2017 Yachtsmen Routing Guide to Northwest Passage for safe/unsafe anchorage/shelter, 4th Edition

"In those Northwest voyages where navigation must be executed in most Exquisite Sort" (John Davis 1594)

by Victor Wejer, Toronto, Canada, Jan. 2017, vic11@bell.net
The feedback of many NWP sailors collected over the years with most grateful contributions and review by Eric Brossier (E.B.) Vagabond, Steven Brown (Novara) Novara, Jimmy Cornell (J.C.) Aventura, David Cowper (D.C.) Polar Bound, Richard Hudson (R.H.) Issuma, Capt. W. Jacobson (W.J.) Vagabond'eux, Michael Johnson (M.J.) Gitana, Piotr Kuzniar (P.K.) Selma, Claudia Kirchberger (C.K.) La Belle Epoque, Arthur J. Osborn (J.O.) Empiricus, Ali Parsons (A.P.) Arctic Tern, Larry Roberts (L.R.) Traversay III, Robert Shepton (R.S.) Dodo's Delight, Wolfie Slanec (W.S) Nomad, Richard Weber (R.W.) Arctic Watch, Eef Willems (E.W.) Tooluka, Carl Zaniboni (C.Z.) Salty. Intended to be updated annually.

The RCC Pilotage Foundation book ***Arctic and Northern Waters*** by Andrew Wilkes (initial publication by Imray, Laurie Norie and Wilson in May 2014) Edition: Rev 1st Published: 06 Sep. 2016 ISBN: 9781846238284 covers everything you will want to know about sailing in Arctic waters. It includes detailed passage planning and selected port information for Faroe, Iceland, Greenland, the Northwest Passage, the Northern Sea Route and their approaches.

This ***Yacht Routing Guide to the Northwest Passage*** by Victor Wejer is a compilation of further port and anchorage information which will be updated annually. The RCC Pilotage Foundation is very pleased to be able to make this guide available to you via a download from the RCCPF website. However, the RCCPF has had no part in the production of this guide and accepts no responsibility for the accuracy of the information contained within.

CAUTION

This guide contains selected information and thus is not definitive. It does not contain all known information on the subject in hand and should not be relied on alone for navigational use; it should only be used in conjunction with official hydrographical data. This is particularly relevant to the plans, which should not be used for navigation. The information provided in this guide may be out of date and may be changed or updated without notice. The RCC Pilotage Foundation cannot accept any liability for any error, omission or failure to update such information. To the extent permitted by law, the RCC Pilotage Foundation does not accept liability for any loss and/or damage.

East coast Baffin Is. Heading North

Eastern seaboard of Baffin Is. and Labrador coast is known for its constant fog and icebergs flowing with Labrador Current south, it is not a recommended route for any sail boat to cruise those waters. Most of the navigation charts are not very precise including Canadian and many electronic. See final notes on Arctic Charts.

Kimmirut (Lake Harbour) 62º51'N / 69º52'W
Located above tree line. Very safe harbour from all winds. Village with all support and airport. Tricky approach due to many small rocky isles and shoals. Most of approach covered by chart 5455 is not surveyed. Charts position WGS84 may be off by 2 Nm. Local Inuit Pilot at Beacon Is. 62º42'N / 69º43'W can be get at times. It has wooden pyramid. Anchorage 0.4 Nm SE of Sealer Narrows is not recommended in bad weather. Tidal stream in Lake Harbour is negligible. Used by whalers in 1800th. (inf. by Ernie Lyall).

Clephane Bay 65º54.54'N / 62º28.41'W
Anchored in 15m with good swinging room, fair holding and excellent protection. Estimated the Navionics charts were 0.25 Nm to the south and the Cmap NT+ gave position as 65º54.21'N / 62º28.47'W (Novara).

Pangnirtung – 66º08'N / 065º50'W. Accessible 0.6 Nm NW off landing beach. Poor holding. Sudden gales. Fuel and water from town. Airport.

Novara Bay (own name) 66º48.2'N / 61º37.3'W
This bay 15 Nm north of Cape Dyer as offering greater protection than the bay 5 Nm to the south that is mentioned in the sailing directions. The Cmap charts are reasonably accurate except for a small islet. This islet is not shown on the Navionics charts but these also proved to be out by some distance. Some other charts show position of islet. Anchored in 14m with good holding just of the rocky shore. The entrance to the bay was partially blocked by the last of the winter fast ice. (Novara).

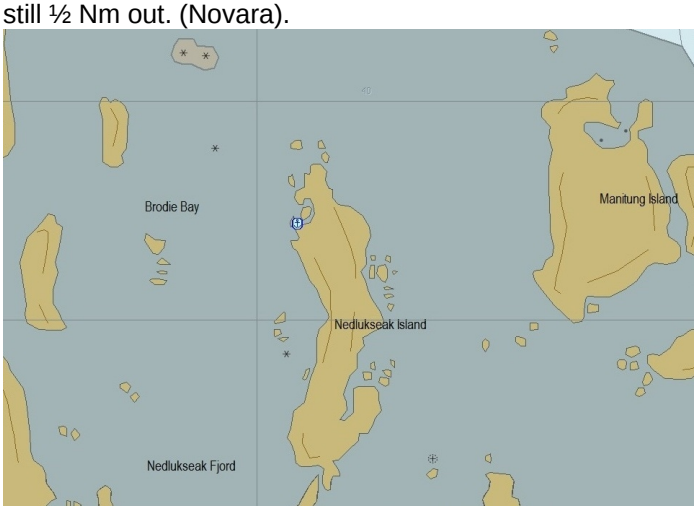
Cape Dyer 66º39.6'N / 61º21.3' W. Anchorage in Sunneshine Fiord. Fair holding but poor shelter. Strong tidal stream. Sudden gusts, Radiobeacon, Airstrip.

Coronation Fjord 67º12'N / 64º45'W
A Spectacular anchorage about ¼ Nm off the calving face of the glacier. Found an alluvia flat to anchor in about 15m with good holding surrounded by high rock walls and within touching distance of the glacier. (Novara).

Broughton Is. Qikiqtarjuaq 67º33.5'N / 64º01.5'W. Very good holding with shelter available. Charts are off to the west. No reliable GSW84 positions. Fuel and water from village. Airport.

Okoa Fjord 67º38.4'N / 065º59.1'W
Anchorage in deep water off a side glacier run off gulley, sitting anchor and 3:1 scope without digging in to avoid snagging any big boulders. Another spectacular anchorage beneath huge cliffs.
Expect sudden torrential rains turning all trickling streams into torrents and 100's of waterfalls. Hanging glacier an indeterminable distance up galley does not give safe feeling spot! For a mountaineer it would not do to be avalanched boat! (Novara).

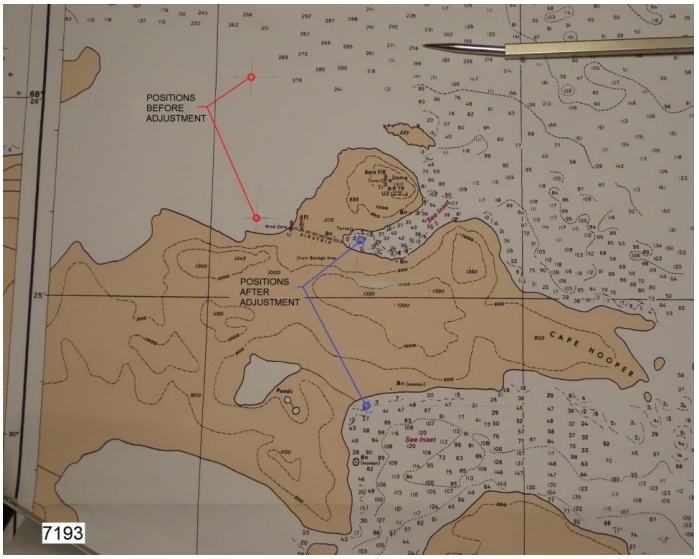
Nedlukseak Island 68º07.2'N / 65º57.5'W
Within strong headwinds anchor in a small bight on the W side of the island in 8m close to the shore to gain the most shelter. Poor anchorage and exposed in westerlies. Charts still ½ Nm out. (Novara).



Tanner Bay – Cape Hooper – C-maps and BSB charts for Cape Hooper Upper & Lower Anchorage and Approaches are off. (Novara). Important notes at Chart 7193 are placed and separate for Approach parts that state "...correction must be moved 2 minutes 11 seconds southward and 3 minutes 26 seconds eastward to agree with this chart".

Lower Anchorage 68º26'N / 66º48.5'W
Open to the South and east with strong gusts coming down from the high cliffs. Good holding in 15m but uncomfortable in strong winds. Offset 2.5 Nm from Navionics charted position. (Novara). For Lower Anchorage CHS states "...correction must be moved 2 minutes 12 seconds southward and 3 minutes 29 seconds eastward…"

Upper Anchorage – Cape Hooper – 68º27.6'N / 66º48.7'W
A far better anchorage offering good shelter and good holding in 10m to 15m.
An emergency shelter and service huts ashore. 2.75 Nm offset from Navionics charted position. (Novara). For Upper Anchorage CHS states "...correction must be moved 2 minutes 0 seconds southward and 3 minutes 36 seconds eastward…"



Cape Hooper 68º24.6'N / 66º37'W. Poor holding and open to NE winds is obtainable. (Novara).

Arctic Harbour, Aulitiving Island 69°31'N / 067°33'W.
Little shelter that can be filled outside with many icebergs. The position according to the GPS is about 4 miles further west, so during approach it was interesting to find sailing way over the island. "Well protected, strong S winds, no ice. Plenty of ice outside at sea. Holding was good." (E.W.)

Clyde River 70º26'N / 68º37'W .
Very good holding and protection from all except southerly winds. Its WGS84 location may vary by 0.35 Nm West. Foggy place mornings and evenings. Good place to clear entry to Canada. Fuel from village, water from stream. Airport.

Sam Ford Fjord - Kigut Peak anchorage – 70º31.8'N / 71º00'W
A superb anchorage on the south side of Sam Ford Fjord at the mouth of a river and wide valley leading to glaciers and mountains. Spectacular mountain scenery. (Novara)

Sam Ford Fjord - Walker Arm 70º33.5'N / 71º26'W
An amazing anchorage under enormous rock walls. Deep water anchoring and lines ashore.
Place of Dodo's Delight and Bob Shepton plus Piolet D'Or team for climbing. (Novara)

Sam Ford Fjord South Side 70º45.5'N / 70º27.5'W
Anchor in a small bight on the southern entrance to the fjord behind a rocky promontory.
Fair shelter from the South and west but open to the north and east. Poor holding. (Novara)

Cape Eglinton 70º46.8'N / 69º25.2'W
Take the last chance of a good anchorage under the lee of Cape Eglinton in 8m with good holding.
Protected from the north and west this anchorage would be exposed in winds from the south and east. The charts are reasonably accurate along this stretch of coast. (Novara).

Round Island 72º09'N / 74º38.2'W
A poor anchorage but useful in the strong northerlies. Anchored on a shelf in 20m close to shore. Inadvisable with winds from any other direction. (Novara).

Greenland, West Coast, GREENPOS
http://www.forsvaret.dk/glk/greenpos/greenpos%20in%20english/Pages/default.aspx

INFORMATION ABOUT THE GREENPOS SYSTEM: As of December 1st 2002 THE GREENPOS system is mandatory for ships travelling in Greenland. The ships report their position, course, speed and actual weather information every 6th hour.

Smallesund Havn 61º 33.089'N / 49º 15.651'W, we marked it on our Navionics. We were surprised that the Sailing Directions gave clear instructions to take this path. The bottom came up to abrupt stop at 2-3 knots of speed. We struck our keel as we draw 2 mtr. where the center pin is located, while on our way to the "preferred anchorage". Avoid 7 mtr. sounding given path on the chart. (J.O.)

Irkens Havn 63º04'N / 50º47'W Eqalugissat on Mannisaat Is. (R.S.)

Sisimiut 66º56.45'N / 53º40.71'W Western approach has to be taken carefully. There are underwater rocks near fairway. Head to 66º56.76'N / 54º10'W from that point take COG 90º to 66º56.76'N / 53º55'W then follow COG 92.5º onto range beacons 2 sec. yellow light and 4 sec. yellow light for about 5.6 Nm. Then red light on starboard into the harbor. Tides may exceed 4.5 mtr. Sisimiut has airport accepting only STOL aircrafts for local flight. Facilities for fuel, repairs and medical assistance with possible wintering on dry. Cost for 19 ton 40 feet boat is DK 2740,- for haul out & lunch plus some monthly charges. Contact Mr. Bent Lyberth bl@ang.gl

Ilulissat (Jacobshavn) 69º13'N / 51º05'W.
Attractive place due to its proximity of one of the most productive glaciers named **Sermeq Kujalleq.** As one of the major harbors it can get filled with ice growlers and floes with no warning and it happens every year. According to some theory one of the ice bergs from this glacier caused collision with RMS Titanic on April 14th 1912. This led to the establishment in 1914 of the International Convention for the Safety of Life at Sea (SOLAS), which still governs maritime safety today and since 1913, the United States Coast Guard has been tasked with the management and operation of the patrol, known as the International Ice Patrol.

Upernavik
Important to point out that the safest anchorage in the Sortehul is:
Qornoq kangigdleq 72º44'N / 55º44'W. Shelter can be had either side of the promontory depending on wind direction. In the **Sarpinat** 72º46'N / 56º04'W for smaller bolder boats there is a more sheltered anchorage in the south west corner, gained by going close in along the southern rocky shore. Beware of rock at the end to starboard. Good when you get there! This was base camp for the first ascent of Sanderson's Hope AD2000 (R.S.)

Qaanaaq (Thule) 77º 27'N / 69º14'W.
A safer anchorage has been reported *("Tooluka", 2012*) to the west, on the western side of the drying reef. "A shallow

bay gives wonderful protection there from SE wind and ice, as only the smallest of pieces of ice can move over the reef at high tide."
But there is only a narrow passage to get into this bay. 77º27.8'N / 69º17'W least depth on entering: 3,5 m., close to low water. In the bay itself it gets a little deeper. Attempts were made to find a way out of the bay further west, unsuccessfully. There may be a deeper passage, but that would need reconnoitering. Small Hospital, Airport (R.S.)

Northwest Passage Heading East through Fury & Hecla

Starting at Brentford Bay the usual Way Points that icebreakers take are:

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WP0083,71°30.00'N,092°00.00'W
WP0084,69°55.00'N,088°00.00'W
WP0085,69°55.00'N,086°00.00'W
WP0086,69°56.00'N,085°30.00'W
WP0087,69°55.00'N,085°00.00'W
WP0088,69°52.00'N,083°15.00'W
WP0089,69°48.00'N,083°00.00'W
WP0090,69°46.00'N,082°50.00'W
WP0091,69°43.20'N,082°40.00'W
WP0093,69°42.30'N,082°30.00'W
WP0094,69°41.50'N,082°27.00'W
WP0095,69°41.50'N,082°00.00'W
WP0096,69°37.00'N,081°30.00'W
WP0097,69°25.00'N,081°00.00'W
WP0098,69°07.00'N,080°30.00'W
WP0099,67°06.70'N,080°30.00'W
WP0100,63°48.00'N,078°20.00'W
WP0101,63°48.00'N,076°00.00'W
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Fury & Hecla Str. 69º 55'N / 84º34'W. It is very wide strait with few anchoring places near northern shores. Southern shores despite charts showing some deep enough points are mostly shallow with drying rocks in many places. Constant Easterly currents regardless tidal stage 2-3 kt. Approach only when ice is less than 1/10. Magnetic variation reaches 48º W.

Labrador Narrows 69º 43'N / 82º37'W.
Avoid sailing west through Labrador Narrows as it is only good for crafts with powerful engine.
Approach 2 hrs before LW slack at Bonne Is. Tidal Station. Currents are well above 5 kt. heading East. Keep center of strait as counter currents and eddies are present. It is not very long strait at about 3.5 Nm and it could take only approx. 20-30 minutes to make it. Extra time to use before slack will be spent to clear notorious cross currents and eddies on the east side of Narrows into Foxe Basin. No any known safe anchoring places available.
After completing, the nearest place to rest is Igloolik Island with Inuit village of the same name.

Igloolik 69º 22'N / 81º45'W.
Good sheltered place to anchor in Turton Bay off landing beach. Approach only from East. Watch for kelp and some rocks on the E. & SE of island. The village is very active with all supplies available and the airport.
Very crude electronic raster charts for this area are available from undersigned.

Foxe Basin
Heading to Cape Dorset. You will need about thirty hours to cross Foxe Basin, very shallow, very much unsurveyed. And currents are strong and unpredictable! (E.B.)

Cape Dorset 64º 14'N / 76º33'W.
It is accessible from Hudson Str. With approach from the East. Nice Inuit village with all supplies available. Airport services.
Expect to see first ice bergs in Hudson Strait and turbulent eddies with high tides.
Next stop will be in Labrador, not at Button Islands.

Northwest Passage Heading from East to West

The major note from David Scott Cowper (Mable E. Holland, Polar Bound).
"The boats that come up to the Arctic are entering a hostile area weather-wise and should be fully aware that their boat must be capable of withstanding 80 mile per hour winds, ice and being nipped in the ice, which could easily crush their vessel, and make provisions for encountering these conditions with possibly the carrying of sledges, tents, extra food, skis, chainsaws, come-ons etc.. In addition, they should have very good heavy duty ground tackle. Another important item in my view, is that all boats should carry enough paper charts as opposed to relying on electronics." …"Venturing forth in many cases in unsuitable vessels which are not strong enough to deal with robust conditions. If I was advising anyone on a suitable boat, strength would be the major factor at the expense of speed. I would also insist on about four watertight bulk heads up to the deck level to give a boat a fighting chance if it was holed of being able to survive. The other areas on a boat that are vulnerable are, of course, the prop shafts and rudder" …

Albert Harbour 72º45'N / 77º26'W separated by Beloeil Is. from Baffin Is. within approaches to Pond Inlet. Entry from east with good holding in mud and sheltered from all winds. Ice may drift in. Exit can be done at the west end with caution between Baffin Is. and small isle on the west side of Beloeil Is. Used by whalers at the end of 1800th. GPS coverage is nil due to high cliffs obscuring satellite signal. (M.J.)

Pond Inlet 72º41.7'N / 77º58'W.
Open anchorage under constant threat from heavy ice flows.
Expect in few years a $40-million small-craft harbor at Pond Inlet.
Fuel and water from village. Good place to clear entry to Canada. Airport.
In the fiords some 40 miles south west of Pond Inlet, and south of Eclipse Sound: Charts may differ from GPS positions by as much as 1.5 Nm.

Emerson Island 72º22'N / 79º03'W.
Several possibilities for anchoring in the open bay on west side of island. (R.S.)

White Bay
Anchorage can be made on west shore of White Bay, on the south side of the small spit on east side of **Curry Island** 72º26'N / 79º25'W.
It may be possible to anchor on the north side, but beware of an extensive reef across the entrance. (R.S.)

Deep Cove off Milne Inlet 72º11'N / 80º24'W.
Strongly recommended by *"Jonathan III" (2011)* (R.S.)

Tay Bay 73º29.5'N /80º43.0'W – Navy Board Inlet.
Muddy clay bottom with fair holding. Good shelter from just all winds and ice for small boats. No settlements.

Wollaston Islands a.k.a. Wallaston Islands 73º43'N / 80º55'W
At north side of biggest islands that has small bight indentation of shore line, attempts were made to anchor at approx. 73º43.8'N / 80º58.0'W in 4 m. During gusty SE 8-9ºB anchor was not holding at all. Most likely due to its rocky bottom. (W.J.)

Navy Board Inlet is known for its tunnel like accelerated winds mainly due to its high elevation shores as it is barely 4.5 Nm wide at its narrowest point. (W.J.)

Elwin Inlet 73º21'W / 84ºW very deep up to shores, no good for small sail boats anchorage.

Baillarge Bay 73º23'N / 84º41'W very deep up to shores, no good for small sail boats anchorage.

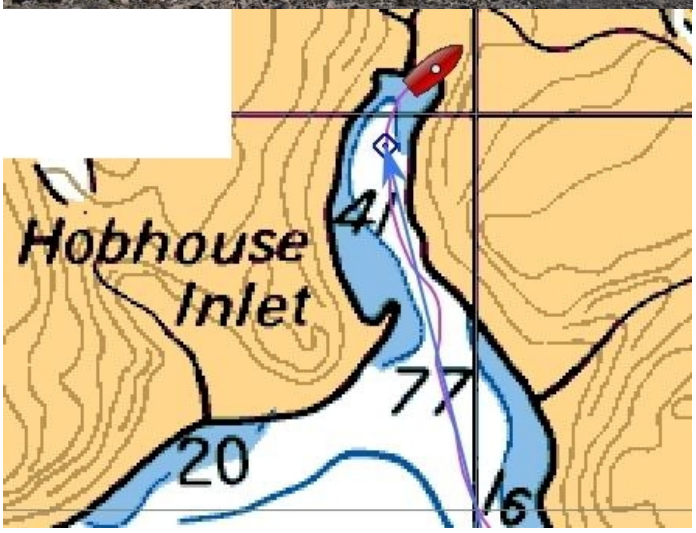
Nansivik Mine 73º04'N / 84º33'W – Admiralty Inlet.
Excellent holding. Solid wharf available for mooring. May have some construction workers camp. Access to Arctic Bay airport. 2.5 Nm east of wharf good anchorage can be found further in English Bay. No fuel or water.
Arctic Bay 73º01N / 85º07'W
Excellent holding. Fuel, water from village. Airport.

Dundas Harbour 74º32.4'N / 82º25'W and
Johnson Bay 74º31'N / 82º23'W – Lancaster Sound.
Former RCMP outpost over the ridge. 2 locations. Deeper into the bay better shelter can be found during northerly gales.

Cuming Inlet 74º34'N / 85ºW A superb fiord, a bit of trip up to anchorage well worth it. On west side anchorage with protection from the north. A bay on the east side further up providing protection from the south, good holding. Muskox and walrus. (A.P.)

Stratton Inlet 74º30'N / 86º38'W. Good anchor at the head of the inlet (A.P.)

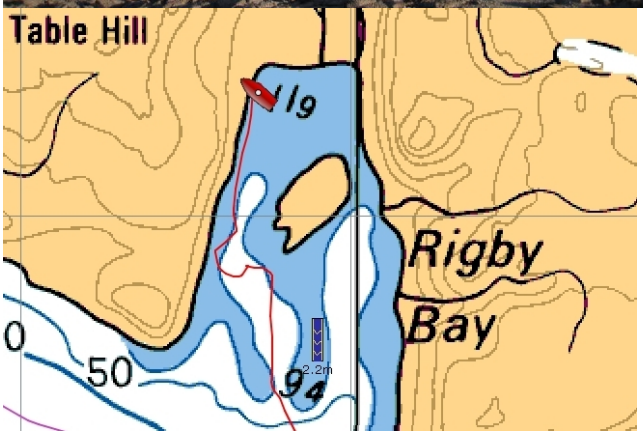
Hobhouse Inlet 74º30'N / 87º00'W.
Very deep up to shores, anchor in NE end. Charts are off by approx. 0.4 Nm West. Chart by *"Tooluka"*. Anchorage at 74º50.2236'N / 87º00.7635'W. "Hobhouse definitely wasn't a good anchorage" (E.W.) No settlement.



Blanley Bay 74º30'N / 87º24.4'W.
Good for short stop over, unknown depth anchorage. No settlement.

Graham Harbour 74º30.7'N / 88º09.7'W.
Excellent anchor past mid spit and shelter from all winds and ice. Soundings by C.K. No settlement.

Rigby Bay 74º34'N / 90º03'used by *"Tooluka"* in 2013 for shelter. The unnamed island position in the middle is off by some 0.2 Nm west. Entrance found close to the west shore. Anchored at 74º34.992'N / 90º02.8192'W good holding. No settlement. (E.W.)



Scallon Cove at Radstock Bay 74º45.40'N / 91º10.70'W used by few boats in 2013 for shelter. Good holding and good shelter from all but SSE winds. Water ashore. No settlement. (L.R.), (A.P.)

Kearney Cove 74º43.6'N / 90º45.2'W on opposite side of Radstock Bay has better shelter from SE but parts of it may be a bit deep for small boat anchoring. No settlement. (L.R.)

Erebus & Terror Bay, Beechey Is.
74º 43'N / 91º5.5'W
Place of three graves of late Franklin expedition crew are at the far west end. In odd years can be filled with ice and not accessible. Select Union Bay from north separated by the sand spit instead.

Resolute Bay 74º41'N / 94º52.4'W – Barrow Str.
Poor holding available for smaller vessels in open bay. Deeper vessels in open roadstead. Can be swamped with ice at no notice. Advisable to enter on western side, for depth. Fuel and water from village. Airport.

Polaris Mines NW off Resolute. 75º23'N / 96º53'W. Sheltered from all directions.

Bridport Inlet, Melville Is. 75º01'N / 108º45'W.
Good for large vessels available off south shore.

Arctic Watch 74º04.2N / 93º48.7W at Cunningham Inlet north side of Somerset Is. Never listed by any Pilot Books. It is an Arctic Lodge a tourism establishment for wildlife viewing since 2000. It is inhabited, annually from about 20 June to mid August. Operated by Richard Weber & Josee Auclair. Entry to inlet very shallow just above 0.6 m. pending chart information or own soundings. Tides can reach 1.5 m. Very quaint place not ready for any rescue. It may offer only the very final rescue for very stranded who will abandon their boat at the entrance to the Inlet. Was frozen solid in 2013. Contact only by mail@arcticwatch.ca. or skype telephone number: +1 802 375 7379. Active 1070 mtr. long airstrip with connections to civilized world.


Arctic Watch looking North

Port Leopold 73º51'N / 90º18'W – Prince Regent Inlet. Water in harbour has a dangerous looking light tinge. Anchoring quality fair. Shelter from N winds, ice may enter any time. Abandoned HBC outpost. In past used by whalers and Thule.

Batty Bay 73º14'N / 91º24'W. Kennedy wintered there. Middle channel offers 6-9 m. depth and good shelter for small crafts. Tides are 1.2 to 2.1 m.

Cresswell Bay 72º40'N / 93º00'W generally shallow with few soundings.

Port Bowen 73º13'N / 89º00'W. Parry wintered there. Avoid south point entrance. Anchorage at North Cove in 8 m.

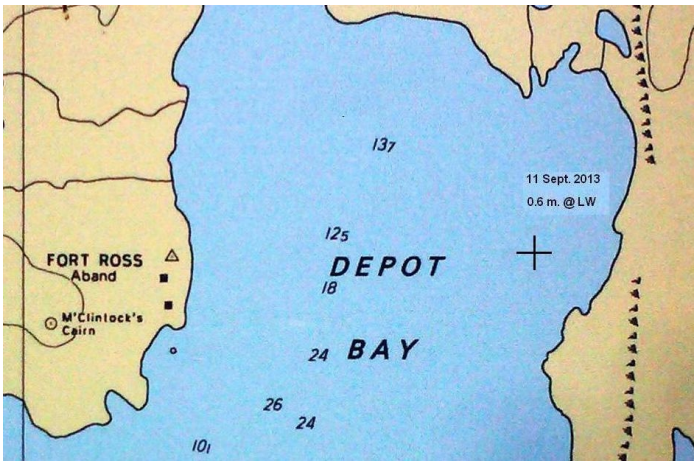
Port Neill 73º09'N / 89º10'W. Well sheltered in NW part, mud with good holding. No settlement.

Fitzgerald Bay 72º09'N / 89º45'W has very low and fronted shallow waters. Pilotage there is tricky with sand banks.

Levesque Harbour 71º54.6'N / 94º28.2'W. Off Smellie Point offers safe anchor from all winds. Used by M'Clintock and many other in 2013 during gales. No settlement.


Levesque Harbour Libellule

Depot Bay at Ft. Ross 72º00.5'N / 94º13'W.
Anchorage in mud and gravel good for W winds only. Anything from WNW to ENE Gale force winds should be avoided in Depot Bay. Communication by VHF radio limited with west end of Bellot Str. At 72º00.65'N / 94º12.10'W shallow water of 0.6 m. during ebb.
Place may get engulfed with dense fog with no warning. Abandoned Hudson's Bay Co. outpost, new book inside south hut to sign by visitors. The key to the hut can be found under the stone at right hand corner. Temporary locks are being installed with no key due to misplacement of original key by the sailors during 2014 sail season.



Near Ft. Ross a good shelter from ice and wind can be found in a bay west of **Brands Is.** at 71º57.95'N / 94º28.33'W. Holding is fair and shelter excellent. Entry can be taken via the channel either south of or west of Brands Is. Care must be taken on either route as, while both channels are generally deep, there are shoals, some of which are uncharted. (L.R.)

South of 71º06'N the electronic charts end displaying much details of shore line and soundings of Boothia Gulf. Sailors need to maintain extreme caution.

Cape M'Clure 72º54'N / 96º41'W – Peel Sd.
Channel between Prince of Wales Is. and Pandora Is. nearly always blocked by shallow waters. Not for navigation.

Young Point 72º41'N / 97º00'W – Peel Sd. Very shallow bay with excessive shoaling at the mouth of streams.

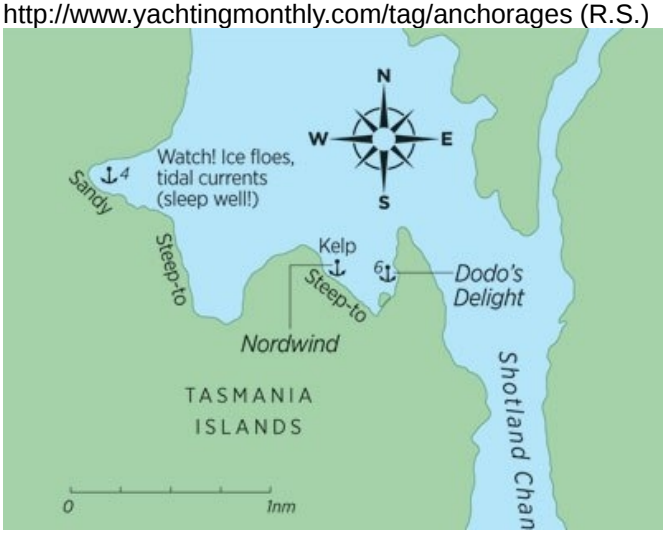
False Str. 71º59.3'N / 95º08'W – Peel Sd.
Shelter from all but westerly winds. Good holding 1 Nm within entrance in 7-10 m. No settlement. (R.S.)

Willis Bay 71º56'N / 96º38'W – Peel Sd.
Good shelter from all winds with fair anchorage. No settlement.

Jonathan Shoal 71º43.9400'N / 95º41.3000'W.
Reported by *"Jonathan III"* (2012) after hitting rock at 2.1 m. depth. Acknowledged by Canadian Hydrographic Service in Notice to Mariners.

Tasmania Islands **Teleport Shoal** 71º19.6610'N / 96º41.0320'W, own name. Reported by *"Teleport"* (2011) tidal rips in apparent 40 m. depth.

Sophie Louise Cove – assumed name 71º15'N / 96º32'W.
A pleasant anchorage by a beach at the far western end of this cove. However ice floes on the unpredictable tidal currents can be a problem. See more at: http://www.yachtingmonthly.com/tag/anchorages (R.S.)



Larsen Sd. and James Ross Str.
Tidal currents in these waters are very prominent causing movement of ice accelerated by the strong winds. Sailing during strong westerly winds in heavy ice along west coast of Boothia Peninsula is not advisable. Reference tidal points at Admiralty Is. (Driftwood Pt.), Tasmania Is. (Hartstene Pt.), Seal Bay (King William Is.) and False Str. (Bellot Str.) can be used. Please note that some tidal points are not listed in Canadian Tide and Current Tables for Arctic and Hudson Bay, Volume 4.

Weld Harbour 71º07'N / 96º22'W very good shelter even for winter with good steel hull boat. Jetfuel depot nearby, lots of Muskox. (E.B.)


Weld Harbour (C) Eric Brossier

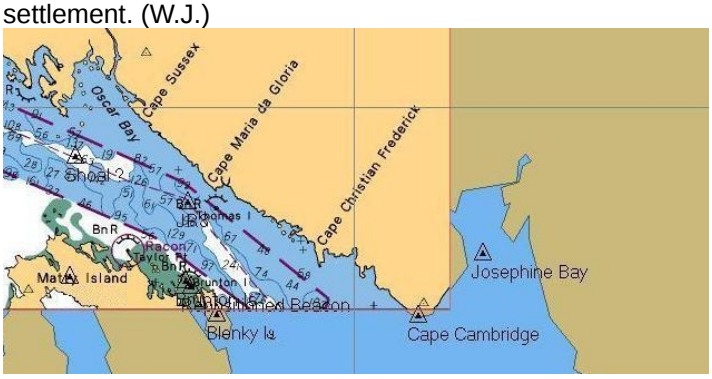
Pasley Bay 70º36'N / 96º09'W – Larsen Str.
Used by St. Roch to winter. Fair holding and shelter except for W winds. No settlement.

Cape Victoria 69º52'N / 96º08'W charts can be off by 0.8 Nm. Anchorage available at south side during fair weather only. Some shoals are reported in vicinity. (W.J.)

Oscar Bay 69º45'N / 95º39'W offers good anchorage in sand for small vessels except for NW winds bringing ice from Larsen Sd. Watch for ingress of ice brought during tidal currents not specified anywhere. (W.J.)

James Ross Str. Has undocumented difficult currents causing shift of ice at about 6 hour intervals.
At 69º42.4167'N / 95º43.50'W chart 7760 shows doubtful shoal. The depth is 32 m. (M.J.)

Josephine Bay on the North side of St. Roch Basin. At 69º38.57'N / 94º43.8'W anchorage in 8 m. sand. Gary River estuary offers good and safe anchorage and granite hills to 100 m. high with no evidence of shoaling. Sudden dense fog may be encountered in all Josephine Bay. No settlement. (W.J.)



Taloyoak (Spence Bay) 69º32.058'N / 93º314832'W.
Difficult approach. Good anchorage except in SW winds. Entrance to harbor must be held to the southeast. September gales funnel large waves into the harbor and has a very late thaw.
Pilot book ARC 403 page 8-14 is a good description of approach.
At low tide when entering the inner harbor anchorage rocky in 4.9 mtr. Looks better, deeper in the bay. Inner harbor has anchor points on land for supply vessels to moor. Daylight approach only and lots of morning fog here. Fuel at airport and fresh water available from lake few hundred feet inland of inner harbor. Two grocery stores and most friendly and welcoming village. Not acceptable port for wintering. No crane or heavy equipment. Used by only few sail boats in past. (J.O.)

Wilkins Point, off route – Rasmussen Basin. Unsheltered with good holding for larger vessels 0.4 Nm of beach.

Gjoa Haven 68º38'N / 95º52.9'W King William Is.
Good holding and shelter from all winds off landing beaches. Some Banking at the Northern Store. Fuel and water from town. Airport.

Gladman Point 68º38.634'N / 97º44'W – Simpson Str.
Obtainable south of entrance to bay and off former landing beach.
Abandoned DEW Line facility. Tide monitoring point.

Hat Island 68º19'N / 100º06.5'W - Queen Maud.
No anchor near 68º18'N / 100º00'W small Islands. Good holding elsewhere. No settlement.

Ellice River 68º 01.30' N / 104º W in the Campbell Bay south of Spalding Islets offers outstanding Arctic Char fishing. Contact Bill Lyall at:
manager.ikaluktutiak@arcticco-op.com
Approach to Ellice River requires very intricate navigation skills due to many shoals and rocks along the way.

Jenny Lind Bay 68º38'N / 101º45'W - Queen Maud
Anchorage with good shelter except from SE winds.
No settlement.

Parker Bay 68º49'N / 103º12'W. Officially uncharted.
Possibility of hiding from incoming ice from SE-SSE behind small unnamed islet at 68°50.21'N / 103°10.18' W in 5 m. as per Vagabond'eux information dated 20 Aug. 1986. The middle of bay has shoal with many places at 1.2 m. muddy bottom. (W.J.)

Cambridge Bay 69º06'N / 105º04'W Victoria Is.
Good holding in central part of arm and off landing beach on N side of entrance. No charge fuel delivery during business hours otherwise $157,- after hours per boat. Water delivery is $100,- Propane available with North American style 20 lb. cylinder exchanged for $80,- at Kitimuth Supplies. WiFi available at hotel restaurant. Some repairs can be done. For boats to winter using local crane to lift on shore the charge is now CAN $2500,- per lift. Major airport.

Dease Str. & Coronation Gulf from Finlanson Islands to Lady Franklin Point. Generally south of 60º20'N.
Includes Kent Peninsula, Duke of York Archipelago, Home Islands, Lawford Islands, Barens Islands, Coupler Islands and Black Berry Is. positioned as much as 2 Nm off WGS84. Be aware.

Sinclair Creek 68º44'N / 108º57.6'W.
Unsheltered anchorage is available over rock and shingle bottom.

Edinburgh Is. 68º31'N / 110º41' W.
Fair anchorage in one of the bights in about 10 mtr. on East side of island. Will shelter against NW & W winds (W.S)

Baychim Harbour – off course
Anchorage obtainable in NW part of the harbour

Port Epworth 67º43'N / 111º54'W.
Available in the west and east arms. Excellent anchorage. Shallow draught vessels only.

Kugluktuk 67º49.7'N / 115º05.6'W. Should be approached with caution. Good holding 0.8 Nm NW of hamlet. Some time fuel available from village. Airport.

Lady Franklin Point 68º29.1'N / 113º14.5'W.
0.4 Nm off landing beach. Barges if any, anchor with stern lines to shore. A small hut offers shelter for stranded.

Muskox Bay 69º13'N / 113º40'W (Vagabond'eux own name).
Excellent anchor holding bottom with mud. Good shelter from all but southerly winds and ice. Small unoccupied Inuit cabin. Fog frequents the area (1986 W.J.) Last visited extensively in 2015 by s/y Selma (P.K.)

Read Is. 69º13'N / 113º53'W.
Abandoned Hudson's Bay outpost. Long narrow bay offers 2.7 m. depth for small craft. 0.2 Nm North of island in 9 m. water has sand and mud with good holding. (W.J.)

Sutton Is. 68º54.323' N / 114º17.681' W anchorage. The unnamed bay on the east shore may offer shelter from gale winds from South, and North and a little less from the West winds. Soundings inside the bay not available. If used please report. Ice accumulation may not be as prominent after prolonged westerly winds.

Bernard Harbour 68º46.8'N / 114º46'W.
Large vessels at 1 Nm north of Chipman Point. Untenable w/NW gales. No settlement.

Cape Young 68º56'N / 116º54'W Unprotected obtained at 0.5 Nm off former beach landing. No settlement.

Ulukhaktok (Holman) 70º44'N / 117º46'W.
Poor holding and exposed to south winds. Easier anchorage at Queens Bay for sail boats in 6 m. Fuel and water sometime available from village. Internet access at library next to school. Health Center, Airport. (R.H.)

Fresh Water Bay on Diamond Jenness Peninsula
70º36'N / 117º28'W fresh water available at the far end west arm of bay from the stream 70º38.1N / 117º29.6'W. Proceed in the middle with no less than 13 m. water until close to creek. Anchor in 5 m. loose gravel/poor holding. (R.H.)

Tysoe Point 69º35.5'N / 120º43.2'W. 0.4 Nm offshore anchorage but exposed to wind and ice.

Pearce Point Harbour 69º49.4'N / 122º41.4'W.
Its charts follow GPS position with no offsets. Fair holding and protected from all but north winds. Difficult holding during gale winds. Careful selection of anchoring should be made according to Sailing Directions ARC 403. In less than gale winds good ground tackle should hold. Only sheltered anchorage for 200 Nm. No settlement.
27/08/2012 0722 UTC *Best Explorer*
69° 48.702'N / 122° 41.212'W

Darnley Bay 69º45'N / 123º40'W at many places gets foggy for some 20 days a month. There is a constant set of currents in the bay.
Letty Harbour 3 Nm South of Racing Is. at 69º51'N / 124º26'W offers full shelter off abandoned trading post in 3.7 m. depth.

Cape Parry 70º11.8'N / 124º32.3'W.
Available in Cow Cove with poor holding but good shelter from E winds. No settlement.

Summer's House 70º07.7'N / 125º04.6'W.
Excellent protection from sea and ice with good holding. No settlement.

Franklin Bay 69º50'N / 126º00'W known for its Smoking Hills. It gets similar dose of fog as Darnley Bay.

Baillie Is. Snowgoose Pass, 70º34'N / 128º06'W.
Shoaling and silting due to strong tidal currents, not recommended for deep draughted yachts!
Smaller boats with less than 1.8 m. draught may pass by keeping to the middle of the channel but only with good visibility and during fair weather. Islands wrongly located according to radar observations. (J.C.)

Nicholson Island, Liverpool Bay 69º56.1'N / 128º52.7'W.
Close off outer side of Hepburn Spit. Not recommended to sail due to erratic tidal currents.

Sachs Harbour, Banks Is. 71º58.4'N / 125º17'W.
Very clear water. Ice threat with NW winds. Better anchorage 6 Nm W. Not used much by sailors as is off the beaten track. Fuel and water if available from village. Airport.

De Salis Bay, Banks Is. 71º26.9'N / 121º37.2'W.
Sheltered from all but north to west winds on East side of the bay. Alternate in NW part of the bay. No settlement.

MacKinley Bay 69º56'N / 131º09'W
This is the great anchorage as it used to be the old oil field turning basin for anchorage and dredged channel was no less than 7.6 meter all the way in. Electronic charting was dead on. There is even break water man made stopping swells entering anchorage. Possible mooring at concrete wharf. This is not on charts. (C.Z.)

Hutchison Bay 69º44'N / 132º10'W
Abandoned oil rig. Unknown depth appearing shallow for bigger boats.

Tuktoyaktuk 69º27.1'N / 132º59.3'W.
The harbour is relatively deep and sheltered. Fuel, water and repairs available. Airport and full Banking Services.

Inuvik 68º21'N / 133º44'W. Located some 100 km inland on MacKenzie River. The only NWP presently available wintering place for boat with lifting keel as the river is very shallow in many places 1.5 mtr. Storage on dry with Northwind Marine Yard. (W.S.)

Shingle Point 68º58.8'N / 137º16'W.
Good anchorage on south side of Escape Reef. Shallow !

Herschel Is. , Pauline Cove 69º34.4'N / 138º55'W.
Good anchorage in 6 m. Historical and very quaint place.

Komakuk Beach 69º36'N / 140º11'W.
In open roadstead with good holding, alternative in Thetis Bay.

Demarcation Bay 69º41'N / 141º19.2'W shallow water to get in, use the north entrance, Inuit fishing summer camp. (E.B.)

Barter Is. (AK) 70º08.5'N / 143º37'W.
Extensive shoaling to 1.0 m.
At Kuvritovik Entrance 70º07'N / 143º47'W shelter can be found with 2.2 mtr. under keel (R.S.)

Flaxman Island, 70º12'N / 146º13'W
I am pleased to tell you that this morning 25 July 2015 we managed to get through that ice choke point off Flaxman Island. We stayed in shallow water 5 to 6 metres depth, encountered maximum 5/10 ice but managed to find our way around. Yesterday we were in areas 6 to 8/10 east of Prudhoe Bay, got into some dead ends but found ways around. Last night we diverted south of Duchess Island (Maguire islands) - the latest Canadian chart was wrong, location of the sand banks was wrong, depths all wrong... we had to lift centerboard up so as only draw 5 feet to avoid going aground, and also when leaving via Mary Sachs entrance early this morning.
Sand banks have shifted also west of Flaxman...So far, so good, and it may sound easy but you do have to have a boat like Aventura (aluminum, centerboard that reduces draft from 9 feet to 4 feet in an instant), and good crew. (J.C.)

Cross Is. (AK) 70º29'N / 147º57'W.
Good anchorage, watch for shoaling. Ex whaling station.

Cape Halkett (AK) at Harrison Bay. Anchor at 70º46.12'N / 152º15.2W in 2.7 m. was not found in 2014 mainly due to extensive shoaling. Unknown quality of bottom.

Elson Lagoon 71º21'N / 156º21'W.
Shelter and rest can be found in the lagoon to the north east of Point Barrow. Enter through Eluitkak Pass. It offers shifting sand bottom with approx. 3 m. depth and some shelter from west winds. Walking distance to Barrow (R.S.)

Next is **Point Barrow** (AK).
Gravel beach landing only. Airport, Hospital. The hospital is a qualified Acute Care facility and State certified Medevac Service.
NSB Search & Rescue provides Critical Care Air Ambulance Service.
Emergency Services have coastal helicopter and floatplane access.
Emergency service is provided by 911 Telephone Service volunteers and health aide.
Borough Volunteer Fire Dept/EMS/Search & Rescue/Medevac (907) 852-0234 or (907) 852-6111
US Coast Guard, District Seventeenth,
PO Box 25517, Juneau, AK 99802-5517, Tel: (907) 463-2000, (907) 463-2004, http://www.uscg.mil/d17

Peard Bay 70º50'N / 158º35'W.
Have seen its casualties. Its not the place to storm. Shifting sand banks and mainly very shallow.

Wainwright 70º36'N / 160º07'W.
Is subject to shifting sand banks and information should be sought by radio before any attempt to enter. (R.S.)

No shelters till Point Hope.

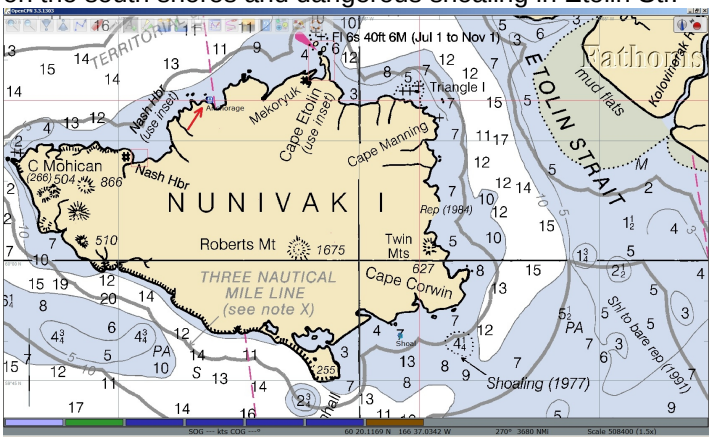
Point Hope
As its name indicates the shelter can be found to the north or south of Point Hope. To the north:
Karen's Cove 68º27'N / 166º19'W (assumed name). It is south of Kowtuk Pt. Anchor in 7 m. off beach by curve of the shoreline. NOAA charts there are off by 0.23 Nm West. It may be possible to enter beginning of the lagoon, well hidden a little to the west, but it is still ten miles from the settlement.
To the south:
The shore is very steep-to in the vicinity of the settlement. The best anchorage is approximately 3 miles to the east.

Once through Bering Str. Port Clarence offers good shelter with its Teller place/Grantley Harbour and airstrip while most will be proceeding as fast as possible for **Nome** (Alaska) where USA immigration clearance can be get. (R.S.) (E.B.)

For those arriving to seek winter shelter in Alaska can be intimidating and difficult. Anchoring in kelp should be discouraged.
The following places are recommended:

Nome, 64º30'N / 165º25'W US Customs Port of Entry. Proper port with nearly all facility. Limited wintering for smaller boats on shore, contact Rolland Trowbridge for help at (907) 434-1516.

Nunivak Is. 60º20'N / 166º37'W This little bay next to Nash Hbr. offers some landing. Watch for plenty of kelp primarily on the south shores and dangerous shoaling in Etolin Str.



Hagemeister Str. In Bristol Bay 58º46'N / 161º08'W. Good shelter from prolonged Westerly & Northerly storms.

Security Cove in Kuskokwim Bay 58º41'N / 161º54'W offers good place for anything but Northerly winds.

St Paul, Pribilof Islands, has sheltered harbor (Port of Refuge). Docking is $2 ft for each 12 hours (so $4 ft/day). Groceries available. Anchoring in the lee of the island is also possible. Not recommended for wintering.

Dutch Harbor, 53°54'N / 166°31'W.
is a major fishing port with all services available. US Customs Port of Entry. Potential place to winter in-water.

Sand Point (Humbolt Harbor) 55º20'N / 160º30'W fishing port with available wintering facility.

Kings Cove 55º30'N / 162º19'W major fishing port with 150 ton lift. Repairs available. Check for wintering availability.

Kodiak, 57°46'53"N / 152°26'09"W.
is a major fishing port with all services available. US Customs Port of Entry. Potential place to winter in-water.

Homer 59º36'N / 151º25'W. Crowded wintering either in water or on dry. Many services.

Halibut Cove 59º35'N / 151º14'W. Pristine Alaska place. Reachable by boat or sea plane only. Former fishing place now resided by artists and business people. Electricity on shore. Possible wintering for sail boats in water, no services.

Seward 60º07'N / 149º26'W. Some yachts wintered in water, available on dry as well. Many services. Road to Fairbanks.

Yakutat, 59°33'N / 139°44'W.
is a small fishing town of about 500 people. Airport. Small boat harbor has good protection, inexpensive docking (no electricity for transients). Many boats run aground on rock outside harbor.
Follow both daymarks to avoid the rocks. (R.H.)
Chignik, 56°17′54″N / 158°24′16″W.
is a fishing harbor. Fuel and propane likely available. (R.H.)

Hoonah (Inside Passage, near Juno) 58°06.5′N / 135°26′W
has a 250 ton Travelift and a large gravel pad to store boats ashore. Potential place to winter boat ashore (or in water, but harbor is small). (R.H.)

Sitka, 57°3′5.62″N / 135°20′19.11″W. is a fishing port of about 8 000.
All services available, and a potential place to winter in-water. (R.H.)

All Alaska ports and harbors have access to the airports.

See Websites of major Alaska harbor choices:
http://www.mxak.org/ports/all_regions.html

For contact list of all Alaska Harbor Masters see:
http://www.alaskaharbors.org/membership_corporate.html

US Customs and Border Protection issued New Procedures for Small Boat Reporting Beginning 2016 Release Date: December 22, 2015.

US Department of Homeland security and USCG has issued GUIDELINES FOR TRAINING OF PERSONNEL ON SHIPS SUBJECT TO THE POLAR CODE 16715 CG-OES Policy Letter No. 01-2016.
The amendments will enter into force on January 1, 2018.

Later paper can be obtained at Internet from appropriate authority or in form of request from vic11@bell.net

The Polar Bears protection issued was published in 2016 by US at: http://maritime-executive.com/article/polar-bears-win-120-million-acres-of-alaska so be aware.

Canada Search and Rescue

The Canadian Armed Forces (DND) are responsible for coordinating all Search and Rescue (SAR) activities in Canada, including Canadian waters and the high seas off the coasts of Canada. A Joint Rescue Coordination Center (JRCC) are situated in the Canadian Forces base at Halifax, Nova Scotia to coordinate activities in the region. The JRCC is the headquarters of a coordinated network of agencies trained and responsible to search for and aid vessels in distress. There are Canadian Coast Guard officers at the JRCC who are on continuous watch to arrange the response to marine SAR incidents.
Maritime Rescue Coordination Subcenters (MRSC) are maintained at St. John's, Newfoundland and Quebec City. These centers function as subcenters of the above-mentioned JRCC. MRSC St. John's will coordinate the necessary response measures during marine SAR incidents in the waters off the coasts of Newfoundland and Labrador. MRSC Quebec will similarly respond to SAR incidents in the waters off the province of Quebec.
All distress situations and requests for assistance should be directed to the appropriate MRSC or JRCC via the nearest Canadian Coast Guard Radio Station, Vessel Traffic System Center, or by any other available means. The JRCC and the MRSCs can be contacted, as follows:

JRCC Halifax
Telephone: 1-902-427-8200
1-800-563-2444 (Newfoundland & Labrador Region)
E-mail: jrcchalifax@sarnet.dnd.ca
Facsimile: 1-902-427-2114

MRSC Quebec City
Telephone: 1-418-648-3599
Facsimile: 1-418-648-3614
E-mail: mrscqbc@dfo-mpo.gc.ca

Arctic SAR, Trenton
Telephone 1-800 267-7270
+1-613-965-3870 (Satellite, Local, or Out of Area)
E-mail: jrcctrenton@sarnet.dnd.ca

JRCC, Victoria
Telephone: 1-800-567-5111, Cellular: #727
Satellite, local, or out of area: 250-413-8933
Email: jrccvictoria@sarnet.dnd.ca

All Canadian government ships and aircraft are available for search and rescue duties when required, as are all

Canadian registered ships in accordance with the Canada Shipping Act.
In addition, the Canadian Coast Guard operates a number of specialized vessels whose prime mission is search and rescue.
Medical assistance in Canadian part of NWP is provided at most places with qualified nurses, for more severe cases the lift by aircraft to Yellowknife Hospital or University Hospital in Edmonton is available. The return flight from Cambridge Bay to Yellowknife may cost approx. $3500,- per person.
Pond Inlet, Nunavut has now official immigration officer during summer time while the rest of Canadian Arctic uses its Royal Canadian Mounted Police (RCMP) to do the clearance. For all aliens leaving Canada it is not required to report to authorities.
Canadian gun permit fee in 2014 was $50,- and is usually good for 2 months unless requested otherwise (for boats wintering). Inquire at local RCMP detachment.

Notmar
Notmar.gc.ca email notification service provides with Section 2 - Chart Correction notices only. Users wishing to receive the complete Monthly Notices to Mariners publications electronically can do so by subscribing on page at http://www.notmar.gc.ca/subscribe Mariners are responsible to apply the complete Notices to Mariners publications (Section 1 -5) in accordance with the Canada Shipping Act, Charts and Nautical Publications Regulations 1995.

To view all sections of the Notices to Mariners publication visit www.notmar.gc.ca and select the appropriate publications from the left side menu under "Notices to Mariners". For more information on marine safety or other Canadian Coast Guard programs and services please visit www.ccg-gcc.gc.ca.

Final Notes on Arctic Charts:
Chart Catalogues Index (PDF) publication is available at: http://www.charts.gc.ca/charts-cartes/paper-papier/index-eng.asp?step=1#h2
Select any of four.
Catalogue 1 - Atlantic Coast - 2012 (11.1 MB)
Catalogue 2 - Pacific Coast - 2012 (30.0 MB)
Catalogue 3 - Ontario/Manitoba including Great Lakes - 2013 (28.87 MB)
Catalogue 4 - Arctic - 2013 (7.95 MB)
Those are available only in electronic format now.

Principles of High Latitude Navigation:
Navigating in high latitudes requires great care in the procedures and in the use of information. The remoteness of the Arctic and the proximity to the North Magnetic Pole has an affect on the charts that are supplied and the navigation instruments that are used with them. This section discusses some of the effects and limitations on charts and instruments used in the Arctic.
In high latitudes, the meridians are not the familiar parallel lines of the Mercator chart but radial lines converging at the poles. Thus Ice Charts provided by Canadian Ice Service are plotted on Polar Stereographic projection to show real shape of ice occupied particular waterways. Mariners prefer using a Mercator chart, so to preserve the look of a Mercator chart a polar grid is used. A grid is printed parallel to a meridian, usually the Greenwich meridian. On a Transverse Mercator chart the fictitious meridians found on this type of chart would serve this purpose. Because the meridians cross all grid lines at the same angle they are fictitious rhumb lines.
The direction that is chosen as the reference for the grid is north, so then all parallel grid lines can be taken to be extending in the same direction. The direction relative to the grid lines is then known as the grid direction. If a magnetic compass is used to follow the grid direction then the corrections of variation and convergency can be combined to a single correction called grid variation or grivation.

Charts:
There are two areas of concern with the use of charts in the Arctic. These are consideration of the uncommon projections used and the accuracy of the surveys.

Projections
To compensate for the fact that the meridians converge as they near the pole the scale of the parallels is gradually distorted. In the high Arctic, Mercator projections suffer too much distortion in the latitude direction to be used for anything but large-scale charts. As the latitude increases the use of rhumb lines for visual bearings becomes awkward, as it is necessary to add ever larger convergency corrections. As the Arctic becomes better surveyed there will be more Mercator charts, but other projections such as Lambert Conformal, Polyconic, and Polar Stereographic are used as well. Until about 1985 most of Arctic Charts were of Polyconic projection. Polar Stereographic is becoming the most popular as it provides minimum distortion over relatively large areas. The number of different projections make it important, when changing charts, to check the type and any cautions concerning distances, bearings, etc. For example, the habit developed with Mercator charts is to use the latitude scale for distance, which is not possible on Polyconic charts. Particular care must also be taken when laying off bearings in high latitudes, as a convergency correction may be needed even for visual bearings.

Accuracy
The accuracy of charts in the Arctic can vary widely according to the date of survey. The more frequently traveled areas, such as Lancaster Sound, Barrow Strait, and the approaches to Polaris and Nanisivik mines, are well surveyed, but many charts are based on aerial photography (controlled by ground triangulation) combined with lines of reconnaissance soundings. Even new editions of charts may be misleading as some information on them may be dated. The appearance of depth contour lines on new charts does not indicate any new information. Production priorities may result in new information being added to large-scale charts only.
Precautions to be taken when using charts for Arctic areas include:
- checking the projection and its limitations,

- checking the date of survey and / or the Source Classification Diagram,
- using range and bearing to transfer positions from chart to chart,
- checking for evidence of reconnaissance soundings,
- using the larger scale map in preference to the smaller scale map; and
- checking for the method of measuring distances and taking bearings.

Canadian Arctic Nautical Charts and Charting Deficiencies

One of the principal problems with charts in the Arctic concerns the horizontal datum on which the actual chart is based. With more and more vessels using accurate positioning systems such as the Global Positioning System (GPS) or the Russian system (Global'naya Navigatsionnaya Sputnikovaya Sistem - GLONASS), the greater the problem will become. Regarding GPS, the positions are referenced to the World Geodetic System (WGS 84) which is virtually equivalent to the North American Datum 1983 (NAD 83). If you are navigating on a NAD 83 chart with GPS there would be no corrections to apply. If you wanted to plot on a NAD 27 chart you must manually apply the appropriate corrections.

In 1997 there were 245 charts listed in the Arctic Chart Catalogue. Only 55 charts (22%) have sufficient accuracy or detail to facilitate accurate plotting of positions obtained by GPS, which requires a chart base relative to the NAD 83 horizontal datum. There are 49 charts that specify that positioning with GPS can lead to positioning errors up to some defined magnitude, which may be as much as 4 nautical miles. The remaining 141 charts did not have any information about the horizontal datum of the chart. For bathymetry (depth soundings, bottom composition, etc.) it is estimated by the Canadian Hydrographic Service that less than 25% of the Arctic waters are surveyed to acceptable, modern standards. Much of the data has been collected by random vessel's track soundings or over ice spot soundings.

Sailors should proceed with due caution and prudent seamanship when navigating in the Arctic especially in poorly charted areas or when planning voyages along new routes. Additional information may be found in the Annual Edition Notices To Mariners.

Effect of High Latitude on Compasses and Electronic Aids

Compasses
The magnetic compass can be erratic in the Arctic and is frequently of little use for navigation:

"The magnetic compass depends on its directive force upon the horizontal component of the magnetic field of the earth. As the north magnetic pole is approached in the Arctic, the horizontal component becomes progressively weaker until at some point the magnetic compass becomes **useless as a direction measuring device**."

If the compass must be used the error should be checked frequently by celestial observation and, as the rate of change of variation increases as the pole is approached, reference must be made to the variation curve or rose on the chart.

The gyro compass is as reliable in the Arctic as it is in more southerly latitudes, to a latitude of about 70°N. North of 70°N special care must be taken in checking its accuracy. Even with the compensation given by the latitude corrector on certain makes of compass, the gyro continues to lose horizontal force until, north of about 85°N, it becomes unusable. The manual for the gyro compass should be consulted before entering higher latitudes. The numerous alterations in course and speed and collisions with ice can have an adverse effect on its accuracy. Therefore, when navigating in the Arctic:

Radar
In general, Arctic or cold conditions do not affect the performance of radar systems. Occasionally weather conditions may cause ducting, which is the bending of the radar beam because of a decline in moisture content in the atmosphere. This effect may shorten or lengthen target detection ranges, depending on the severity and direction of the bending. A real problem with radar in the Arctic concerns interpretation of the screen for purposes of position fixing.

Position Fixing
Problems encountered with position fixing arise from either mistaken identification of shore features or inaccurate surveys. Low relief in some parts of the Arctic make it hard to identify landmarks or points of land. Additionally, ice piled up on the shore or fast ice may obscure the coastline. For this reason radar bearings or ranges should be treated with more caution than measurements in southern waters. Visual observations are always preferable. Sometimes it is possible to fix the position of grounded icebergs and then to use the iceberg for positioning further along the track, if performed with caution. Large areas of the Arctic have not yet been surveyed to the same standards as areas further south, and even some of the more recently produced charts are based on aerial photography. To decrease the possibility of errors, three lines (range, or less preferably bearings) should always be used for positions. Fixes using both sides of a channel or lines from two different survey areas should be avoided. Because of potential problems, fixes in the Arctic should always be compared with other information sources, such as electronic positioning systems.

Global Positioning System (GPS)
The Global Positioning System, or GPS, is a space-based radio-navigation system which permits users with suitable receivers, on land, sea or in the air, to establish their position, speed and time at any time of the day or night, in any weather conditions.

The navigational system consists nominally of 24 operational satellites in six orbital planes, and an orbital radius of 26,560 kilometers (about 10,900 nautical miles above the earth). Of the 24 satellites, 21 are considered fully operable and the remaining 3 although functioning, deemed ‘spares’. The orbital planes are inclined at 55° to the plane of the equator and the orbital period is approximately 12 hours. This satellite constellation allows a receiver on earth to receive multiple signals from a number of satellites 24 hours a day. The satellites continuously transmit ranging signals, position and time data which is received and processed by GPS receivers to determine the user’s three-dimensional position (latitude, longitude, altitude), velocity and time.

GPS was declared initially operational in December 1993 with full operational capability being declared in July 1995. GPS provides two levels of service - a Standard Positioning Service (SPS) for general public use, and a Precise Positioning Service (PPS) primarily intended for the use of the U.S. military. The SPS point accuracies within 100 metres in the horizontal plane and 156 metres in the vertical plane, 95% of the time. However, the US Department of Defense, deliberately introduced errors in the satellite’s clock oscillator frequency in a seemingly random, though controlled manner, consequently degrading the accuracy to those given for SPS. This deliberate introduction of errors is known as Selective Availability. The US president has proclaimed that the level of SA will be reduced to zero within the next seven years and when this occurs the horizontal position accuracy for stand alone civilian GPS receivers will improve from the previously stated 100 meter level to the 30 meter level.

Although the satellites orbit the earth in a 55° plane, the positional accuracy all over the globe is generally considered consistent at the 100 meter level. For a ship at a position 55° North or South latitude or closer to the pole, the satellites would be in a constellation around the ship with the receiver actually calculating the ship’s Horizontal Dilution of Precision (HDOP) with satellites possibly on the other side of the pole. With a ship at or near the north pole all the satellites would be to the south, but well distributed in azimuth creating a strong fix. The exception to this is the vertical component of a position which will grow weaker the further north a ships sails because above 55°N there will not be satellites orbiting directly overhead.

Other than Selective Availability, there are a variety of sources of error which can introduce inaccuracies into GPS fixes especially in polar regions such as tropospheric delays and ionospheric refraction in the auroral zone. The troposphere varies in thickness from less than 9 kilometers over the poles to over 16 kilometers on the equator which can contribute to propagation delays due to the signals being refracted be electromagnetic signal propagation. This error is minimized by accurate models and calculations performed within the GPS receiver itself. The ionospheric refraction in the auroral zone (the same belt in which the aurora borealis / aurora australis phenomena occur) caused by solar and geomagnetic storms will cause some error. Sunspot activity is on an 11 year cycle and this activity is expected to peak at about the year 2011. If the datum used by the GPS receiver in calculating latitude and longitude is different from the datum of the chart in use, errors will occur when GPS derived positions are plotted on the chart. GPS receivers can be programmed to output latitude and longitude based on a variety of stored datums. Since 1986 the Canadian Hydrographic Service has converted some CHS charts to NAD 83. Information on the chart will describe the horizontal datum used for that chart and for those not referenced to NAD 83, corrections will be given to convert NAD 83 positions to the datum of the chart. The title block of the chart will describe the horizontal datums used for the chart and will give the corrections to convert from the datum of the chart to NAD 83 and vice versa.

Radios

Radio communications in the Arctic, other than line of sight, are subject to interference from ionospheric disturbances. Bad propagation is common. Whenever communications are established alternative frequencies should be agreed upon before the signal degrades. Use of multiple frequencies and relays through other stations are the only methods of avoiding such interference.

INMARSAT

Use of INMARSAT services in the Arctic is the same as in the south, until the ship approaches the edge of the satellite reception. At high latitudes where the altitude of the satellite is only a few degrees above the horizon, signal strength is dependent on the height of the receiving dish and the surrounding land. The 1990 repositioning of the Atlantic West satellite has extended its area of coverage to include most of Lancaster Sound and Barrow Strait. As the ship leaves the satellite area of coverage the strength of the link with the satellite will become variable, gradually decline, and then become unusable. When the strength has diminished below that usable for voice communications, it may still be possible to send telexes. Upon the ship's return to the satellite area of coverage there may be problems in obtaining the satellite signal and keeping it until the elevation is well above the horizon.

MSAT - A Regional Communications Satellite System

Early in 1996 a new telecommunications network, called MSAT, was commercially introduced. MSAT is a Canadian-owned satellite-based network targeted primarily towards mobile users operating in rural and remote areas. Currently the initial services include: voice (telephone), 4.8 kbps data, facsimile, dispatch radio, electronic mail and voice mail. MSAT Mobile Communicators are compact, with antennas approximately 20 centimetres high and 20 centimetres in diameter and have been specifically developed for marine applications. The equipment and service costs are significantly lower than those charged by international mobile satellite service providers and due to the satellite's optimal geostationary position over the equator, excellent coverage is available over the Arctic, the Caribbean and 200 nautical miles off the east and west coasts of North America. The MSAT equipment was successfully used from Halifax en route to Resolute, Cambridge Bay and Tuktoyaktuk during an evaluation of the satellite's coverage

in the 1996 shipping season. MSAT provided a reliable, efficient and inexpensive method for the reception of ice information in the form of verbal consultation, the paper facsimile generation of ice charts, and electronic mail of text descriptions of ice conditions from the Canadian Ice Service to the ship. The only weak link has been the dissemination of large graphics files such as SLAR or RADARSAT imagery because they are just too big to be sent through the present 4.8 kbps data processors. MSAT Network upgrades being introduced will include packet-switched communications for applications such as vessel tracking using Global Positioning System technologies.

Tracking
Popular devices like Spot, DeLorme InReach, Yellow Brick are reliable for Arctic usage.
In 2016 Garmin made acquisition of DeLorme and will remain as a part of Garmin's offering.
Other European supplies also offer different devices with variety of features and prices suiting sailors.

Notes to the places:
If no note about safe anchorage or specific anchor bottom holding that means no information is available.
If no emergency landing strip mentioned it means no aircraft can land for lift up.

Typically **Kenn Borek** Aircrafts can land nearly anywhere in Arctic and provides an emergency lifts. They work with Aklak Air and Unaalik Aviation. Contact at: Kenn Borek, 290 McTavish Rd. NE, Calgary, AB T2E 7G5 phone 403-291-3300, 1-800-536-1149 toll free, admin@borekkair.com and Resolute Bay, NU, Canada, P.O. Box 210, X0V 0V0, ph. 867-252-3845, yrb@kbaops.com

Note to cellular phone users: Greenland, Nunavut, Northwest Territory and Yukon is not covered with roaming that Europe, North America can enjoy unless satellite connections are in place. For Alaska North Slope shore it is very limited while starting from Barrow it gets increased and from Nome more frequent localized while Alaska roaming service has to be in place. Places of Alaska Peninsula gets black spots off high hills as well as Homer, Seward, Prince William Sd. and Alaska Inside Passage.

Internet users can enjoy good connections in Greenland as it is linked through fiber optics cable to Nuuk since 2009. Its G3 connections can be used by purchasing user card. Communities in southern Yukon and Northwest Territories also have speedy fiber connections. The rest of Arctic Canada unfortunately relays on slow satellite signal of mainly no more than 1200 baud while practical is about 600 baud. Canadian Government has set a download speed goal for Nunavut, Nunavik and Nunatsiavut of 3 mbps for 2017, a step down from previous commitment. So, the need to turn off the updates to operating system is needed in order to avoid locking computer.
Arctic Fiber, a Canadian company, initiated the project to build the first Asia-Europe telecommunications line through the Arctic. Logistics delays are uncertain now. Alaska connections to Anchorage, Kenai, Homer, Seward and Kodiak are through the cable including Anchorage, Juneau, Seward, Ketchikan, Warrenton, Sitka, Angoon, Petersburg, Wrangell and Prudhoe Bay. No Nome to Barrow is included.

Many emergency parcels with spare parts air lifted to Arctic or Alaska were missed in past and not delivered on time. To make sure of prompt delivery the **Waybill Number** has to be printed on parcel by shipper in big **Letters / Numbers** visible from the distance by the warehouse personnel. It will ease identification fast. Address to c/o (care of) / Poste Restante, Airport name or Postal Station including its postal code and boat name and recipient name. In order to avoid custom duties hassle, the best is to ship from local place like Canada or USA. For American parcels to Alaska use US Postal Service which is faster than courier as Postal contracts with airlines specify Mail cannot be bumped from flight.

Geographical positions reported by Vagabond'eux are very accurate as they were using Sat-Nav system, predecessor of today GPS.
Obtaining reliable GPS signal in the Arctic depends on "visibility" of satellite signal coming from south direction. Any obstruction of horizon below 3º will make signal very weak or unavailable.
For other support notes refer to Royal Cruising Club Pilot Foundation (RCCPF) as well as Canadian Hydrographic Service Sailing Directions ARC400, ARC 401, ARC402 and new ARC403. Also please note the changes to Canadian Hydrographic Service publication dealers listing as its charts Catalogue 4 for Arctic dated 2008 is obsolete. The most updated list is at:
http://www.charts.gc.ca/charts-cartes/paper-papier/pdf/arctic-index.pdf
For electronic charts please search at:
http://www.charts.gc.ca/charts-cartes
Effective April 1st 2013, in an effort to adopt and focus on newer technologies, the Canadian Coast Guard (CCG) did cease the printing of its List of Lights book & Annual Edition of the Notices to Mariners. Also note, NOAA as of 13 April 2014 stopped distributing paper charts except for purchases from shops with print-on-demand capabilities. See http://www.oceangrafix.com/ for full list of worldwide retailers.