing Chart 16006 is converted into an ENC cell.

Approach Coverage – ENC Band 4
Page 15 shows the shows the extent of the existing Harbor and Approach ENC Usage Bands 4 and 5 ENC cells in Arctic Alaska.

The new approach scale chart of the northern portion of the Bering Strait has been published, which will provide much needed ENC Band 4 coverage for this vital passage. Another chart and ENC is planned just south of Little Diomede Island as well. Three new charts and ENCs are also planned over Nunivak Island and east of the island in Kuskokwim Bay.

New ENC data will also be made available from insets on existing charts 16200 and 16240, which will provide new ENC Band 4 coverage for Golovnin Bay and Cape Romanzof.

Harbor Coverage – ENC Band 5
New harbor scale charts and ENCs have recently been published for Kotzebue Harbor and the Delong Mountain Terminal. These provide additional ENC Band 5 coverage in Kotzebue Sound. The Little Diomede Island Inset on the recently published Bering Strait North chart has also been released as a Band 5 ENC.

The inset for St. Michael Bay on the existing chart 16240 will also be converted to new ENC Band 5 coverage.

Although there is complete ENC Band 5 coverage along the North Slope, the planned new chart and ENC over Point Barrow will increase the scale of the coverage for this area from 1:47,943 to 1:20,000.
Arctic Nautical Charting Plan

Boundary of the Arctic as defined by the Marine Mammal Protection Act
"Marine and estuarine waters north of 60° N latitude."

Boundary of the Arctic as defined by the Arctic Research and Policy Act
"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."

Planned new ENC coverage corresponds to these charts. (Display scale of ENCs may vary slightly.)

Band 3 Coastal Coverage
16140 1:200,000  Point Hope
16160 1:200,000  Kotzebue Sound
16260 1:300,000  West Yukon Delta - Nunivak Island to Norton Sound
16280 1:300,000  Nunivak Island
16310 1:300,000  West Bristol Bay
16320 1:300,000  East Bristol Bay
*16006 1:500,000  St. Matthew Island Inset

*The first edition of Chart 16006 was published in 1900, but it has not yet been converted to ENC format. All other charts shown in this table are planned new charts.
Recently added and planned new ENC coverage corresponds to these charts. (Display scale of ENCs may vary slightly.)

**Band 4 (Approach) Coverage**
- 16006 1:80,000 Cape Etolin Anchorage Inset
- 16120 1:100,000 Bering Strait North
- 16210 1:100,000 Bering Strait
- 16220 1:100,000 Golovnin Bay Inset
- 16240 1:100,000 Cape Romanzof Inset
- 16281 1:100,000 West Nunivak Island
- 16282 1:100,000 East Nunivak Island - Etolin Strait
- 16301 1:100,000 Northern Kuskokwim Bay

**Band 5 (Harbor) Coverage**
- 16079 1:20,000 Barrow (will provide larger scale coverage within the same usage band)
- 16006 1:40,000 Nash Harbor Inset
- 16145 1:40,000 Delong Mountain Terminal
- 16210 1:40,000 Little Diomede Island Inset
- 16240 1:50,000 Kotzebue Harbor and Approaches
- 16240 1:40,000 St. Michael Bay Inset

* These charts already exist, but have not yet been converted into ENC coverage at the scale band indicated.
** These three charts, first proposed in the 2011 Arctic Nautical Charting Plan have now been published.
All other charts in this table are planned new charts.
Progress Report on Publishing New Charts

The original Arctic Nautical Charting Plan, published in 2011, proposed 14 new charts. We are pleased to report that three of these charts have been produced and released for use by the public. Each of these is described in the sections below, which include a small image of the chart. There is also a link in each section header that will open the chart in the NOAA Online Chart Viewer.

Building a new nautical chart is a considerable accomplishment, which usually requires undertaking new hydrographic and topographic surveys to gather updated depth and shoreline data appropriate for the scale of the chart being constructed. This data, along with other existing data for aids to navigation, tides, regulatory limits and other boundaries, and many other items must then be complied into one unified presentation. The efforts to provide increased chart coverage in the Arctic must also compete with the need to maintain and enhance chart coverage in other parts of the Nation's 95,000 nautical miles of shoreline.

There is no definite schedule to produce the remaining 11 charts in the Plan, but each is expected to be built as the appropriate data and other resources needed to compile each chart become available. Release of the ENC product will usually precede the publication of the corresponding raster chart product by a number of months.
The Delong Mountain Terminal is a shallow draft port with an open shipping season of approximately 100 days. It was constructed to service the Red Dog Mine. The mine, in operation since 1989, is the world's largest producer of zinc concentrate, representing 79% of all U.S. zinc mine production. It is also the second largest lead producing mine in the country, accounting for a third of all U.S. production.\(^8\) The mine uses self-loading barges to pick up the ore and lighter it to the ships anchored offshore.\(^9\)


Kotzebue Harbor and Approaches
New Chart 16161 has been completed

Previous largest scale chart: 16005, 1:700,000.

Kotzebue lies on a sand spit at the end of the Baldwin Peninsula where the Noatak, Kobuk, and Selawik rivers empty into Kotzebue Sound.

“Kotzebue serves as the transportation hub (both air and sea) for the whole of the Northwest Alaska. There are 11 villages that require barge shipments and the large transport ships must be anchored at least 14 miles out in the Kotzebue Sound due to shallow waters, inadequate charts and navigational aids. The transport ship's freight must be lightered by smaller barges to Kotzebue. Our port of call is the second most costly in the world with the exception of Antarctica.”

**Chart Details**

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<th>Chart Number: 16161</th>
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<td>NGA Reference Number: 16BHA16161</td>
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<tr>
<td>Title: Alaska – West Coast Kotzebue Harbor and Approaches</td>
<td></td>
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<tr>
<td>Scale: 1:50,000, inset 1:25,000</td>
<td>at Latitude: 66° 54’ N</td>
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<td>163° 28’ 26” W</td>
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<td></td>
<td>162° 10’ 12” W</td>
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<td>66° 39’ 42” N</td>
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<td>Total Longitude: 1° 18’ 14”</td>
</tr>
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<td>Neatline Height: 818 mm</td>
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</tbody>
</table>

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11 Chuck Greene, Mayor of Northwest Arctic Borough, Letter to NOAA, "Regarding: Survey of Kotzebue Sound," April 13, 1998
Previous largest scale chart: 16005, 1:700,000

The Bering Strait is 44 miles wide between Cape Prince of Wales, Alaska, and Cape Dezhneva, Siberia. It is the gateway from the Bering Sea in the Pacific Ocean to Chukchi Sea in the Arctic Ocean.\textsuperscript{12} The Russian island of Big Diomede and the American island of Little Diomede lie just three nautical miles apart. These islands divide the two major passages through the strait, which lie to the east and west of the islands with depths of about 20 to 30 fathoms. Much of the Alaskan vessel traffic clings close to the shore rounding Cape Prince of Wales, as shown by the clustering of AIS returns on the chart graphic below. New chart coverage includes a 1:40,000 scale inset of Little Diomede Island on the Bering Strait North Chart.

\textbf{Chart Details}

- Chart Number: 16190
- National Stock Number: 7642016122021
- KAPP Number: 0000
- NGA Reference Number: 16BCO16190
- Title: Alaska – West Coast
- Bering Strait North
- Scale: 1:100,000 at Latitude: 65° 57' 00.0" N
- Horizontal Datum: NAD83
- Projection: Mercator
- Soundings In: Fathoms and Feet at: MLLW
- Depth Curve Values: 1, 2, 3, 6, 10, 20
- Blue Tint Curve(s): 10
- Main Chart Panel Limits: 66° 18' 45.0" N
- 169° 43' 51.0" W
- 167° 04' 10.0" W
- 65° 35' 46.0" N
- Total Latitude: 42' 59"
- Total Longitude: 02° 39' 41"


\textsuperscript{13} Alaska Department of Commerce, Community, and Economic Development, "Alaska Community Database Photo Index," at www.dced.state.ak.us/dca/commdb/images/diomede_aerial1.jpg
Chart Details

Chart Number: 16190
KAPP Number: 0000
Title: Alaska – West Coast
Little Diomede Island (inset)

Scale: 1:40,000 at Latitude: 65° 45' 00.0' N
Horizontal Datum: NAD83 Projection: Mercator
Soundings In: Fathoms and Feet at: MLLW
Depth Curve Values: Blue Tint Curve(s):

Limits

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</tr>
<tr>
<td>65° 45' 00.0' N</td>
<td>169º 01' 04&quot; W</td>
</tr>
</tbody>
</table>

Total Latitude: 04' 07" Total Longitude: 11' 38"
Proposed New Raster (Traditional) Charts

Each proposed new chart is described in a separate section below. The banner at the top of each section shows the chart's title, NOAA chart number and proposed scale. The line directly below the banner lists the chart number and scale of the largest scale nautical chart that is currently available for the area.

The items listed under the "Chart Details" banner provide information about how the chart will be constructed, including the scale, extent of the chart footprint under "Limits."

All of the charts will be based on the North American Datum of 1983 (NAD83) and use the Mercator Projection. Depths will be shown in fathoms and feet at the Mean Lower Low Water (MLLW) tidal datum. Some details, such as the values at which depth curves will be compiled or the depth of water which will be tinted blue are yet to be determined (TBD).
Barrow is the northernmost community in the U.S. and is the “economic, transportation and administrative center for the North Slope Borough.” Vessel traffic, heaviest during the summer after the subsistence whaling season ends, consists of tugs carrying fuel and supply barges. Barrow has no pier facilities. Marine cargo bound for Barrow is lightered from barges to landing craft. Anchorage can be had 1200 yards off Barrow in 30 feet of water to receive supplies and to transfer personnel by small boat. The anchorage is exposed to weather from all directions. Barrow is a destination for small cruise ships carrying as many as 400 passengers. A seasonal U.S. Coast Guard station is active from July to August.

**Chart Details as of February 1, 2013**

<table>
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<th>Chart Number: 16079</th>
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<tr>
<td>Title: Alaska – Arctic Coast Barrow</td>
<td>Scale: 1:20,000 at Latitude: 71° 19’ 30.0&quot;N</td>
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<tr>
<td></td>
<td>Horizontal Datum: NAD83 Projection: Mercator</td>
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<tr>
<td>Soundings In: Fathoms and Feet</td>
<td>at: MLLW</td>
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<tr>
<td>Depth Curve Values: TBD</td>
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<td>Limits</td>
<td>71° 25’ 00.0” N 156° 50’ 28.0” W 156° 12’ 07.0” W 71° 16’ 12.0” N</td>
</tr>
<tr>
<td>Total Latitude: 08’ 48”</td>
<td>Total Longitude: 38’ 21”</td>
</tr>
</tbody>
</table>

15 City of Barrow, “Welcome,” at www.cityofbarrow.org
One of the oldest continuously occupied settlements in North America, Point Hope is a subsistence village dependent upon fishing, gathering and hunting of marine mammals for food. The subsistence activities throughout the year revolve around whales, other marine mammals and land mammals. The spit of land jutting into the Chukchi Sea resembles an index finger and Tikigaq, the Inupiaq language name for the village, means index finger. Average ice breakup at Point Hope is in late June and average freezeup is about the second week of November. Navigation is difficult from the latter part of November until mid-July and usually is suspended from early December until the latter part of June.  

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**Point Hope: Chart 16140**

Largest scale chart currently: 16005, 1:700,000

![Point Hope, photo: Zachariah Hughes](image)

Chart Details as of February 1, 2013

<table>
<thead>
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<tr>
<td>KAPP Number(s): 0000</td>
<td>NGA Reference Number: 16BCO16140</td>
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Title: Alaska – West Coast Point Hope

Scale: 1:200,000 at Latitude: 68° 05' 00.0"N

Horizontal Datum: NAD83 Projection: Mercator

Soundings In: Fathoms and Feet at: MLLW

Depth Curve Values: TBD Blue Tint Curve(s): TBD

Limits 68° 49' 42.0" N 169° 02' 56.0" W 163° 46' 10.0" W 67° 21' 41.0" N

Total Latitude: 01° 28' 01" Total Longitude: 05° 16' 46"

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Iñupiat Eskimos have lived in the Kotzebue area for at least 600 years. Its coastal location at the terminus of three major rivers made Kotzebue a major Arctic trading hub long before European contact. Iñupiat from interior communities as well as visitors from the Russian Far East traveled to Kotzebue to trade furs, skins and seal oil, among other valuables. Commerce activity increased following the arrival of whalers, Russian fur traders, gold miners and missionaries. The federal government introduced reindeer herding to Kotzebue in 1897. Expanding economic activities and services in the area enabled Kotzebue to develop at a rapid pace to become the largest community in Northwest Alaska.

Bearded seal in Kotzebue Sound, photo: Mike Cameron

Chart Details as of February 1, 2013

<table>
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<td>Title: Alaska – West Coast Kotzebue Sound</td>
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<table>
<thead>
<tr>
<th>Scale: 1:200,000</th>
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<td>Horizontal Datum: NAD83</td>
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<tr>
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<tr>
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Limits

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<td>160° 55' 24.0&quot; W</td>
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<tr>
<td>65° 59' 17.0&quot; N</td>
</tr>
<tr>
<td>Total Latitude: 01° 28' 01&quot;</td>
</tr>
<tr>
<td>Total Longitude: 05° 16' 46&quot;</td>
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<tr>
<td>Neatline Height: 000.00mm</td>
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<tr>
<td>Neatline Width: 000.00mm</td>
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19 NOAA, "Habitat Use and Seasonal Movements of Adult and Sub-Adult Bearded Seals," photo by Mike Cameron, http://www.afsc.noaa.gov/Quarterly/ond2009/ond09featurelead.htm

The Bering Strait is 44 miles wide between Cape Prince of Wales, Alaska, and Cape Dezhneva, Siberia. It is the gateway from the Bering Sea in the Pacific Ocean to Chukchi Sea in the Arctic Ocean. The Russian island of Big Diomede and the American island of Little Diomede lie just three nautical miles apart. These islands divide the two major passages through the strait, which lie to the east and west of the islands with depths of about 20 to 30 fathoms. Much of the Alaskan vessel traffic clings close to the shore rounding Cape Prince of Wales, as shown by the clustering of AIS returns on the chart graphic below. New chart coverage includes a 1:40,000 scale inset of Little Diomede Island on the Bering Strait North Chart.

**Chart Details as of February 1, 2013**

- **Chart Number:** 16210
- **National Stock Number:** 7642016122022
- **KAPP Number:** 0000
- **NGA Reference Number:** 16BCO16210
- **Title:** Alaska – West Coast Bering Strait
- **Scale:** 1:100,000
- **at Latitude:** 65° 24' 00.0" N
- **Horizontal Datum:** NAD83
- **Projection:** Mercator
- **Soundings In:** Fathoms and Feet
- **at:** MLLW
- **Depth Curve Values:** 1, 2, 3, 6, 10, 20
- **Blue Tint Curve(s):** 10
- **Limits**
  - 65° 55' 14.0" N
  - 169° 43' 42.0" W
  - 167° 57' 15.0" W
  - 64° 53' 48.0" N
- **Total Latitude:** 01° 01' 26"
- **Total Longitude:** 01° 46' 27"
- **Neatline Height:** 847.725 mm
- **Neatline Width:** 1206.5 mm

---

22 Photo by Petty Officer Richard Brahm, United States Coast Guard.
Hooper Bay, also known by its Yup'ik name, Naparyarmiut, is on the Yukon-Kuskokwim Delta. Chart 16260 will provide enhanced coastal scale coverage north of Nunivak Island for transits to St. Lawrence Island or Norton Sound.

Hooper Bay

Chart Details as of February 1, 2013

<table>
<thead>
<tr>
<th>Chart Number: 16260</th>
<th>National Stock Number: 7642016157933</th>
</tr>
</thead>
<tbody>
<tr>
<td>KAPP Number(s): 0000</td>
<td>NGA Reference Number: 16BCO16260</td>
</tr>
<tr>
<td>Title: Alaska – West Coast</td>
<td>West Yukon Delta / Nunivak Island to Norton Sound</td>
</tr>
<tr>
<td>Scale: 1:300,000</td>
<td>at Latitude: 61°55'00&quot;N</td>
</tr>
<tr>
<td>Horizontal Datum: NAD83</td>
<td>Projection: Mercator</td>
</tr>
<tr>
<td>Soundings In: Fathoms and Feet</td>
<td>at: MLLW</td>
</tr>
<tr>
<td>Depth Curve Values: TBD</td>
<td>Blue Tint Curve(s): TBD</td>
</tr>
</tbody>
</table>

Limits

63° 26' 47.0" N
170° 22' 27.0" W
165° 44' 52.0" W
60 15' 44.0" N

Total Latitude: 03° 11' 03"
Total Longitude: 04° 37' 35"

Nunivak Island is about 330 miles north of Unimak Pass. The latest edition of the *U.S. Coast Pilot* notes that “dangerous shoals and uneven bottom have been reported and are shown on [the 1:1.5 million scale chart 16006]; the island should be approached with extreme caution.”

The currency of the navigational information known about Nunivak Island is betrayed by the same edition of the *Coast Pilot* which reports “in 1899 the U.S.S. CORWIN cruised completely around Nunivak Island, following the shore and outlying islands at a distance of about 2 miles, and found general about depths of 7 to 10 fathoms.”

**Chart Details as of February 1, 2013**

<table>
<thead>
<tr>
<th>Chart Number: 16280</th>
<th>National Stock Number: 7642016157932</th>
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<tr>
<td>KAPP Number: 0000</td>
<td>NGA Reference Number: 16BCO16280</td>
</tr>
<tr>
<td>Title: Alaska – West Coast Nunivak Island</td>
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</tr>
<tr>
<td>Scale: 1:300,000</td>
<td>at Latitude: 59° 55’ 00.0” N</td>
</tr>
<tr>
<td>Horizontal Datum: NAD83</td>
<td>Projection: Mercator</td>
</tr>
<tr>
<td>Soundings In: Fathoms and Feet</td>
<td>at: MLLW</td>
</tr>
<tr>
<td>Depth Curve Values: TBD</td>
<td>Blue Tint Curve(s): TBD</td>
</tr>
<tr>
<td>Limits</td>
<td></td>
</tr>
<tr>
<td>60° 48’ 14.0” N</td>
<td>168° 34’ 58.0” W 162° 25’ 45.0” W</td>
</tr>
<tr>
<td>58° 44' 26.0” N</td>
<td></td>
</tr>
</tbody>
</table>

Total Latitude: 02° 03’ 48”

Total Longitude: 06° 09’ 13”

Neatline Height: 000.00mm

Neatline Width: 000.00mm

---


26 Ibid, Chapter 8, paragraph 386.
Deep draft vessels used for supply lightering to coastal communities seek shelter on the east side of Nunivak Island. Due to the vintage of chart data available to mariner, navigating in and out of Etolin Strait poses significant risks for vessels constrained by maneuverability and draft.

Nunivak Island is about 330 miles north of Unimak Pass. The *U.S. Coast Pilot* notes that “dangerous shoals and uneven bottom have been reported and are shown on [the 1:1.5 million scale chart 16006]; the island should be approached with extreme caution.”

```
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<thead>
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<tr>
<td>KAPP Number: 0000</td>
<td>NGA Reference Number: 16BCO16282</td>
</tr>
<tr>
<td>Title: Alaska – West Coast</td>
<td>East Nunivak Island – Etolin Strait</td>
</tr>
<tr>
<td>Scale: 1:100,000</td>
<td>at Latitude: 60° 10’ 00.0” N</td>
</tr>
<tr>
<td>Horizontal Datum: NAD83</td>
<td>Projection: Mercator</td>
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<tr>
<td>Soundings In: Fathoms and Feet</td>
<td>at: MLLW</td>
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<tr>
<td>Depth Curve Values: TBD</td>
<td>Blue Tint Curve(s): TBD</td>
</tr>
<tr>
<td>Limits</td>
<td>60° 38’ 53.0” N</td>
</tr>
<tr>
<td>166° 31’ 56.0” W</td>
<td>165° 08’ 46.0” W</td>
</tr>
<tr>
<td>59° 39’ 11.0” N</td>
<td></td>
</tr>
<tr>
<td>Total Latitude: 59’ 42”</td>
<td>Total Longitude: 01° 23’ 10”</td>
</tr>
</tbody>
</table>
Kuskokwim Bay is filled with many flats, and hard steep-to-shoals. The channels through the bay are not always apparent by the surface indications of the water. At times the channels will be smooth with rips on the shoals, and at other times the reverse will be true.

Because of the inequality of the tides, a vessel grounding at high water may not be refloated for several days. Operating costs for tugs and barges are about $20,000 per day, which make groundings and other delays costly.

Chart Details as of February 1, 2013

- **Chart Number:** 16301
- **National Stock Number:** 7642016157929
- **KAPP Number(s):** 0000
- **NGA Reference Number:** 16BCO16301
- **Title:** Alaska – West Coast
  - Northern Kuskokwim Bay
- **Scale:** 1:100,000
- **Horizontal Datum:** NAD83
- **Projection:** Mercator
- **Soundings In:** Fathoms and Feet
- **at:** MLLW
- **Depth Curve Values:** TBD
- **Blue Tint Curve(s):** TBD
- **Limits**: 59° 55' 38.0" N
  - 164° 54' 36.0" W
  - 162° 38' 02.0" W
  - 59° 09' 55.0" N
- **Total Latitude:** 45’ 43”
- **Total Longitude:** 02° 16’ 34”

Bristol Bay covers over 50,000 square miles. All five species of Pacific salmon live in the bay and it has the largest sockeye salmon run in the world, producing approximately 46% of the world’s wild sockeye harvest. In 2009, Bristol Bay’s wild salmon ecosystem generated $480 million in direct annual economic expenditures in the region and sales per year, and employed over 14,000 full and part-time workers.\textsuperscript{32}


\textsuperscript{32} EPA, "About EPA's Bristol Bay Assessment," http://www2.epa.gov/bristolbay/about-epas-bristol-bay-assessment
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<td>Alaska – West Coast</td>
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<tr>
<td></td>
<td>East Bristol Bay</td>
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<td>Fathoms and Feet</td>
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<tr>
<td>160° 14' 22.0&quot; W</td>
<td>155° 49' 58.0&quot; W</td>
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<tr>
<td>56° 11' 01.0&quot; N</td>
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<td>Total Latitude</td>
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<tr>
<td>Total Longitude</td>
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