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subjective and lack objective standards by which to measure that need, the period of time between when such a determination may be made and the necessary marine pilots may be so licensed to take care of the need will likely exceed the time in which the need exists.

Unless there is an existing pool of pilots that have the capability to pilot in more than one region, there is no ability to respond in the event the board determines the need. Being licensed in an area requires local knowledge, experience, and recency of piloting in the area, all of which take time to acquire. How then may pilots respond to a need for pilots in another area. On a short-term basis, it appears that under proposed 12 AAC 56.021(c) they can not do so. In the long-term, adding pilots in the area for which there is a need will cure the need. Thus, proposed 12 AAC 56.021(c) appears to be a prohibition that indeed may frustrate the legislative intent to, at least on a limited basis, allow for licensure in more than one region. 4/

In short, I think the regulation should be disapproved.

Proposed 12 AAC 56.310(c)(9)

Proposed 12 AAC 56.310(c)(9) requires that a pilot organization seeking recognition by the board under AS 08.62.175 must have provisions in its articles of incorporation, bylaws, or operating rules that, among other things, require the organization to "at all times, maintain an efficient, fair, and nondiscriminatory dispatch system that enables the organization to provide prompt dispatch of pilots to the entire region given the size of the membership, and retain the records of those dispatches". The version of the regulation that went out to public comment did not contain the words "given the size of the membership". In response to my expressed concern that the earlier version might conflict with AS 08.62.175, the board added that language to the regulation before adoption.

Legislative discussion about pilot organizations was dominated by a concern to allow for more than one pilot organization in any particular region. There was also a fair amount of discussion about allowing very small pilot organizations to operate in the regions. Indeed, the idea of a one person pilot organization was considered. A large part of that legislative discussion and concern was expressed in AS 08.62.175(d)(3)(B), which in substantial part is very similar to what is now proposed

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4/ For the most part, discussions by both the legislature and the board about licensure in more than one region had to do with cruise ships that go from the Southeast Region into the Southcentral Region.

12 AAC 56.310(c)(9). It expressed what I think is pretty clear intent -- small pilot organizations were to be permitted so long as they faithfully served state pilotage to the best of there ability given the size of its membership.

Although an attorney representing one pilot organization disagrees, I think that proposed 12 AAC 56.310(c)(9), as amended, is within the authority of the board to adopt.

I urge speedy action of this project. I will talk with you further about that as this project progresses.

GIA/jp

CHAPTER 56.
BOARD OF MARINE PILOTS

The article listing for Chapter 56 is amended to read:

Article
1. Licensing Requirements (12 AAC 56.011 -- 12 AAC 56.080)
2. Compulsory Pilotage Waters (12 AAC 56.090 -- 12 AAC 56.120)
3. Tariffs[RATES] (12 AAC 56.200 -- 12 AAC 56.240) [(12 AAC 56.130 -- 12 AAC 56.158)]
4. Recognition of Pilot Organizations (12 AAC 56.300 -- 12 AAC 56.320
5. Training and Continuing Education Programs (Reserved)
6. Very Large Crude Carriers (12 AAC 56.500 -- 12 AAC 56.510)
7. General Provisions (12 AAC 56.930 -- 12 AAC 56.990)

Publisher: Please note redesignation of articles

12 AAC 56.021 is repealed and readopted to read:

12 AAC 56.021. PILOTAGE REGIONS. (a) Pilotage regions for which a marine pilot license may be issued are as follows:

(1) Southeastern Alaska -- covering the compulsory pilotage waters of Alaska commencing at the southern border with Canada, then west to and north on 141 degrees west longitude;

(2) Southcentral Alaska -- covering the compulsory pilotage waters of Alaska commencing at the western boundary of the Southeastern Alaska pilotage region, then generally west to 156 degrees west longitude;

(3) Western Alaska -- covering the compulsory pilotage waters of Alaska commencing at the western boundary of the Southcentral pilotage region, then west, north, and east to the northern border with Canada.

(b) An exemption to a license for a pilotage region will be identified on the license for the parts of the region that the licensee is determined by the board as not qualified to pilot or the pilot does not seek licensure. An endorsement for an

extended route will be identified on the license if the board issues an endorsement under this chapter.

(c) A pilot may not be licensed in more than one region at a time unless the board determines that the members of the marine pilot organization or organizations of that region recognized by the board under AS 08.62.175 do not have a sufficient number of qualified members to provide the kind of pilotage in the region that will assure the protection of shipping, the safety of human life and property, and the protection of the marine environment. (Eff. 3/30/88, Register 97; am / / , Register)

Authority: AS 08.62.040
AS 08.62.080

12 AAC 56 is amended by adding a new section to read:

12 AAC 56.022. TRANSITION. (a) In order to ensure that the creation of pilotage regions does not inadvertently prevent the provision of safe and efficient pilotage in any region as a result of changes to 12 AAC 56.021, the board will allow an otherwise qualified Southcentral Alaska region pilot to retain a license to pilot large container vessels in the Western Alaska region until the earlier of the following:

(1) The board determines that a Western Alaska pilotage organization has a sufficient number of qualified members to assure the protection of shipping, the safety of human life and property, and the protection of the marine environment in the Western Alaska region; or

(2) June 30, 1994.

(b) If, by June 30, 1994, the board has not determined that the situation described in (a)(1) of this section exists, a licensee described in (a) of this section may apply to the board to retain a license authorized under this section until a time specified by the board. (Eff. / / , Register)

Authority: AS 08.62.040

ARTICLE 3. Tariffs [RATES]

Section
130. Repealed [GENERAL RULE FOR DETERMINING RATES]
140. Repealed [CONSENT TO RATE DEVIATION]
150. Repealed [RATE ADJUSTMENT]
152. Repealed [NOTICE OF AUDIT]
154. Repealed [STANDARDS FOR RATE ADJUSTMENT]
156. Repealed [MODIFICATIONS]
158. Repealed [EFFECTIVE DATE]
200. Maximum Tariff
210. Tariffs for Southeastern Alaska region
220. Tariffs for Southcentral Alaska region
230. Tariffs for Western Alaska region

12 AAC 56.130 -- 12 AAC 56.158 are repealed:

12 AAC 56.130 -- 12 AAC 56.158. Repealed / / .

12 AAC 56 is amended by adding new sections to read:

12 AAC 56.200. MAXIMUM TARIFF. The setting of a maximum tariff is based on the following considerations:

(1) the cost of mobilization and demobilization of the pilot;

(2) the cost of transportation expenses of the pilot;

(3) actual time spent by the pilot on board a vessel;

(4) an assessment of the risk of the pilot involved in accomplishing a particular vessel movement, whether the risk is because of the environment, the weather, the season, the port, or other vessel traffic;

(5) compensation for overtime for time worked by the pilot over eight consecutive hours;

(6) reasonable administrative and office expenses of the pilot or pilot organization;

(7) personal or organizational costs incurred by the pilot or pilot organization because of training, continuing education, insurance and license requirements, and the one-time assessment established under sec. 34, ch. 89, SLA 1991;

(8) the cost of living or inflationary increases in the cost of providing pilotage services by the pilot or pilot organization; and

(9) nonreimbursable expenses of the pilot that the board finds are reasonable and necessary to provide pilotage services. (Eff. / / , Register)

Authority: AS 08.62.040
AS 08.62.045

12 AAC 56.210. TARIFF FOR THE SOUTHEASTERN ALASKA REGION. (a) The tariff published and charged by a pilot, or a pilot organization on behalf of its members, for the provision of pilotage services in the Southeastern Alaska region may not exceed the charges established in this section.

(b) For all vessels, except passenger vessels,

(1) port charges (one way) may not exceed the following:

Ketchikan	$821
Metlakatla	821
Klawock	1,001
Ward Cove	821

Wrangell	894
Shoemaker Bay	894
Petersburg	894
Duncan Canal	1,109
Sitka	821
Juneau	821
Juneau Oil Docks	959
Haines, Chilkoot	959
Haines, Lutak	959
Skagway	959
Skagway Ore Dock	1,109
Yakutat Bay	900
Hydaburg	1,001
Kake	1,001
Hoonah	1,001
Hobart Bay	1,001
Long Island	1,001
Dora Bay	1,001
Hawk Inlet	1,001
Green Cove	1,001
Unlisted Ports	900

(2) entry, transit, and departure for each of the following areas constitutes a single event that may not exceed a charge of $234:

(A) Wrangell Narrows;

(B) Sergius and Whitestone Narrows, including transit through both on the same day in the same direction;

(C) Tlevak Narrows;

(D) Boca de Finas and San Christoval Channels, including transit through both locations on the same day in the same direction;

(3) overtime may not exceed a charge of $75 per hour or portion of an hour when one pilot exceeds eight continuous hours on duty; on transits anticipated to be over eight continuous hours, two pilots are required, and the charge for a second pilot may not exceed 50 percent of the applicable charge for the first pilot;

(4) charges for anchoring or waiting for a berth may not exceed $266; anchoring or laying to for loading cargo or discharging cargo is considered as a regular port charge, and all other applicable charges may be assessed as if the vessel was moored.

(c) For all passenger vessels,

(1) port charges (one way) may not exceed the following:

(A) Ketchikan $821

(B) Wrangell 894

(C) Petersburg 894

(D) Sitka 821

(E) Juneau 821

(F) Haines, Chilkoot 959

(G) Haines, Lutak 959

(H) Skagway 959

(2) entry, transit, and departure for each of the following areas constitutes a single event that may not exceed the charge indicated below:

(A) Glacier Bay $2,345

(B) Tracy Arm 1,170

(C) Endicott Arm 1,170

(D) Misty Fjords 1,170

(E) Sergius and Whitestone, including transit through both locations on the same day in the same direction 234

(F) Wrangell Narrows 234

(G) Tlevak Narrows and Tlevak Strait,including transit through both on the same day in the same direction . 234

(H) Boca de Finas and San Christoval,transit through both on the same day in the same direction . . . 234

(3) additional charges based on the number of passengers may not exceed a mileage rate of 8.51 mills times the actual number of passenger berths on board for sale times the number of miles transited in the inside waters of the Southeastern Alaska region, excluding miles transited in the areas identified in (2)(A)--(D) of this subsection; the actual number of berths for sale used in setting the charge may be not less than 200, but may not exceed 1,000 berths;

(4) the charge for anchoring or waiting for a berth may not exceed $266; anchoring or laying to for loading passengers or discharging passengers is

considered as a regular port charge, and all charges may be assessed as if the vessel was moored.

(d) All vessels with a draft in excess of 32 feet may be charged at the rate not to exceed $21.72 per foot or portion of a foot. This charge may be computed separately for each entry into or departure from a port or area identified in (c)(2)(A)--(D) of this section;

(e) The charge based on tonnage and draft may be calculated using a tonnage unit system that has a rate not to exceed $2.49 per unit for all units in excess of 163 units. This charge may be computed separately for each entry into or departure from a port or area identified in (c)(2)(A)--(D) of this section. Tonnage units are calculated as follows:

$$\frac{\text{overall length x extreme breadth x depth}}{10{,}000}$$

For the purpose of determining a tonnage unit

(1) overall length is the distance between the forward and after extremities of the vessel;

(2) extreme breadth is the maximum breadth to the outside of the shell plating of the vessel;

(3) depth is the vertical distance of amidships from the top of the keel plate to the uppermost continuous deck fore and aft and which extends to the sides of the vessel; the continuity of a deck shall not be considered to be affected by the existence of tonnage opening, engine space or a step in the deck; and

(4) all measurements shall be in feet and inches.

(f) The charge for a dock to dock commercial movement of a vessel within a harbor may not exceed one-half the regular port charges. A charge for moving a vessel from dock to dock, dock to anchorage, anchorage to anchorage, or anchorage to dock for bunkering or other non-commercial reasons, within a harbor, may not exceed $320 per movement. A dock to dock shift of a vessel constitutes two separate movements for charging purposes.

(g) The charge for docking and undocking a vessel in the absence of the use of the vessel's own propulsion system and a stern-to docking of that vessel may not exceed a 50 percent increase over the regular charge for the movement.

(h) In the event of an emergency involving the safety of the vessel, crew or passengers, a charge may not be assessed by the pilot, except for transportation and per diem incurred for the pilot to respond to the emergency.

(i) A pilot may charge for the actual cost of travel expenses, including airplane and ferry fares, cab fares, telegrams, telephone calls, and other expenses pertaining to vessel's business, plus the per diem rate allowed for tax purposes by the United States Internal Revenue Service for meals and lodging for 1992 tax year. The per diem rate shall be distributed 60 percent to hotel, 20 percent to dinner, 10 percent to lunch, and 10 percent to breakfast, rounded to the nearest dollar, but in no instance may the rate exceed the total per diem rate. If adequate meals and rooms are not furnished to the pilot when on ship, an additional charge may be assessed by the pilot in accordance with the distribution of per diem rate as described in this subsection.

(j) Additional charges may be assessed for the services of a pilot, as follows:

(1) when, due to weather and transportation difficulties, a pilot is required to leave in advance to ensure meeting a vessel upon its arrival or departure, or the pilot is delayed returning from a piloting assignment, that additional time may be charged at a rate not to exceed $75 per hour up to a maximum of $600 per day for each day a pilot is in transit or on standby; this charge need not include hours spent in an actual work day in which piloting duties were performed;

(2) the charge for detention time on board ship when no other charges accrue during the day may be at the rate not to exceed $75 per hour per pilot up to a maximum of $600 per pilot per day; a pilot carried to sea may be paid the same rate for each day the pilot is detained, plus the pilot may charge for first class transportation back to Ketchikan and per diem;

(3) the charge for trip cancellation may not exceed $266, plus transportation and per diem charges in accordance with (i) of this section;

(4) an out-of-area charge, in lieu of charges for detention and travel time, may not exceed one and one-half times the maximum detention rate set in paragraph (2) of this subsection; this paragraph is not applicable within 100 miles of the Southeast Alaska region;

(5) when an agent, owner, or master of a vessel do not correct an estimated time of arrival and notify the pilot within four hours of the last time of arrival given, compensation not to exceed $75 per hour or $600 per day may be charged until actual arrival of the vessel at a pilot station;

(6) when sailing time of a vessel is set by an agent, owner, or master of a vessel, any delay over one hour from the set time may be charged at the rate not to exceed $75 per hour or portion of an hour and may not exceed $600 per day; if a pilot is detained for one hour or less, no detention charge may be assessed; if a

pilot is detained for more than one hour, detention may be charged for the first hour and succeeding hours in accordance with paragraph (2) of this subsection.

(7) when an agent, owner or master of a vessel requests a pilot to stay on board a vessel on a continuous basis while the vessel is docked or anchored at a port or anchorage, the charge may not exceed $533 per day.

(k) For purposes of this section, travel, standby, and work days begin and end at midnight. Each charge accruing at any point within a midnight to midnight time period may be assessed.

(l) The maximum tariff for the Southeastern Alaska region established in this section is repealed January 1, 1993. (Eff. / / , Register)

Authority: AS 08.62.040
AS 08.62.045

12 AAC 56.220. TARIFF FOR SOUTHCENTRAL ALASKA REGION. (a) The tariff published and charged by a pilot, or a pilot organization on behalf of its members, for the provision of pilotage services in the Southcentral Alaska region may not exceed the charges established in this section.

(b) For all vessels in Cook Inlet, port charges (one way) may not exceed the following:

Homer Pilot Station to Port Anchorage	$1,063
Homer Pilot Station to Nikiski	796
Homer Pilot Station to Drift River	796
Homer Pilot Station to North Foreland, Point Possession, or Tyonek	937
Anchorage to Drift River (North of	

Kalgin Island) 796

Anchorage to Drift River

(South of Kalgin Island) 1,063

Anchorage to Nikiski 700

Nikiski to Drift River (North of Kalgin

Island) 631

Nikiski to Drift River (South of Kalgin

Island 796

Homer Pilot Station to Kasitsna Bay 642

Homer Pilot Station to Homer 625

Homer Pilot Station to Port Chatham 1,125

(c) For all Southcentral Alaska ports, except Cook Inlet, port charges (one way) may not exceed the following:

Valdez 1,716

Cordova 703

Whittier 703

Ocean Entrances of Prince William Sound to

Designated State Pilot Stations for Valdez,

Whittier and Cordova 1,012

Ocean Entrances of Prince William Sound to

Knowles Head Anchorage 675

Knowles Head Anchorage to Valdez or Whittier

Pilot Station 675

Seward 703

Kodiak -- City Harbor 703

Kodiak -- Womens Bay 703

Icy Bay 810

(d) Charges for unlisted ports may be negotiated between the pilot and the agent, owner, or master of the vessel according to risk of the movement and time required.

(e) A tonnage surcharge may be charged for a vessel with a tonnage in excess of 14,000 gross tons. The tonnage surcharge per gross ton may not exceed the following:

Vessel tonnage	Cook Inlet	Remainder of Southcentral Alaska Region
first 50,000 gross tons	$.03	$.027
gross tonnage in excess of 50,000	$.015	$.0135

(f) The applicable charge in this section apply whether piloting is to or from sea or to or from the location a pilot boards or disembarks.

(g) The charge for standing by to pilot, or traveling to or from distant pilot stations or pick-up points and not actually piloting, may not exceed $67.50 per hour up to a maximum of $810, except that the charge for Cook Inlet may not exceed $75 per hour up to a maximum of $900.

(h) The charge for a pilot's travel expenses, including airplane and ferry fares, cab fares, telegrams, telephone calls, and all other expenses pertaining to vessel's business may not exceed actual costs, plus the per diem rate allowed for tax purposes by the United States Internal Revenue Service for meals and lodging for 1992 tax year. The per diem rate shall be distributed 60 percent to hotel, 20 percent to dinner, 10 percent to lunch, and 10 percent to breakfast, rounded to the nearest

dollar, but in no instance may the rate exceed the total per diem rate. If adequate meals and rooms are not furnished to the pilot when on ship, an additional charge may be assessed by the pilot in accordance with the distribution of per diem rate as described in this subsection.

(i) For the purposes of this section, travel, standby, and work days begin and end at midnight. Each charge accruing at any point within a midnight to midnight time period may be assessed.

(j) When a pilot exceeds eight continuous hours on duty without a six hour rest period or presence of a relief pilot while transiting compulsory pilotage waters, overtime may be charged at a rate not to exceed $101 per hour or portion of hour worked, except that the charge for services in Cook Inlet may not exceed $112 per hour or portion of an hour worked.

(k) The charge for moving a vessel from dock to harbor or harbor anchorage, from harbor or harbor anchorage to dock, or from one anchorage within a harbor to another anchorage within the same harbor, may not exceed $337 per movement, except that the charge for services in Cook Inlet may not exceed $375 per movement. A dock to dock movement of a vessel constitutes two separate movements for charging purchases.

(l) Anchoring or laying to for loading cargo or discharging cargo may be assessed a regular port charge and all other applicable charges may be assessed as if the vessel was moored.

(m) The charge for moving a vessel alongside a dock or mooring to position tanks, holds, manifolds, loading arms, towers, or hoses may not exceed $337 per movement, except that charges for these services for vessels in Cook Inlet may not exceed $375 per movement.

(n) The charge for the movement of a vessel in the absence of the vessel's own propulsion system, even though assisted by tugboats, may not exceed twice the charge under this section for each movement.

(o) The charge for docking or undocking vessels over 2,000 gross tons without the use of an available tugboat at Seward, Whittier, Valdez, Cordova, Kodiak, or Women's Bay may not exceed $405 per movement, except that the charge at Anchorage may not exceed $450 per movement.

(p) The charge for a pilot being carried to sea and detained on board, or for off duty detention on board, or for being off duty standby on board at the request of the master, may not exceed $540 per day, or portion of a day, except that the charges for these services in Cook Inlet may not exceed $600 per day or a portion of a day. If the pilot disembarks at a location other than the pilot station from which the pilot was dispatched, first class return transportation and per diem may be additionally charged.

(q) The charge for watch time on the bridge rendered by the pilot, at the master's request, while a vessel is anchored, moored, or underway may not exceed $67 per hour or portion of an hour, except that the charges for this service in Cook Inlet may not exceed $75 per hour or portion of an hour. Overtime charges may apply in accordance with (j) of this section.

(r) The charge for the use of a pilot's VHF transceiver on vessels that do not have a VHF transceiver in proper working order according to the provisions of 33 U.S.C. 1201 -- 1208 (Vessel Bridge-to-Bridge Radiotelephone Act), may not exceed $13 per day or portion of a day, except that the charge for this service in Cook Inlet may not exceed $15 per day or portion of a day.

(s) The charge for a second pilot, when used, may not exceed 50 percent of the applicable charge for the first pilot. All other applicable charges under this section may apply. The expenses of the second pilot may be charged to the same extent as the expenses of the first pilot.

(t) The charge for the services of a mooringmaster may be negotiated between the pilot and the agent, owner, or master of the vessel.

(u) An agent, owner, or master of a vessel shall advise a pilot of a vessel movement at least 36 hours before the movement in order to provide sufficient time for the pilot to arrive at the vessel by the available means of transportation. An agent, owner, or master of a vessel shall again advise the pilot of a vessel movement at least 24 hours before the movement. A pilot will be considered unavailable for service only if the timely notice under this subsection is given and a pilot does not show up at the vessel to render service. If shorter notice is given than required under this subsection and a pilot is not able to reach the vessel to render pilot services, the vessel or the vessel's owner may be charged for the transportation costs incurred by the pilot in attempting to reach the vessel and the pilotage charge and all other charges that would have been incurred had the pilot reached the vessel and provided pilotage services.

(v) When the time of movement is set by the agent, owner, or master of a vessel, the charge for any delay over two hours from the time set may not exceed $67 per hour or a portion of an hour, except that the charge for delay in Cook Inlet may not exceed $75 per hour or a portion of an hour. The total charge may not exceed $810 per day, except that total charge delay in Cook Inlet may not exceed $900 per day. If the pilot is detained for two hours or less, no charge may be assessed. If the pilot is detained for more than two hours, the pilot may charge for

the first two hours detained, as well as other hours detained according to this subsection.

(w) The maximum tariff for the Southcentral Alaska region established in this section is repealed January 1, 1993. (Eff. / / , Register)

Authority: AS 08.62.040
AS 08.62.045

12 AAC 56.230. TARIFF FOR WESTERN ALASKA REGION. (a) The tariff published and charged by a pilot or a pilot organization on behalf of its members for the provision of pilotage services in the Western Alaska region may not exceed the charges established in this section.

(b) The maximum port charges (one way) may not exceed the following:

Cold Bay	$914
King Cove	810
Dutch Harbor, Unalaska Bay, Iliuliuk Harbor, Captain's Bay	844
Adak	914
Kivalina	1,270

(c) Unlisted port charges may be negotiated between the pilot and the agent, owner or master of the vessel according to risk of the movement and time required.

(d) A tonnage surcharge may be charged for a vessel with a tonnage in excess of 14,000 gross tons. The tonnage surcharge per gross ton may not exceed the following:

Vessel Tonnage	Western Alaska Region
first 50,000 gross tons	$.027
gross tonnage in excess of $50,000	.0135

(e) All applicable charges in this section may be assessed whether piloting is to or from sea, or to or from a pilot boarding or disembarking point.

(f) The charge for standing by to pilot, or traveling to or from distant pilot stations and not actually piloting, may not exceed $67 per hour. Travel time shall commence when the pilot leaves for dispatch, or after piloting, when the pilot begins travel to return to the dispatch station. Standby and travel time may accumulate up to a maximum of 12 hours per day.

(g) A pilot may charge the actual cost for that pilot's travel expenses including plane and ferry fares, cab fares, telegrams, telephone calls, and all other expenses pertaining to vessel's business, plus per diem allowed for tax purposes by the United States Internal Revenue Service for meals and lodging for 1992 tax year. The per diem rate shall be distributed 60 percent to hotel, 20 percent to dinner, 10 percent to lunch, and 10 percent to breakfast, rounded to the nearest dollar, but in no event may it exceed the total per diem rate. If adequate meals and lodging are not furnished to the pilot when on ship, an additional charge may be assessed by the pilot in accordance with the distribution of the per diem rate as described in this subsection.

(h) For the purposes of this section, travel, standby, and work days begin and end at midnight. Each charge accruing at any point within a midnight to midnight time period may be assessed.

(i) When a pilot exceeds eight continuous hours on duty without a six-hour rest period or presence of a relief pilot while transiting compulsory pilotage waters,

overtime may charged at a rate not to exceed $101 per hour or portion of an hour worked.

(j) The charge for moving a vessel from dock to harbor or harbor anchorage, from harbor or harbor anchorage to dock, from anchorage within a harbor to another anchorage within the same harbor, may not exceed $337 per movement.

(k) The charge for anchoring or laying to for loading cargo or discharging cargo, or anchoring for any other purpose may be assessed a regular port charge and all other applicable charges may be assessed as if the vessel was moored.

(l) The charge for moving a vessel alongside a dock or mooring to position tanks, cargo holds, manifolds, loading arms, towers, or hoses may not exceed $337 per movement.

(m) The charge for the movement of a vessel in the absence the vessel's own propulsion system, even if assisted by tugboats, may not exceed twice the charge under this section for each movement.

(n) The charge for docking or undocking a vessel over 2,000 gross tons without the use of an available tugboat at the ports of Dutch Harbor or Captains Bay may not exceed $405 per movement.

(o) The charge for a pilot being carried to sea on board and detained, or for off-duty detention on board, or for being off-duty standing by on board at the request of the master, may not exceed $540 per day or portion of a day. If the pilot disembarks at a location other than the pilot station from which the pilot was dispatched, the pilot may charge for first class return transportation and per diem.

(p) The charge for watch time on the bridge rendered by the pilot, at the master's request, while vessel is anchored, moored, or underway may not exceed

$67 per hour or portion of an hour. Overtime charges apply, in accordance with (i) of this section.

(q) The charge for a second pilot, when used, may not exceed 50 percent of the applicable charge for the first pilot. All other applicable charges under this section may be assessed. The expenses of the second pilot may be charged to the same extent as the expenses of the first pilot.

(r) The charge for the services of a mooringmaster may be negotiated between the pilot and the agent, owner, or master of the vessel.

(s) An agent, owner, or master of a vessel shall inform a pilot of a vessel movement at least 24 hours before the movement in order to provide sufficient time for the pilot to arrive at the vessel by the available means of transportation. A pilot will be considered unavailable for service only if the 24-hour notice required by this subsection is given and a pilot does not show up at the vessel to render service. If shorter notice is given than required under this subsection and the pilot is unable to reach the vessel to render pilot services, the vessel or the vessel's owner may be charged for the transportation costs incurred by the pilot in attempting to reach the vessel and for the pilotage charge and all other charges that would have been incurred had the pilot reached the vessel and provided pilotage services.

(t) When the time of movement is set by the agent, owner, or master of a vessel, the charge for any delay over two hours from the time set may not exceed $67 per hour or portion of an hour. The total charge may not exceed $810 per day. If the pilot is detained for two hours or less, no charge may be assessed. If the pilot is detained for more than two hours, the pilot may charge for the first two hours detained as well as other hours detained according to this subsection.

(u) In addition to any other charges for vessel movement established in this section, a surcharge based on vessel length may be charged. The surcharge is a percentage of total pilotage charges assessed under this section not to exceed the following:

Vessel Length Overall	Surcharge
Less than 450 feet	0 percent
450-500 feet	5 percent
501-550 feet	15 percent
551-600 feet	25 percent
Over 600 feet	40 percent

(v) The maximum tariff for the Western Alaska region established in the section is repealed January 1, 1993. (Eff. / / , Register)

Authority: AS 08.62.040
AS 08.62.045

12 AAC 56 is amended by adding a new sections to read:

ARTICLE 4 RECOGNITION OF PILOT ORGANIZATIONS

Section
300. Standard for recognition
310. Qualification for recognition
320. Suspension or revocation of recognition

12 AAC 56.300. STANDARD FOR RECOGNITION. In order for a pilot organization to be recognized by the board in a pilotage region or regions, the organization must demonstrate to the board's satisfaction the organization's ability to

promote a safe, reliable, and efficient pilotage system in that region or regions considering the size of the organization. (Eff. / / , Register)

Authority: AS 08.62.040

AS 08.62.175

12 AAC 56.310. QUALIFICATIONS FOR RECOGNITION. (a) A pilot organization seeking recognition by the board must comply with the minimum qualifications in AS 08.62.175 and of this section.

(b) A pilot organization seeking recognition must provide the board with a list of its members, including pilots, deputy pilots, and trainees.

(c) The articles, bylaws, or rules of a pilot organization seeking recognition by the board must include provisions that require the organization to

(1) comply with all applicable federal, state, and local laws;

(2) treat both its members and applicants for membership in a uniform, nondiscriminatory, and otherwise lawful manner;

(3) conduct its business activities in a nondiscriminatory and otherwise lawful manner;

(4) cooperate and assist the board by

(A) maintaining a system that enables the organization to obtain necessary information from members on a timely basis and to respond to directives issued by government agencies having jurisdiction over pilotage;

(B) maintaining a process for responding to inquiries and requests of the board or its marine pilot coordinator;

(C) cooperating, and requiring its members to cooperate with investigations and audits by or on behalf of the board;

(D) acknowledging the authority of the board for cause and after notice and hearing to suspend or revoke the recognition of the organization;

(E) bringing to the attention of the department any credible information regarding a member of the organization that may require the board to act under AS 08.62.150 -- 08.62.155;

(F) maintain a relationship with other pilot organizations that furthers the purposes of AS 08.62 (the Alaska Marine Pilotage Act); and

(G) identifying an agent of the organization for the service of process in the state;

(5) maintain in-house procedures for the handling of disciplinary actions and grievances within the organization; the procedures must, at a minimum, provide a member with the right to due process and a fair hearing;

(6) adopt and revise a tariff in accordance with AS 08.62.045 and this chapter;

(7) ensure fair and equal access to the experience necessary to obtain or upgrade a pilot's license under AS 08.62 and this chapter;

(8) maintain fair procedures for the conduct of its internal organizational business;

(9) maintain an efficient, equitable, and nondiscriminatory dispatch system at all times that enables the organization to provide prompt dispatch of pilots to the entire region given the size of the membership of the organization and retain the records of those dispatches for audit by the board; and

(10) comply with a written request from the master or owner of a vessel, or that person's representative, showing cause to not dispatch a particular

member to pilot to a particular vessel and maintain in-house procedures to provide a member with the right to due process and a fair hearing to contest that action;

(d) A pilot organization seeking recognition must demonstrate to the board that

(1) the organization and its members will conduct or participate in a board approved continuing education program;

(2) the organization and its members will participate in a board approved random drug or alcohol testing program;

(3) the organization and its members will conduct or participate in a board approved training program;

(4) the organization has a bookkeeping and accounting system that enables the organization to prepare and retain accurate and detailed financial records of the activities of the organization; and

(5) the organization has a equitable system for the allocation of its members' income earned from piloting services covered by this chapter. (Eff. / / , Register)

Authority: AS 08.62.040
AS 08.62.045

12 AAC 56.320. SUSPENSION OR REVOCATION OF RECOGNITION. In addition to imposing a civil fine under AS 08.62.155(b), the board may suspend or revoke the recognition of a pilot organization that fails to comply with that organization's articles, bylaws, or rules in such a manner that it fails to comply with the statutory or regulatory standards for recognition. (Eff. / / , Register)

Authority: AS 08.62.040
AS 08.62.175

12 AAC 56.990 is amended by adding new paragraphs to read:

(10) "board" means the Board of Marine Pilots;

(11) "department" means the Department of Commerce and Economic Development;

(12) "laying to" means the temporary interruption of a vessel's transit for some special purpose that stops, but does not anchor or moor, the vessel;

(13) "movement" means the act or process of changing the place, position, or posture of a vessel;

(14) "on duty" means on the navigating bridge of the vessel, having control of the vessel, or assisting the master or navigating officer;

(15) "standing by" means the time during which a pilot is dispatched to a vessel and is waiting to go on duty to perform pilotage service; stand by time may be accumulated on board the vessel or on shore if the vessel's owner, master, or agent has scheduled a pilot to be available for pilotage duty. (Eff. 6/11/71, Register 38; am 6/19/74, Register 50; am 5/12/78, Register 66; am 7/24/83, Register 87; am 12/26/86, Register 100; am 8/29/87, Register 103; am 7/26/90, Register 115; am / / , Register)

Authority: AS 08.62.040
AS 08.62.160

(3)

Attorneys representing the various pilot associations in the state, ships' agents, ship insurers, and the Department of Law met with Division of Policy staff and the President of the American Pilots' Association, Captain Pat Neely, in Juneau in late September to draft a new State Pilotage Act.

Copies of the draft report and legislation were released to the Board of Marine Pilots, staff from relevant state agencies, pilot groups, and other interested parties in October for review. Comments received as a result of the review process are appended to this report[3]. The study authors presented the report and comments from reviewers to the Board of Marine Pilots at its November meeting in Anchorage.

Legislation to amend the existing State Pilotage Act is expected to be introduced during the First Session of the Seventeenth Legislature, which begins January 20, 1991.

C. STUDY OUTLINE

Section 2 of the study presents a historical review of state pilotage to provide a background for the issues raised in the report. The existing Alaska legal framework is then discussed and compared with marine pilotage law in other states in Section 3. Section 4 outlines the status of Alaska marine pilotage in general and in the various regions of the state. The following two sections detail information and opinions on the issues raised in Captain Murphy's letter which were solicited from pilots and ships' agents. Section 7 contains the study's conclusions and recommendations for state action.

2. HISTORICAL BACKGROUND

Alaska's marine pilotage system must be considered within a larger framework of maritime law and tradition. Maritime communities throughout the world have long recognized the dangers of unregulated traffic in local waterways. Provisions for mandatory piloting—that is, the requirement that ships have or take on board persons familiar with local conditions when transversing local waters—date from Roman law. The Florida statute on piloting clearly states the rationale for such provisions:

> The Legislature recognizes that the waters, harbors and ports of the state are important resources, and it is deemed necessary in the interests of public health, safety and welfare to provide laws regulating the piloting of vessels utilizing the navigable waters of the state.[4]

Concern about unregulated pilotage for local waters first surfaced in this country in colonial times. According to an authoritative history of American marine pilotage published by the American Pilot's Association:

> the early pilotage records of the the colonies cover only sketchy accounts of the beginnings of the profession in America, and much has been lost or destroyed. Such

> scant records as exist seem to indicate a pattern of pilotage development progressing through stages of pure individual initiative, to periods of severe competitive practices resulting in a struggle for predominance and eventually government regulation.[5]

Colonies gradually gained control over pilotage to the extent that, as an early U.S. Supreme Court decision commented:

> When the government of the union was brought into existence it found a system for the regulation of its pilots in full force in every state.[6]

This state system was left virtually intact by a 1789 provision in federal statues:

> Until further provision is made by Congress, all pilots in the bays, inlets, rivers, harbors, and ports of the United States shall continue to be regulated in conformity with the existing laws of states, respectively, wherein such pilots may be, or with such laws as the states may respectively enact for the purpose.[7]

States continued to exercise sole authority over piloting until 1871 when Congress enacted provisions that significantly reduced the scope of state control by requiring that:

> ...every coastwise sea-going steam-vessel subject to the navigation laws of the United States, and to the rules and regulations aforesaid, not sailing under register, shall, when underway, except on the high seas, be under the control of pilots licensed by the inspectors of steamboats.[8]

This act effectively established a dual piloting system in the United states: the historical state system and a new federal system. Generally speaking, vessels engaged in foreign trade (vessels sailing under register[9] and foreign-flagged vessels) are under the authority of the states while American vessels engaged in domestic trade are under federal authority. One exception to this general division of responsibility is Great Lakes traffic, which is under the exclusive regulatory control of the federal government through the Coast Guard. The exemption from state law of Great Lakes vessels was made pursuant to an international treaty with Canada which provides for piloting by persons having either U.S. Coast Guard or Canadian licensure.

The dual system of piloting has resulted in a dual system of pilots: federal pilots, often employees of the ship; and state pilots, who generally act as independent agents or as officials of the state which licenses them. In Alaska, shipping companies may meet compulsory pilotage regulations either by obtaining the services of an independent pilot or by employing a state-licensed pilot to service company ships exclusively. According to the American Pilots' Association (APA), Alaska is one of the few maritime states in which a state pilot need not be independent of a vessel or its owner.[10]

Summary: The public service nature of local pilotage has been long recognized. By tradition and statute, government has the authority to protect life, property and the environment by insisting that ships operating in coastal waters carry pilots familiar with local conditions. The current system in the United States splits responsibilities for pilotage between the federal government and the maritime states. While the federal government exercises control over vessels engaged in domestic trade, the individual states appear to have unlimited authority to impose pilotage standards and to require compulsory pilotage for foreign ships and ships sailing under register within the waters of the state.

3. COMPARISON OF ALASKA STATUTES WITH THOSE OF OTHER STATES

During the course of U.S. history, a very large body of state law has developed around the marine pilotage profession.[11] In several of the older states, marine pilotage practices, laws, regulations, and traditions have more than 200 years of development and refinement behind them. Currently, all 24 maritime states have established mechanisms for controlling the licensing of pilots, setting rates, and providing general oversight of the state pilotage system.

Many states have recently amended their pilotage laws, partly because of statutory sunset provisions, but also in response to increasing litigation and a heightened awareness of the importance of state pilotage brought about by the *Exxon Valdez* disaster.

The Alaska State Pilotage Act (AS 08.62) was first enacted in 1970 and has been amended only slightly over the past 20 years. The original bill exempted all "vessels and tow boats of United States registry...engaged exclusively on the rivers of Alaska or in the coastwise trade on the west coast of the United States"[12] from compulsory state pilotage. This section was amended in 1972 to exclude only those vessels of less than 300 gross tons. The 1973 legislature amended the act to give the Marine Pilot Board the authority to reexamine persons whose license had lapsed for less than two years if "the Board has reason to believe that the person applying for reinstatement of a license is incapable or incompetent to carry out the duties of a licensed marine pilot."[13] Section 08.62.185 of the Act was added in 1977, requiring that:

> any oil tanker, whether enrolled or registered, of 50,000 dead weight tons or greater, when navigating in state waters beyond Alaska pilot stations either (1) employ a pilot licensed by the state under this chapter; or (2) utilize a federally licensed pilot whose duty station has been on that tanker throughout that specific voyage.[14]

Several other amendments dealt with the Marine Pilot Board. A public member was added in 1976 legislation while board members were limited to two consecutive terms in 1980. The Board was added to Alaska's sunset statute in 1985 and was extended to June 30, 1991 under this statute during the 1987 legislative session.

Compared with other states, Alaska's Marine Pilotage st[illegible]e appears quite sparse. It contains only three articles—addressing the Board of Ma[illegible]ne Pilots, Licensing and General Provisions—and delegates broad rule-making responsibility to the Board. Such a practice is common in Alaska, where statutory language is often limited in favor of regulatory authority, which is presumed to provide more flexibility as conditions change. Thus, items which other states place in statute are left to the discretion of the Board. Alaska's statutory and regulatory scheme differs from many states in one other significant respect. Pilotage in many maritime states centers around particular ports and, as described below, some states have elected to regulate pilotage through local port commissions. Even where pilotage is under the supervision of statewide boards, licenses are generally given for specific ports. Pilot services are generally organized through separate associations serving particular ports. In Alaska, geolography and shipping patterns dictate regional rather than port licensing. This, in turn, has led to regional associations, which seek to provide pilotage services over a large geogrpahic area. This feature of Alaskan pilotage, which is unique among the maritime states, suggest that wholesale adoption of regulatory practices of other states may not always be appropriate. However, common features of state pilotage need to be addressed in statute either directly or by explicitly delegating regulatory authority to the Board. These common features of the states' pilotage systems are discussed below.

A. SYSTEM OF REGULATION

Twenty-one states, including Alaska, have established pilot boards charged with promulgating and enforcing pilotage regulations. Only three states—Connecticut, New Hampshire and Hawaii—regulate directly without going through a board.

Boards are of two general types: a statewide board, having authority over all compulsory pilotage waters in the state and local port boards or commissions whose authority is limited to a specific area. Alaska's Board of Marine Pilots is statewide in scope. In general, boards having statewide authority are relatively recent, local boards having been the common practice historically. Unique among the states, California's state board (which is actually the oldest pilot board in the country) oversees only the San Francisco Bay area, leaving other state ports to local control.

Pilot boards [illegible]be [illegible]sed in a state agency or created independent of agency oversight. N[illegible]ncluding Alaska, place their boards in an executive department, most co[illegible]n the agency having responsibility for professional licensing Alaska's Marine Pilot Board is housed in the Division of Occupational Licensing, Department of Commerce and Economic Development. All such boards exercise statewide authority. Twelve states have established boards outside of any state agency. Of the states with independent boards, seven have boards established for each local port.

Most statewide boards are comprised of representatives of the pilot profession, the marine industry, and the general public. Alaska's board:

> consists of two pilots licensed under [Chapter 62, Alaska Statutes] who have been actively engaged in piloting on vessels subject to this chapter, two agents or managers of vessels subject to this chapter, two public members...and the commissioner [of the Department of Commerce and Economic Development] or the commissioner's designee.[15]

In those states where local port commissions are used in lieu of a state-wide board, membership patterns are less standard, but the majority of members are specified to be "seafaring men" or persons skilled and experienced in maritime affairs.

B. LICENSING

Because the essence of state piloting is knowledge of local waters and conditions, all states require training for person's wishing to become licensed. States have, in general, established two routes for qualifying for a state pilot license: apprenticeship or deputy pilot programs. In states opting for apprenticeship, local pilot associations usually select and train the apprentices according to association criteria. After the applicant has completed the apprenticeship to the satisfaction of association members, they present him/her to the state for examination. Entry into an apprenticeship program often requires little or no previous experience and the duration of the training is fairly long. In states with deputy pilot programs, the deputy pilot meets entry-level requirements established by the state and performs limited duties under an entry-level license. The deputy pilot progresses to higher levels of licensing by meeting experience standards which are set and examined by the board or state licensing official. Training periods for deputy pilots are generally considerably shorter than for apprenticeship pilots, based on the more extensive prior experience required of deputy pilots. Alaska's system follows the deputy pilot form, although that term is not used in the statute.

State pilot licenses can be considered both a certificate of competency and a franchise to perform a public service, requiring the licensee to:

> assume public obligations in maintaining pilot stations and operating a pilotage system...[the state pilot] sees his duty and obligation as being owed to local political authority and the public, rather than to the shipowner.[16]

Some states have recognized this public purpose function by "appointing" as well as licensing the pilot. Virginia statute requires that:

> If the Board finds the applicant qualified to act as a branch pilot it shall issue him a license, and he shall thereupon become a state officer, to be known as a branch pilot and shall hold the office for one year next ensuing.[17]

Alaska is unique in its treatment of licensing as an individual right rather than a franchise. Alaska's statute states that "a person is ***entitled*** (emphasis added) to a

license"[18] if s/he meets the criteria outlined. In virtually all other states, the license is granted at the discretion of the Board or other licensing authority. Commonly-used language in other states allows the Board (or other licensing authority) "to choose and appoint" pilots or to "grant commissions"[19] to act as pilots. As will be discussed at greater length elsewhere, the Alaskan emphasis on right rather than franchise is, in the opinion of the study staff, a primary cause of current tensions in the state's regulatory scheme.

Pilot licenses must be renewed at periodic intervals, ranging from one to five years. Alaska requires biennial renewal. No state at present requires continuing education or training as a condition for renewal, although the State of Washington has recently amended its pilot statute by requiring that:

> The Board shall establish additional training requirements, including a program of continuing education, developed after consultation with pilot organizations.[20]

Some states do require a physical examination prior to renewal or reissuance of a license. If a pilot has allowed a license to lapse, most states, including Alaska, require either re-examination or certification that the pilot has completed a certain number of familiarization trips in the waters for which a license is requested.

Thirteen state statutes either specify the number of pilots to be licensed or clearly delegate to the pilot board(s) the responsibility for setting the number of state licensed pilots. Two other states have statutory language which implies that the board(s) may limit the number of licenses issued. In effect, however, in those states without statutory provision for limiting the number of pilots but with mandated apprenticeship programs, the number of licenses is limited *de facto* since pilot associations must recommend an apprentice for licensing. Alaska appears to be the only state without either a statutory limitation or a limitation through apprenticeship provisions. Thus, a recent Florida pilot study concludes that "Only Alaska issues licenses to anyone who qualifies and passes the examination."[21]

C. PILOT DISCIPLINE

All maritime states have instituted procedures for disciplining pilots. Where statewide boards or local commissions are used, this power generally has been delegated to such bodies. All states allow for suspension or revocation of a pilot's license for cause, generally incompetence, repeated negligence, or habitual substance abuse. A long-standing problem in pilot discipline has resulted from the dual pilotage system referenced above. Almost all states, including Alaska, require that a pilot hold an appropriate federal pilot license as a condition of state licensing. Thus, most state pilots hold both a state and federal license and may operate under either license, depending on the type of vessel being piloted. Since each license is issued under a different authority, this situation results in several anomalies. First, where a federal license is a precondition of state licensing, "when a state sees fit to discipline a pilot,

perhaps even revoking his/her license, the federal license is untouched and remains valid."[22]

Thus, a person found negligent or incompetent may still be allowed to operate in local waters on vessels subject to Coast Guard rather than state regulation even after the state has taken action against the individual.

Second, in those few states where a federal license is not required for state licensure, a pilot may still hold both. If disciplinary action is taken against an individual when operating under his/her federal license, the state cannot revoke its license even though the pilot has been proved incompetent. The Pilotage Study Group commissioned by the U.S. Coast Guard has recommended federal legislation to address the first problem. Individual states are moving to correct the second by giving state licensing authorities the power to act against a person who has been found incompetent by a federal authority.

In addition to the ultimate penalty of revocation, some state statutes institute a graduated system of penalties, beginning with reprimand or a fine. Washington State has recently amended its marine pilot act to grant the Board the ability to prescribe "disciplinary or corrective action, including training and treatment, that will be taken."[23] Alaska's statute in this respect would appear to be a model. The Board has an impressive array of discipline options, including peer review and imposing "professional education requirements until a satisfactory degree of skill has been attained in those aspects of professional practice determined by the board to need improvement."[24]

Pilots' due process rights are recognized in all state statutes by requiring a formal hearing before a license is revoked. Several states, however, including Alaska, allow the board or other licensing authority to summarily suspend a license for a specified period or before a formal hearing in cases of clear danger to public health or safety. A few state statutes spell out specific timelines for holding hearings and rendering decisions concerning the discipline of a pilot.

D. PILOTAGE RATES

Of the states with pilot boards, fourteen charge the board with setting pilotage rates. Four states set rates by statute. Rates in the six remaining states are set by various persons or bodies. Alaska's statute is rather cumbersome in this regard. It gives the board the authority to "adopt regulations under the Administrative Procedures Act...establishing standards by which pilotage fees may be established."[25]

E. PILOT LIABILITY

Until recently, it was rare for pilots to be sued and have damages assessed against them for two reasons. First, given the comparatively large amount of damages claimed in most marine accidents, assessing damages against the limited resources of a state pilot was not considered worth the expense of litigation. Second, under traditional

maritime law, a vessel (vessel owner) is liable for the negligence of a pilot. Therefore, it is not in the interests of vessel owners to obtain a finding of negligence on the part of a pilot. This traditional liability situation, however, is changing. Pilots are being sued with increasing frequency.

If pilots are held to be personally liable, the effect on the industry would be crippling. No pilot can obtain insurance against losses which could potentially amount to millions of dollars. Also, since ships are already insured against damages, requiring a pilot to carry similar insurance would merely increase transportation costs.

To address these problems, several states have moved to limit pilot liability in statute. California statute clearly states that "when a pilot goes aboard a vessel, the pilot becomes a servant of the vessel and its owner and operator."[26] South Carolina and Washington limit liability to $5,000 in statute. Oregon has addressed the problem in a more complicated manner: it allows for pilots to purchase insurance on a 'trip' basis:

> in an amount equal to the value of the vessel and its cargo, or such other amount as may be agreed upon between pilots and the vessel, its master, owners, agents or operators, insuring the pilots and the organization of pilots to which they belong against all claims or demands, arising from or based upon, directly or indirectly, pilotage of the vessel. The premium for such insurance shall be assessed in addition to the rates and charges specified [in statute].[27]

Alaska statute does not speak to pilot liability.

F. PILOT ASSOCIATIONS

Pilot associations are the traditional way in which pilots organize themselves to fulfill their duties. Pilots must be on call at all times to handle traffic into and out of pilotage waters. They must meet ships at pilot stations to offer services. They must be prepared to handle all types of ships in all conditions. Individually, pilots cannot offer the range and scope of services required. Therefore, associations of pilots have formed since the early years of compulsory pilotage in this country. Pilot associations offer centralized dispatch and clearance services. They either own or make arrangements for pilot boats to carry pilots to and from ships. Through their members, they can offer 24 hour per day, year-round services. Together, the members provide the skills necessary to deal with all types of situations.

Associations also have traditionally taken the responsibility for training new pilots and for evaluating existing pilots. Both activities serve important functions in maintaining and upgrading pilot skills.

States have long recognized that pilotage lends itself to association among pilots, which is the reason behind state control over pilotage rates. However, few states have recognized associations formally. Without some form of state recognition, the

traditional association has been challenged on antitrust grounds. Some states have sought to protect associations from such challenges. Florida, Hawaii, Louisiana, and North Carolina all explicitly recognize pilot associations.

Although pilot associations are recognized as improving the efficiency of the compulsory pilotage system, they have been accused of abusing their power by limiting entry into the profession in an arbitrary and capricious manner. Hawaii went through a particularly troubling experience with pilot associations and recently amended its pilotage law to state:

> Pilots licensed under this chapter, each of whom shall be deemed an individual contractor, may form a nonprofit association which shall not be deemed a partnership or corporation for liability purposes, in order to provide such arrangements and facilities as may be necessary and desirable for the efficient dispatching of vessels and rendering of pilotage services required under this chapter. The association shall have no control over the selection of persons to be licensed as pilots or their discharge. The association shall have no direction over the manner in which an individual pilot performs the pilot's duties.[28]

Alaska statute does not recognize pilot associations, although associations do operate in two of the three regions of the state, as described in Section 4.

Table 1 (pages 10a-10f) outlines the provisions of each state's pilotage statute in some detail.

Summary: Although Alaska's statute on marine pilotage is considerably shorter than most other maritime states, it does address many common concerns. It has, for example, placed state pilotage under the direction of a statewide board, composed of both industry and public membership —a practice common to most states. Alaska's statute speaks to licensing and discipline of pilots, two major issues in professional certification and control. With respect to discipline, Alaska's statute is among the most comprehensive in the country, giving the Board a wide range of options not only to discipline but to improve the performance of pilots who have experienced difficulties.

There are, however, weaknesses and gaps in current statute. As mentioned above, Alaska law is written from the perspective of individual rights rather than public franchise. This emphasis is unique among the maritime states. Another potential weakness is that the Alaska Marine Pilotage Statute sets out only basic duties and responsibilities but delegates broad regulatory powers to the Board of Marine Pilots. In recent years, the Attorney General and others have questioned the existing Act, maintaining that current language does not give the Board authority to set rates and establish specific licensing requirements. As a result, the Board has not reviewed the pilotage rate schedule for several years. More important, weak authority to set specific licensing standards has resulted in the charge that Alaska's marine pilot standards are the lowest among the maritime states.

In addition to questionable Board authority to regulate marine pilotage, the Act fails to mention several areas of growing concern. In particular, it does not address pilot liability or pilot associations. As outlined in the following section, these are areas of increasing contention in Alaska.

4. CURRENT STATUS OF MARINE PILOTAGE IN ALASKA

Compared to the long history of maritime law and regulation in the United States, Alaska's oversite of marine pilotage is quite recent, dating only from 1970. However, in the 20-year period since the passage of the first Marine Pilotage Act, state pilotage has undergone tremendous changes.

In 1970, piloting in the state was provided by a handful of local pilots operating in Southeast Alaska and organized in a tightly-knit pilot association. The association assumed the responsibility for maintaining standards among existing pilots and for training new pilots as needed. As Prudhoe Bay oil shipments began in Southcentral Alaska, a new group of pilots emerged and organized in response to an amendment to the Alaska statute requiring pilots on all tankers. Again, the association for this region assumed continuing education and training responsibilities.

This system of virtually self-regulated pilotage appears to have worked well until the explosion of cruise ship traffic in Southeast and the emergence of the domestic bottomfish industry in the Aleutian Chain. These two events occasioned a rapid increase in the demand for pilot services and strained the capacity of existing pilot groups to train and absorb new members. As relatively large numbers of pilots, often from out-of-state, entered the system the profession turned to the State Maine Pilot Board to establish entry standards and to exercise greater control over the industry. However, Alaska's statute, while originally intended to give the State Board flexibility—through broad regulatory powers—to deal with changing situations, was unequal to the task. The Department of Law increasingly questioned Board authority under the statute to develop standards, set pilotage rates, and to exercise overall control.

The erosion of the state board's ability to promulgate and enforce regulations for the industry took place at a time when newer pilots began to question the internal operations and politics of the traditional pilot associations. Impatient with what they perceived to be "old boy networks", preserving the income and prestige of long-term pilots, newer and younger pilots turned to the courts. Successive legal challenges raised the specter of group and individual liability for actions taken in the course of training, disciplining, or dispatching of pilots and pilot trainees. Self-regulation of the profession through associations, which had served the state well in the early years, could no longer be relied upon.

The growth in demand for pilot services brought about by the rapid increase in shipping opened opportunities for disgruntled pilots to break with existing associations and to operate independently or to form new groups. For the first time in Alaska's marine pilotage history, competition between pilots and pilot groups entered

* Sec. 9. AS 08.62.080 is amended by adding new subsections to read:

(b) A pilot may not be licensed in more than one pilotage region at one time, unless the board determines that it is in the best interests of the state to license pilots for parts of more than one pilotage region.

Compulsory Pilotage ... ... Pribilof Islands Area

MEMORANDUM

TO: Alaska Board of Marine Pilots
FROM: Alaska Marine Pilots
RE: Compulsory Pilotage in the Pribilof Islands Area
DATE: April 1, 1992

This memorandum presents the view of Alaska Marine Pilots ("AMP") respecting the need for compulsory pilotage in the Pribilof Islands (St. Paul and St. George) and nearby St. Matthew Island. (Even though St. Matthew Island is not considered one of the Pribilof Island groups, for convenience of discussion in this presentation AMP includes it in the Pribilofs.)

With this memorandum, AMP provides to the Board all the information it has been able to gather to date. If AMP is able to gather additional relevant information, it will provide it to the Board as soon as possible.

SUMMARY: The law requires the Alaska Board of Marine Pilots ("the Board") to designate compulsory pilotage in the State of Alaska if necessary to protect shipping, human life and property, and the marine environment. On the evidence outlined in this presentation, AMP believes the statutory criteria require the Board to create a compulsory pilotage zones to the full extent of the three-mile territorial sea surrounding the Pribilofs and St. Matthew Island. AMP asks the Board to do so by adding a new subsection to 12 AAC 56.100.

I. LEGAL AUTHORITY AND DUTY OF THE BOARD

AS 08.62.040(a)(1) provides that the Board shall

> provide for the maintenance of efficient and competent pilotage services on the inland and coastal water of an adjacent to the state to assure the protection of shipping, the safety of human life and property, and the protection of the marine environment.

AS 08.62.160 provides: "The board **shall** define the mandatory pilotage water of the state." (Emphasis added.)

Pursuant to this authority, the Board has adopted regulations governing compulsory pilotage waters, 12 AAC 56.090 througn .120. Section .090 establishes a general rule for determining the boundaries of the compulsory pilotage waters of Alaska; this is a "default" provision which covers all waters "not otherwise described in this chapter."

Section .100 establishes certain specific boundaries of compulsory pilotage waters. AMP is requesting the Board to add the three-mile territorial sea surrounding the Pribilofs and St. Matthew Island to this section.

Three aspects of AS 08.62.040(a)(1) are germane to this presentation. First, this provision together with AS 08.62.160 makes it clear that it is the duty of the Board to designate compulsory pilotage waters in Alaska. Contrary to the suggestion of Board Member Bill Lorch at the Board's January 1992 meeting, the Board cannot and should not defer to local governments to make this determination. The Board certainly may consider the opinions of local government officials to the extent these opinions bear on appropriate criteria, but the ultimate decision can only be made by the Board.

The second important aspect of Section .040(a)(1) is that it expressly defines the waters that fall within the Board's jurisdiction: "the inland and coastal waters of and adjacent to the state." (Emphasis added.) This is a change from the prior statute, in which .040(a)(1) described "all waters covered by this chapter." Clearly, the waters around any Alaskan island are "coastal" waters "adjacent" to the state. There can be no doubt that the Board has authority to designate compulsory pilotage waters to the full extent of the three-mile territorial sea surrounding any Alaskan island, if the statutory criteria are met.

The third important element of Section .040(a)(1) provides the criteria to be applied by the Board in making this decision: "protection of shipping, the safety of human life and property, and the protection of the marine environment." Protection of the marine environment is a new criterion added to the statute by the 1991 legislation. This is critically important in the context of the Pribilofs, because the marine environment in that region is particularly rich and sensitive.

These are the only criteria the Board may consider in evaluating whether to designate compulsory pilotage waters in the Pribilofs. Contrary to suggestions by witnesses and some Board

members at the Board's January 1992 meeting, the Board may not properly consider the economic impact of compulsory pilotage either on local governments or on the shipping or fishing industries. If economic considerations were to play a part in establishing compulsory pilotage, there would be no compulsory pilotage anywhere in the State of Alaska. If safety considerations compel establishing compulsory pilotage in a particular area, then the cost of such pilotage to industry is irrelevant.

Other witnesses at the Board's January meeting argued against compulsory pilotage because of the logistical problems that might arise in getting pilots to and from vessels. That is also an improper consideration, unless it bears directly on the three statutory criteria. If the logistics objection is purely economic, the Board cannot consider it. Everywhere in the world, logistical problems of getting pilots to and from ships are solved in one way or another, and everywhere in the world industry must bear the cost of compulsory pilotage if such pilotage is deemed necessary. In this respect, the Pribilofs are no different from anyplace else in Alaska or rest of the world.

Still other witnesses suggested that pilots are unnecessary in the Pribilofs because the masters of the foreign vessels operating there were the most skilled in the world at "high seas" dockings. This assertion, even if true, is irrelevant. The statute does not permit the Board to consider the expertise of foreign masters in deciding whether to require compulsory pilotage.

The very reason for establishing a system of compulsory pilotage is to ensure that vessels operating in state waters are under the control of someone with proper training and local knowledge and experience. The state has no way of knowing the training and experience of a foreign ship master, or whether he is sober and drug-free, or whether he is proficient in English. None of the state's requirements for a licensed pilot apply to foreign masters. In the absence of a licensed pilot, the state has no way of knowing whether the vessel even has adequate charts (see Statement of Capt. David Sanders, attached hereto as Exhibit A, entry for January 31, 1992, at 1500 hours: vessel operating near St. Paul without adequate charts).

The Board must designate compulsory pilotage waters in the Pribilofs if it determines that it is necessary to protect shipping, the safety of human life and property, and protection of the marine environment. This is a non-delegable duty. AMP believes that the situation in the Pribilofs and St. Matthew Island require imposition of a compulsory pilotage zone.

In passing, AMP notes that if this Board does not impose compulsory pilotage in that area, the federal government has the authority to do so. The Secretary of Transportation may require a federal pilot for any self-propelled vessel when pilots are not required by state law and the vessel is both engaged in foreign commerce and operating on navigable waters of the United States. 46 USC 8503(a). This provision would cover a good deal of the vessel traffic in the Pribilofs.

II. FACTUAL BASIS FOR IMPOSING COMPULSORY PILOTAGE IN THE PRIBILOFS

A. Geography and weather.

The Pribilof Islands are located in the Bering Sea approximately 200 miles northwest of Unimak Pass. Under good weather and sea conditions, it is approximately one day's steaming time from Dutch Harbor. St. Matthew is approximately 200 miles north-northwest of the Pribilofs, about 145 miles west of Nunivak Island.

Because of its geography, the weather and sea conditions in the region are among the worst in the world. These islands lie exposed to hundreds of miles of open ocean, allowing seas and weather to build up over a considerable distance without obstruction. During winter, the islands are within the boundaries of the ice pack, and the presence of ice in winter is frequently a factor in vessel movements.

Attached hereto as Exhibit B is an excerpt from the United States Coast Pilot, Vol. 9 (15th Ed. 1992), describing the area. AMP points out some specific points mentioned in the Coast Pilot about the Pribilofs:

> Fogs are especially thick and prevalent in this vicinity in the summer, and navigation is attended with difficulty and danger. . . . One annoying characteristic of the area is very thick fog accompanying strong winds. . . . Winds do not continue to blow from the same quarter for any length of time. . . . After September 1, gales are frequent and violent, and blow from all directions. . . . The Pribilofs are near the S limit of the ice in Bering Sea.

> Frequent windy periods are characteristic of the (St. Paul Island) area throughout the year. Frequent storms occur from October to April, and they are often accompanied by gale force winds to produce blizzard conditions.

The Coast Pilot has little to say about St. Matthew Island, but what it does say offers a suggestion of the perils of navigation there:

> St. Matthew Island and adjoining islands . . . are rocky, uninhabited islands whose shores are poorly charted except for a small area between Sugarloaf Mountain and Pinnacle Island. . . . During the season of navigation, fog is prevalent in this vicinity.

The shortage of soundings and other information is readily apparent from an examination of NOAA's navigation chart No. 514, which is the only navigation chart that shows St. Matthew Island. This is a large-area, small-scale chart utterly inappropriate for coastal nagivation. NOAA does not offer a high-detail navigation chart for St. Matthew Island similar to Chart No. 16380, which depicts St. Paul and St. George Islands in detail. This underscores the need for a pilot with local knowledge at St. Matthew Island.

Also part of Exhibit B is the weather chart published in the Coast Pilot at page T-9 for St. Paul Island. One of the key facts is at the bottom of the chart: the mean number of days with fog annually is 190. In other words, fog is a factor for navigation more than half the year. This chart also provides an idea of the way in which the wind comes from every direction.

For the Board's review, AMP is also providing weather information from the National Weather Service, which maintains a primary weather station on St. Paul Island. Attached as Exhibits C and D are reports from St. Paul and, for comparison, Cold Bay. These reports include historic weather data going back many years.

The Cold Bay reports are provided to demonstrate that the weather in St. Paul is, in some important ways, worse that the weather in Cold Bay, a long-time compulsory pilotage area. Examination of the Weather Service data indicates that St. Paul has almost three times as many days during which fog reduces visibility to one-quarter mile or less (57.5 days for St. Paul versus 21.7 days for Cold Bay) and that St. Paul has more severe winds (mean speed of 17.7 mph for St. Paul versus 16.9 mph for Cold Bay). This information, coupled with the fact that vessel congestion is now

higher in the Pribilofs area than in Cold Bay, strongly supports AMP's contention that compulsory pilotage is needed in the Pribilofs.

The Weather Service included these comments in its report about St. Paul Island (Exhibit C-7):

> Frequent windy periods are characteristic of the island area throughout the year. Frequent storms occure from October to April, and these often are accompanied by gale-force winds to produce general blizzard conditions. Under the influence of prolonged north and northeasterly winds between January and April, the ice pack occasionally moves south to surround the island.

As the Coast Pilot notes, the winds in the Pribilofs shift constantly and often in a surprisingly short time. This has a direct bearing on the Board's decision. Because of these weather patterns, vessels are constantly on the move trying to find a lee in which to find protected waters in which to work. Typically, as explained below, such a movement occurs in the middle of offloading cargo and therefore involves both a freighter and a floating processor. This combination of severe conditions, multiple vessels, and frequent vessel movements is a key factor for the Board to consider. In winter, ice is generally an additional factor; the expertise of a pilot is particularly valuable in ice conditions.

Another key factor is that the water around the islands is shallow to the full extent of the three-mile territorial sea and beyond. For the Board's convenience, AMP is providing the following attachments:

Exhibits E and F	Excerpts of NOAA Chart 16380 for St. Paul and St. George
Exhibits G, H, and I	Excerpts of NOAA bathymetric charts for St. Paul, St. George, and St. Matthew

(The original of each of these charts has been sent to Pilot Coordinator Capt. Carl Luck for the use of the Board at the April meeting. Photocopies of the relevant portions are attached to each copy of this memorandum for the convenience of the Board members.)

The shallowness of the water is important here for two reasons. First, it is well-known that seas become more severe, more confused, and more "lumpy" in shallow water. Sea conditions throughout the Bering Sea are notoriously severe, in large part because the water is so shallow. This has a direct bearing on the safety of vessel operations and on the risks to human life, property, and the marine environment.

The second relevant consequence of the shallow water surrounding these islands is that vessels can anchor almost anywhere within the three-mile territorial sea. As AMP documents below, vessels are already anchoring and operating just outside the current compulsory pilotage boundary to avoid the expense of engaging a pilot. The charts attached as Exhibits E-I will help the Board to understand why it is essential for the Board to create a compulsory pilotage zone to the full extent of its three-mile territorial jurisdiction.

As a practical matter, floating processors can anchor and operate safely in the Pribilofs in 20 to 25 fathoms of water. While these vessels prefer to operate in shallower water to improve their anchoring, it appears certain that they will move to deeper water if that will enable them to avoid pilot fees.

For this discussion, AMP asks the Board to assume that vessels can and will anchor in up to 20 fathoms of water. That is 180 feet, or approximately 54 meters. AMP asks the Board to examine Exhibits E and F (NOAA Navigation Chart No. 16380), which measure depth in fathoms and feet, and Exhibits G, H, and I (NOAA bathymetric charts), which measure depth in meters.

All these charts show the three-mile territorial sea. AMP asks the Board to compare the three-mile line to the 20-fathom curve on Exhibits E and F, and to the 50-meter curve on Exhibits G, H, and I. These charts show that most of the water inside the three-mile line surrounding all three islands is shallow enough for vessels to anchor and operate. The major consideration for vessels operating within the three-mile line is not whether the water is shallow enough to anchor, but whether they can get in the lee of an island to avoid the wind.

B. Increase in vessel activity in the Pribilofs Area.

Until recently, these remote islands got relatively little vessel traffic. However, a major crab and pollock fishery has developed in the region. In the past few years, the anchorages in

the Pribilofs and St. Matthew have achieved priority importance in the fishing industry. By operating there, floating fish processors enable fishermen to avoid the delay and expense involved in running to and from Dutch Harbor. The emergence of significant vessel congestion in the Pribilofs coincided with the emergence of the large opilio crab fishery.

Peak activity times for the fishing industry are from January through May for the opilio crab fishery and July through September for the "B" season of the pollock quota. Often, there is a summer blue crab fishery near St. Matthew Island. All of these fisheries typically involve floating processing vessels up to 400 feet in length (plus the OCEAN PRIDE, a 700-foot former APL container ship converted to process surimi), a fleet of approximately 100 fishing boats, and a stream of foreign (and domestic) freighters averaging between 230 and 420 feet in length. At any given time during the season, the waters around St. Paul Island, for instance, might have up to 11 floating processors. During a typical 24-hour day, there could be up to 20 fishing boats and 6-8 freighters working simultaneously in the area.

In this connection, the Board is urged to review the attached typescript of the personal notes of Capt. David Sanders (Exhibit A), who kept a log of vessel activity at St. Paul early this year; the statement of Capt. Will Anderson (Exhibit J), who is a former master of factory trawlers and processors in the Pribilofs); and the summary of the harbormaster of St. Paul (Exhibit K), which identifies the floating processors working in the area during the periods January-June 1991 and January-March 1992. Capt. Anderson's statement is particularly valuable, inasmuch as it provides the perspective of processor master with experience in the Pribilofs.

When a floating processor arrives in the Pribilofs area, its goal is to operate 24 hours per day with as few shutdowns as possible. This requires fishing vessels to come alongside the processor to unload their catch, and freighters to come alongside to receive the processed product. With its limited hold space, a typical floating processor working at full capacity must offload cargo every two to three days. Obviously, these activities demand a high degree of skill in ship-handling and the ability to communicate clearly and quickly about vessel maneuvers. The foreign freighters operate under these demanding circumstances with masters of varying degrees of skill, both in ship-handling and in speaking English.

In this context, it is important to note that pilots are not under any economic pressure to keep a processor operating non-stop to the fullest possible extent. Pilots are more likely to make decisions about when, where, and how to move a vessel on the basis of safety considerations than economic considerations. A ship master under pressure from his owners to keep operating is better insulated from such pressure if a compulsory pilot makes decisions about vessel movements (see comments of Capt. Sanders, Exhibit A, for February 5, 1992, at 1020-1120 hours, relating to pressure on master of BANYO MARU not to use pilot; see also Statement of Capt. Anderson, Exhibit J).

Cargo operations (both offloading catch to the processor, and offloading product to the freighters) are frequently interrupted by weather, and freighters particularly may come alongside and depart two or three times before finishing the transfer of cargo. As weather and sea conditions change, and as the wind shifts, cargo operations tend to go on to the last possible minute, then the entire fleet moves "en masse" and simultaneously to a more protected spot near the island. Movements of this kind, to find more protected locations in the lee of the island, may happen more than once in a day. At these times, the vessels have to deal with conflicting schedules, deteriorating weather and sea conditions, small weather windows, parting mooring lines, dragging anchors, and language and communications barriers. Accidents are common.

In addition to the high degree of difficulty in bringing vessels alongside and departing under such conditions, many offshore hazards to navigation exist. Navigation in the waters adjacent to the islands and in and out of congested anchorages in high winds and seas, in low visibility conditions, create extreme hazards.

The wreck of the first ALL ALASKAN is on the north shore of St. Paul Island. This 4,000 gross ton floating processor (approximately 350 feet) went aground on March 20, 1987; it was blown ashore after dragging its anchor and being unable to recover in the high winds. The wreck of the 8100 gross ton Greek-flagged MYLOS REEFER is on the beach at St. Matthew Island, having gone aground in November 1989. In January 1989, the YARDARM KNOT grounded on a charted reef near St. Paul in bad weather, while trying to shift from one side of the island to another, and was damaged badly enough that it had to be towed to Dutch Harbor for temporary repairs to enable the vessel to get to Seattle for permanent repairs. The shores of these islands are littered with the hulks of smaller fishing vessels.

Not routinely reported, but well-known to all mariners who operate in this area, is the frequency of relatively minor collisions and near-catastrophes that result from the congestion coupled with severe weather and sea conditions. Vessel casualties and near-casualties have been and continue to be frequent occurrences in the area.

One of many reported casualties was in April 1990, when the freighter HAKKO BOOMERANG collided with the processor YARDARM KNOT while trying to come alongside the YARDARM KNOT. Weather was clear and visibility was good, but the winds were blowing 20-25 knots, according casualty report filed with the Coast Guard. The HAKKO BOOMERANG did not have a pilot on board at the time.

As this memorandum is being prepared, AMP has learned of a collision that occurred on March 29 or 30, 1992, between the Japanese freighter ORION and the processor YARDARM KNOT at St. George Island. AMP understands this incident is still being investigated. AMP urges the Board to obtain all the relevant information about this incident and include it in its deliberations of this issue.

AMP believes there can be no question about whether the level of vessel activity, coupled with the severity of weather and sea conditions, justifies imposition of a compulsory pilotage zone in the Pribilofs and around St. Matthew Island.

C. The marine environment is particularly rich and sensitive in the area, and must be protected.

All of the vessels operating in the Pribilofs and St. Matthew Island regions carry fuel and other potential contaminants. A typical floating processor may carry up to hundreds of thousands of gallons of diesel or bunker fuel when it arrives at the beginning of the season. Processors typically carry fuel not only for their own operations, but to serve as a floating fuel dump for the fishing boats delivering catch to it. A typical freighter may carry up to 100,000 to 200,000 gallons of fuel.

When considering whether pilotage ought to be compulsory in the area, the Board must recognize the rich diversity of marine life present and the possible consequences of a marine casualty. Deep-water, nutrient-laden currents that upwell onto the shallow continental shelf in the area teem with fish, squid, crustaceans, mollusks, and lesser organisms. The islands and surrounding waters

support immense colonies of nesting seabirds, huge rookeries of Northern fur seals (the largest in the world), Stellar sea lions, walrus, and gray and sperm whales.

The Pribilofs hold the largest seabird nesting colonies in Alaska and one of the largest single colonies in the Norther Hemisphere. The total nesting population in the islands is approximately 3.0 million, with 80 percent nesting on St. George. Even when not nesting, many species spend a good part of the year in the waters near the islands. An oil spill would cause major problems for these populations.

Well over half of the world's one million or so Northern fur seals return each year to the rookeries in the Pribilofs. The greatest concentrations on St. Paul are Zapadni-Tolstoi in English Bay, Reef Point and Village Cove, Lukanin-Kitovi in Lukanin Bay, and Northeast Point. These are also the most favored anchorages for the floating processors and the most heavily traveled by moving vessels. On St. George, the primary rookeries on the north side of the island are located near St. George Village and on the west side in Zapadni Bay; these are also areas that see the most vessel traffic. (See Exhibit L, excerpts from NOAA study of sensitivity of coastal environments and wildlife to spilled oil in the Pribilofs). Fur seals, like sea otters, rely on a dense coat of fur rather than blubber for insulation. Any amount of oil from a spill or beach residue destroys the integrity of this coat, resulting in loss of insulation and death from hypothermia.

Although the St. Matthew Island Group is surrounded by ice longer than the Pribilofs, it also supports vast colonies of nesting sea birds and some marine mammals. From an environemental point of view, St. Matthew is as important as the Pribilofs.

(The sources for this information include Island of the Seals, published by Alaska Geographic 1982, the NOAA sensitivity study attached as Exhibit L, and conversations with representatives of NMFS, including the field biologist directly responsible for the Pribilofs. The primary source documents are too voluminous to submit to the Board, but the Board is encouraged to consult these and other sources. Attached as Exhibits M and N are copies of two charts from Island of the Seals that indicate the location of Northern fur seal rookeries.)

Attached as Exhibit O is a letter to the Board dated March 27, 1992, from Steven T. Zimmerman, chief of the National Marine Fisheries Service protected resource management division. This letter reflects NMFS's support for any action, including compulsory

pilotage, that would reduce the possibility of vessel mishaps in the Pribilofs. Attached as Exhibit P is a letter to the Board dated April 1, 1992, from John Martin, refuge manager, Alaska Maritime National Wildlife Refuge, U.S. Department of the Interior, in the same vein, and highlighting the risk of an invasion of rats from a vessel that grounds in the area.

The most detailed and current assessment of dangers from oil pollution in the Pribilofs is contained in the final environmental impact statement (FEIS) prepared by the Minerals Management Service of the U.S. Department of the Interior for Lease Sale 89 in the St. George Basin. This proposed lease sale ultimately did not take place due to lack of interest from the oil industry, but the FEIS contains a wealth of environmental information too extensive to include in this memo.

However, it is important to note that the federal Fish and Wildlife Service and the Natural Resources Defense Council requested that there be a fifty-mile deferral of leasing around the Pribilofs. NMFS and the State of Alaska joined in expressing their concerns for the welfare of the Pribilofs, and supported the deferral. While the FEIS is too bulky to submit to the Board (though AMP will have it available at the April meeting), AMP does attach as Exhibit Q excerpts of the "Proposed Notice of Sale," which does reflect the sensitivity of the Pribilofs.

It is beyond dispute that the marine environment in this area is very rich and very sensitive. The severity of a marine disaster involving a spill of pollutants is obvious. The potential damage to both commercial and non-commercial marine populations cannot be overstated. Ironically, a significant oil spill in the region could deal a serious blow to the very industry that is now fighting against compulsory pilotage on economic grounds.

The vast seabird colonies and the populations of Northern fur seals and other marine mammals are commonly held public resources. No group, whether it be the residents of the islands or the processing industry, has the right to endanger this resource. All precautions must be taken to protect this marine environment for future generations, even if operating costs are slightly increased. Comments such as "It's their island, their seals, their oil spill" (made at the Board's January meeting by member Bill Lorch) are entirely inappropriate in AMP's opinion. This Board has an affirmative duty to consider environmental concerns in deciding whether to impose compulsory pilotage.

The importance of this criterion in the Board's deliberations on this issue is underscored by the fact that "protection of the marine environment" is a <u>new</u> criterion added by the legislature in the wake of the EXXON VALDEZ disaster in Prince William Sound. AMP urges the Board to give this element of the statute particular attention.

D. The Board must extend compulsory pilotage to the full extent of the three-mile territorial sea.

At its January 1992 meeting, the Board declined to take action to declare compulsory pilotage waters in the area beyond what is already required by the "default" provisions of 12 AAC 56.090. This provision provides that, if compulsory pilotage waters are not otherwise defined, then compulsory pilotage waters

> are those waters inshore of a line drawn approximately parallel with the general trend of the shore through the outermost aid to navigation, or if no aid to navigation exists, then a line drawn from headland to headland across the mouth of the entrance.

After a long discussion of "headlands" and "juridical bays," the Board determined that, under Section .090 of the regulation, compulsory pilotage waters currently exist only shoreward of a line between Reef Point and Zapodni Point on the south side of St. Paul Island.

The "default" provisions of Section .090 were adequate to meet the state's needs for compulsory pilotage waters at the time it was adopted. Historically, vessels congregated in "bays, sounds, rivers, or other estuaries" because they had to call at land-based ports for cargo operations, provisioning, repairs, and so forth. Historically, land-based ports were located only adjacent to protected waters.

Technology has overtaken Section .090. Its default provisions did not anticipate fleets of floating processors, with their attendant fishing boats and tramp freighters, that can now operate in the unprotected waters offshore of Alaska's islands and mainland. Floating processors and their fishing boats and freighters don't need "bays, sounds, rivers or other estuaries." All they need is shelter from winds and seas, and the lee of an island is usually sufficient for that purpose.

In short, Section .090 is not adequate to cope with the problems created by a fleet of floating processors operating in waters adjacent to an island. This Board cannot solve those problems simply by drawing a line from headland to headland. It must instead create a compulsory pilotage zone around the island in order to meet its statutory obligations.

As mentioned above, the shallowness of the waters surrounding these islands creates a problem for the Board in defining where to draw the line for a compulsory pilotage zone. The waters are shallow enough that the vessels can anchor and operate anywhere within the territorial sea around all three islands.

At the January 1992 meeting, an industry witness testified that if the Board draws a line for compulsory pilotage, the processors will simply move outside the line to avoid paying for pilots. That, in fact, is exactly what has happened since the January meeting. See the typescript of the notes of Capt. David Sanders, attached as Exhibit A. Time and again, Capt. Sanders makes note of floating processors moving to locations just outside the pilotage line to avoid pilotage fees.

The line between Reef Point and Zapodni Point includes Village Cove and English Bay. These anchorages have traditionally been most favored because of the lee they provide and their close proximity to harbor and transportation facilities at St. Paul. Since the January meeting, this area has become essentially "off limits" for vessels wishing to avoid pilotage costs. Processors now work either just across the line, in non-pilotage waters, or in Lukanin Bay and the large bights on the northeast and north sides of the island. (See notes of Capt. Sanders, attached as Exhibit A.)

The resulting shipping pattern serves neither the best interests of the State of Alaska nor those of industry. The processors are anchored farther offshore in waters much less favorable to working conditions and the transport of personnel. In an effort to save piloting costs, vessels now operate in areas that are less safe than anchorages within pilotage waters, creating unnecessarily increased risks for vessels and workers.

Under these circumstances, industry will continue to move its operations outside any compulsory pilotage line drawn by the Board, so long as it is perceived as practicable and economically advantageous to do so. It may be that the majority of vessel operations now occur within a mile from the islands, but if the

Board draws the compulsory pilotage line at one mile, it seems inevitable that the fleet will simply move outside the one-mile line. The same appears sure to occur regardless of where the Board draws the line. The shallowness of the water surrounding the islands permits them to do so (see Exhibits E-I and discussion in Section I-A above).

For that reason, AMP urges the Board to establish compulsory pilotage zones to the full extent of the three-mile territorial sea surrounding the islands of St. Paul, St. George, and St. Matthew. This would establish a clear-cut delineation of the compulsory pilotage zones around these islands, inasmuch as the three-mile territorial sea is clearly marked on all navigation charts of the region. To the full extent of the Board's authority, it would preclude vessels from avoiding pilotage by moving outside a line closer to the islands. It would also ensure that the Board has done all it legally can do to protect shipping, life, property, and the marine environment in the area.

AMP points out that the current pilot station is now <u>four</u> miles from St. Paul Island. 12 AAC 56.120(30). With this in mind, imposing a three-mile pilotage zone appears to be consistent with the prior decisions of this Board.

E. Comparison of the Pribilofs and St. Matthew to other ports and areas in the Western Region.

The justification for compulsory pilotage in the Pribilofs becomes readily apparent when one compares the level of vessel activity in the Pribilofs and St. Matthew Island with that in areas of the Western Region where pilotage is <u>already</u> required.

This is the salient fact: During the height of the opilio crab and pollock fisheries, the level of vessel congestion is exceeded only by Dutch Harbor (and sometimes Akutan) in the entire Western Region. The severity of weather and sea conditions in the Pribilofs is second to none in the entire Western Region, which includes the notoriously hostile Aleutian Island chain.

AMP has submitted with this memorandum information reflecting the vessel congestion in the Pribilofs. See Exhibit A (Notes of Capt. Sanders), Exhibit K (Summary of St. Paul harbormaster), and Exhibit J (statement of Capt. Anderson). These exhibits speak for themselves. If compulsory pilotage is justified in areas such as

Chignik, Sand Point, King Cove, Lost Harbor, and Atka, all of which have significantly less vessel traffic and significantly less hostile conditions, then compulsory pilotage is more than justified in the Pribilofs.

III. RECOMMENDATION

A. Amend 12 AAC 56.100

AMP urges the Board to adopt an amendment to 12 AAC 56.100, adding the following subsection:

> (15) all waters within three nautical miles of St. Paul Island, St. George Island, and St. Matthew Island in the Bering Sea.

AMP believes that the Board has sufficient information to form a rational basis for this amendment. If the Board believes it needs additional information prior to adopting this amendment, then AMP recommends that the Board assign the marine pilot coordinator to visit the area, observe the situation, and report back to the Board. This will provide the Board with information from a disinterested party.

Respectfully submitted this first day of April, 1992.

ALASKA MARINE PILOTS

By Capt. Tom Dundas, President
Capt. Will Anderson

pribmemo.amp

TABLE OF EXHIBITS

TYPESCRIPT FROM DAILY NOTES OF CAPT. DAVID SANDERS

At St. Paul January 15 to February 5, 1992

1-15 Pilot Capt. David Sanders (AA-149) arrives on station in St. Paul. Three Japanese freighters in area: ETSUYOH MARU, REEFER SACHI, SHIN MEI MARU. Also three floating processors: YARDARM KNOT, ALL ALASKAN, ALASKAN I). Pilot boat arrives on station.

1-16 1530 - REEFER SACHI shifts to alongside floating processor YARDARM KNOT in Lukanin Bay. No pilot.

1-18 BANYO MARU arrives St. Paul. ETSUYOH MARU departs.

1-19 Approx. 1300 - REEFER SACHI departs from alongside YARD ARM KNOT. YARDARM KNOT shifts from Lukanin Bay to anchor in Village Cove inside compulsory pilotage waters. REEFER SACHI goes back alongside, then departs. No pilot.

1500 - SHIN MEI MARU switches with REEFER SACHI to alongside YARDARM KNOT in compulsory pilotage waters. No pilot. (I believe SHIN MEI damaged YARD ARM KNOT during this landing.)

1-20 In morning hours BANYO MARU (which switched out with the ETSUYOH MARU 1-18) goes alongside ALL ALASKAN inside compulsory pilotage waters. No pilot.

1-21 In early hours BANYO MARU away from ALL ALASKAN and alongside ALASKAN I. No pilot.

1-23 Informed by Capt. Tom Dundas of State's definition of compulsory pilotage line between Reef Point and Zapadni Point. I then advised all three floating processors of the change (ALL ALASKAN, YARDARM KNOT, ALASKAN I).

AMP Ex. A

Page 1 of 4

1-24 Pilot began working compulsory pilotage waters of St. Paul Island.

0545 - Shift BANYO MARU to outside pilotage boundary line. Pilot on board.

1620 - Shift SHIN MEI MARU from alongside YARDARM KNOT to pilot station. Then bring freighter HAKKO BOOMERANG from anchor to alongside YARDARM KNOT. All three floating processors anchored inside compulsory pilotage boundary.

1-26 1100 - Shift HAKKO BOOMERANG from alongside YARDARM KNOT to anchor inside compulsory line. Pilot on board.

1500 - ALL ALASKAN shifts outside sompulsory pilotage line approx. 0.2 miles ouside boundary line.

1-27 0955 - Shift HAKKO BOOMERANG from anchor inside compulsory line to alongside YARDARM KNOT. Pilot on board.

1030 - Observed ALASKAN I shifting from anchor inside compulsory line to alongside BANYO MARU outside compulsory line. No pilot.

1-28 Japanese freighter TAISETSU arrives St. Paul and anchors outside compulsory boundary line. BANYO MARU goes alongside and departs ALL ALASKAN. No pilot either move. Located 0.2 miles outside compulsory line.

1-29 TEISETSU shifts alongside ALL ALASKAN anchored 0.2 miles outside compulsory line. No pilot.

1940 - While alongside ALASKAN I, BANYO MARU heaves anchor while ALASKAN I drops anchor. After both vessels riding on ALASKAN I anchor, BANYO MARU shifts to anchor outside compulsory line. No pilot.

1-30 TEISETSU shifts alongside ALL ALASKAN outside line. No pilot.

1-31 0400 - Freighter ORION arrives St. Paul and anchors outside compulsory line.

1015 - TEISETSU departs ALL ALASKAN and anchors outside compulsory line. No pilot.

AMP Ex. A

Page 2 of 4

2-1 1500 - Shift HAKKO BOOMERANG from alongside YARDARM KNOT then shift ORION from anchor to alongside YARDARM KNOT. Pilot on board. While on board ORION observed that only chart available was small-scale chart. Vessel working area without appropriate detail of area.

1620 - TEISETSU shifts to alongside ALL ALASKAN outside compulsory line. No pilot.

1735 - Freighter ZUIFU arrives. Anchors outside compulsory boundary.

2-2 1145 - ALASKAN I shifts to north side of St. Paul.

1400 - BANYO MARU moves to north side of St. Paul. No pilot.

1640 - TEISETSU shifts away from ALL ALASKAN and anchors outside line. No pilot.

1720 - Shift ORION from alongside YARDARM KNOT to anchor outside bondary line. Pilot on board.

1800 - ALL ALASKAN shifts inside boundary line.

Weather today SE 25-30 knots with low westerly rollers, tricky in Village Cove.

2-3 ALL ALASKAN, YARDARM KNOT anchored inside boundary line until approx. 0900 then shift to north side of St. Paul Island. Approx. 1800 YARDARM KNOT, ALL ALASKAN, and ALASKAN I come back to Village Cove. YARDARM KNOT and ALASKAN I anchored inside line, not sure about ALL ALASKAN. Freighters ORION, ZUIFU, TEISETSU all anchored outside line and anchors holding fine.

2-4 1555 to 1730 - Shift ZUIFU to alongside YARDARM KNOT inside boundary line and pilot on board. ALL ALASKAN anchored outside line (just barely); YARDARM KNOT, ALASKAN I anchored inside.

2-5 0155 to 0220 - Shift ZUIFU from alongside YARDARM KNOT to anchor inside boundary line. Pilot on board.

0220 to 0330 - Shift ORION to alongside YARDARM KNOT inside boundary line. Pilot on board.

United States Coast Pilot 9

Pacific and Arctic Coasts Alaska: Cape Spencer to Beaufort Sea

Fifteenth Edition

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service

1020 to 1120 - Shifting BANYO MARU from anchor outside boundary line to alongside ALASKAN I inside the line; pilot on board. Captain of BANYO MARU told me that he was questioned by Taiyo (his company) as to why he used a pilot on 1/24/92. Also when the ALASKAN I requested this shift, the captain of the BANYO MARU had to get permission from Taiyo office and ship's local agent (North Star) before he would come inside the line to take cargo from the ALASKAN I. He had received explicit instructions against doing that from both his company and ship's agent.

2340 to 2400 - Shifting BANYO MARU from alongside ALASKAN I to pilot station. Pilot on board.

Pilot is relieved and departs St. Paul.

leading marks, and at some of the crossings it is necessary to wait for high water. A pilot is necessary.

(338) Vessels coming down river stand out to sea from a point east of Carter Spit. In entering, this track is not used because of the possibility of running up a blind channel.

(339) Tides.–The diurnal range of tide is 12.2 feet at Kuskokwak Creek entrance and 4.0 feet at Bethel.

(340) Currents.–The currents of Kuskokwim Bay and River are strong, attaining velocities of 5 knots at times. A strong tidal current sweeps past Cape Newenham, setting approximately N and S. Along the N side of the cape, tidal currents of about 1 knot have been observed setting NE and SW. In general, the currents set in directions parallel to the axes of the channels between the shoals. In the channel leading to Goodnews Bay, about 1 mile from the N end of South Spit, flood and ebb each has a velocity of about 2.5 knots, setting NE and SW, respectively. In the deep channels off Jacksmith Bay the flood current has a velocity usually of about 2 to 2.5 knots at strength, and the ebb from 2.5 to 3 knots. In the vicinity of Apokak Creek, the strongest current observed was 3.5 knots. The flood current is felt only about as far as Bethel.

(341) By arriving at the entrance to Eek Channel on the last of the ebb, a favorable current can be carried nearly to Bethel, providing there are no delays.

(342) (See Tidal Current Tables for predictions in Kuskokwim Bay and River.) Variations from the predicted times and velocities, because of freshets and winds, may be expected.

(343) Weather.–The best weather usually occurs in March and April. During the summer, SE to SW gales are frequent and last from 2 to 5 days. These storms gradually blow themselves out and are generally followed by a few days of good weather. In the early fall, N winds are frequent and are usually accompanied by clear skies. After mid-September strong gales become frequent and prolonged.

(344) (See page 1-21 for dates of ice breakup and freezeup.)

(345) Water can be obtained from small streams in Security Cove, Goodnews Bay, and Carter Bay. In the vicinity of Eek Island, the river water is fresh at all stages of the tide; it is very muddy, but the silt settles readily.

(346) Chart 16380.–The Pribilof Islands, in the Bering Sea about 200 miles NW of Unimak Pass, consist of St. Paul, St. George, Otter, and Walrus Islands; the latter two are small and uninhabited. St. Paul and St. George have the largest and most numerous fur seal rookeries in the world. The group is under the jurisdiction of the National Marine Fisheries Service and is patrolled during the sealing season by vessels of the U.S. Coast Guard, under provisions of the international treaty governing sealing. From June 1 to October 15, the fur seal breeding and birthing season, landing is forbidden at the rookeries in the vicinity of English Bay, Reef Point, Lukanin Point, Polovina Point, and Northeast Point on St. Paul Island. Walrus and Otter Islands are bird reservations, landing is prohibited at all times, unless a permit is obtained from the National Marine Fisheries Service.

(347) Radiotelephone and radiotelegraph services are maintained on St. Paul Island and St. George Island. In addition, interisland radio and satellite communications are maintained.

(348) A supply vessel makes several trips a year between Seattle and the Pribilof Islands (St. George and St. Paul).

(349) There are no landlocked harbors about the islands, but safe anchorage is always available on the lee sides. Residents of St. Paul Island say that the prevailing wind during the summer is from the NE, which makes Village Cove on St. Paul Island a good anchorage in all but severe SW winds. The bottom in Village Cove is black sand, and the holding ground is good. During SW winds good anchorage is available in Lukanin Bay on the SE side of St. Paul Island.

(350) The following regulations are from 50 CFR, Wildlife and Fisheries:

(351) Part 215–Pribilof Islands

(352) Subpart C–Administration

(353) §215.21 Visits to fur seal rookeries.

(354) From June 1 to October 15 of each year, no person, except those authorized by a representative of the National Marine Fisheries Service, or accompanied by an authorized employee of the National Marine Fisheries Service, shall approach any fur seal rookery or hauling grounds nor pass beyond any posted sign forbidding passage.

(355) §215.22 Dogs prohibited.

(356) In order to prevent molestation of fur seal herds, the landing of any dogs at Pribilof Islands is prohibited.

(357) §215.23 Importation of birds or mammals.

(358) No mammals or birds, except household cats, canaries, and parakeets, shall be imported to the Pribilof Islands without the permission of an authorized representative of the National Marine Fisheries Service.

(359) §215.24 (Reserved)

(360) §215.25 Walrus and Otter Islands.

(361) By Executive Order 1044, dated February 27, 1909, Walrus and Otter Islands were set aside as birdreservations. All persons are prohibited to land on these islands except those authorized by the appropriate representative of the National Marine Fisheries Service.

(362) §215.26 Local regulations.

(363) Local regulations will be published from time to time and will be brought to the attention of local residents and persons assigned to duty on the Islands by posting in public places and brought to the attention of tourists by personal notice.

(364) §215.27 Wildlife research.

(365) (a) Wildlife research, other than research on North Pacific fur seals, including specimen collection, may be permitted on the Pribilof Islands subject to the following conditions: (1) Any person or agency, seeking to conduct such research shall first obtain any Federal or State of Alaska permit required for the type of research involved.

(366) (2) Any person seeking to conduct such research shall obtain prior approval of the Director, Pribilof Islands Program, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 1700 Westlake Avenue North, Seattle, Wash. 98109, by filing with the Director an application which shall include:

(367) (i) Copies of the required Federal and State of Alaska permits; and

(368) (ii) A resume of the intended research program.

(369) (3) All approved research shall be subject to all regulations and administrative procedures in effect on the Pribilof Islands, and such research shall not commence until approval from the Director is received.

(370) (4) Any approved research program shall be subject to such terms and conditions as the Director, Pribilof Islands Program deems appropriate.

(371) (5) Permission to utilize the Pribilof Islands to conduct an approved research program may be revoked by the Director, Pribilof Islands Program at any time for noncompliance with any terms and conditions, or for violations of any regulation or administrative procedure in effect on the Pribilof Islands.

(372) Weather.–Fogs are especially thick and prevalent in this vicinity in the summer, and navigation is attended with difficulty and danger. A navigator should plan to make landfalls in the Pribilof Islands during the summer based on

no land being visible. One annoying characteristic of the area is very thick fog accompanying strong winds. Logs from survey vessels indicate that a typical summer day in the Pribilof Islands is as follows: Dense fog at daylight, vessels anchored 200 yards distant not visible, calm sea, light airs; by noon intermittent sun, a wet drifting fog, gentle breeze; by evening a dense fog, winds increased to force 6. Dense fog with visibility less than 0.5 mile is more common around St. Paul Island than around St. George Island. An unusual characteristic off North Anchorage, St. George Island, was clear visibility along the shore accompanied by dense curtainlike fog to seaward.

(373) Winds do not continue to blow from the same quarter for any length of time. From December through April winds blow from the NE more than from the other directions. After September 1, gales are frequent and violent, and blow from all directions.

(374) Ice.–The Pribilofs are near the S limit of the ice in Bering Sea. On rare occasions the icefields extend as far as 35 miles S of St. George Island. In 7 years of National Weather Service ice records at St. Paul Island, no sea ice at all was reported in 3 years. In the other 4 years, navigation remained easy throughout 1 year and became restricted to full-powered vessels for short periods in March and April of 3 years; at no time did navigation become suspended or require the use of an icebreaker.

(375) In 1974, a pinnacle was reported 68 miles WNW of St. Paul Island in 57°39.2'N., 173°24.0'W. (see chart 16006). Depth of water over the pinnacle is not known.

(376) Chart 16381.–St. George Island, the southernmost of the Pribilof Islands, consists mainly of high volcanic hills and ridges, and its entire coast is a precipitous cliff except for a few miles on the N side and short intervals at Garden Cove and Zapadni Bay. The E and W extremities of the island, Tolstoi Point and Dalnoi Point, are bold promontories. High Bluffs, on the N side of the island, 1,012 feet high, is a prominent landmark and is visible from St. Paul Island, a distance of nearly 40 miles, on a clear day.

(377) There are no harbors, but vessels anchor at North Anchorage, Garden Cove, and Zapadni Bay, according to the direction of the wind; the anchorages are poor except with the wind directly off the land. At a distance generally not greater than 2 miles from the island the depth of the water is but little less than the surrounding sea, and in thick weather it is not safe to depend upon soundings for picking up the land unless sure of the position. Vessels should not approach the island in less than 12 fathoms of water. There are no outlying dangers except the rock awash 0.6 mile NE of East Landing, and the small reefs at Zapadni Bay and North Anchorage. A rocky shoal, covered 1¼ fathoms, is 9.3 miles 078° from Tolstoi Point.

(378) The anchorage in Zapadni Bay, on the SW side of the island, in 10 fathoms, affords shelter with winds from ENE to NNW. The landing is protected by a breakwater at the E end of the bay. A reef extends about 0.2 mile offshore S of the anchorage.

(379) With N winds, a landing may sometimes be made at Garden Cove S of Tolstoi Point, on the sand beach. The anchorage affords shelter from NW winds, but with the exception of a small area the bottom is rocky.

(380) Currents.–In the open water the tidal current is rotary, turning clockwise. Along the N and S shores of the island the current in general sets E on the flood and W on the ebb. The largest velocity observed over a period of about 6 days in July and August was about 1.5 knots. With opposing wind and current, tide rips occur off Tolstoi and Dalnoi Points. These rips are not heavy enough to be of any consequence, except that to strangers they appear to be breakers. The water is deep off both points, which can be passed close-to with safety.

(381) The approach to North Anchorage is marked by a private marker about 0.5 mile N of St. George. The most prominent landmarks in the village of St. George are the white roofs of the quadrangle of sheds, low down at the water's edge. The roofs loom up first through the fog. Also conspicuous is a tight group of buildings on the slope and ridge back from the beach. Most easily identified is the Russian Orthodox church whose bell tower has a green onion-shaped roof topped by a white St. Andrew's cross.

(382) Vessels should keep the street which extends through the village bearing 164°. Good anchorage will be found about 700 yards from the landing. There is swinging room for a 400-foot vessel riding to 45 fathoms of chain.

(383) The landing is a square block of reinforced concrete next to a cutting in the rocks. The area around the landing, and for about 75 feet to seaward, practically bares at extreme low water. The landing can be used by small shallow-draft boats 3 hours on either side of high water. A launching ramp is at North Anchorage.

(384) East Landing, just NE of the village, is better protected from a W swell. A ledge awash is a short distance off the landing. If desired, a boat will come out to anchored vessels when landing is practicable.

(385) Local magnetic disturbance.–Differences of as much as 11° from the normal variation have been observed on St. George Island.

(386) The U.S. Public Health Service maintains a Native Health Services clinic in the village of St. George.

(387) Communications.–St. George Airport provides air services four times a week. Peninsula Airways Aircraft Charter will provide air transportation in an emergency.

(388) Chart 16382.–Otter Island, off the S side of St. Paul Island, has an abrupt bluff 288 feet high at its SW end, slopes gradually to the N, and rises again in a crater, about 141 feet high, at its extreme E end. Foul ground, marked by kelp, extends about 0.8 mile from the island on its S, SW, and N sides. The N side, from Crater Point to Northwest Reef, is clear of dangers. Probably the best anchorage near the island is in 9½ fathoms, black sand and broken shells, with the NE extremity of Crater Point bearing 185°, distant 0.5 mile. This island must be approached with great caution in thick weather, and at all times a vessel should keep out of kelp. A 38-foot shoal is 2.1 miles ENE of Otter Island.

(389) Between Otter Island and Reef Point, St. Paul Island, the tidal currents are strong, and with heavy winds the tide rips are dangerous especially on the ebb current. In 1976, the NOAA Ship SURVEYOR observed currents setting NW at about 2.5 knots about 2.1 miles SW of the SW end of Otter Island.

(390) Walrus Island, off the E side of St. Paul Island, is low, about 39 feet high, level on top, and composed of irregular masses of volcanic rock. It is very hard to pick up in thick weather. It is about 0.4 mile long and 0.1 mile wide. Anchorage can be had on either side of it, 0.3 to 0.5 mile offshore, in 10 to 15 fathoms. Landing can be made with smooth water, the best place being in a small cove at the SW corner. The island is a bad place to make in a fog.

(391) Parts of Otter and Walrus Islands are covered with sea birds in the breeding season. Walrus Island is a major sea lion rookery. Landing on the islands is prohibited unless a permit is obtained from the National Marine Fisheries Service.

(392) Current observations made in July and August W of Walrus Island show that the current is rotary turning clockwise, with velocities exceeding 2 knots at times.

(393) St. Paul Island, the northernmost of the Pribilof Islands, is about 235 miles NW from Unimak Pass. The W and SW parts of St. Paul Island are high and mountainous, with precipitous cliffs at the coast. The rest of the island is a comparatively low, rolling plateau, with a number of extinct volcanic peaks scattered over its surface. Bogoslof Hill, 590 feet high, a conical crater near the center of the island, and Polovina Hill, double-peaked and 470 feet high, near the E end, are conspicuous and the best landmarks in clear weather when coming from S. From this latter hill the island stretches away, in a low, narrow neck to Hutchinson Hill, about 100 feet high, on Northeast Point. W of Lukanin Bay the coast of the S side of the island is rocky, with bluffs at the points. The shore of the rest of the island is generally a sand beach, with rocks in the vicinities of the seal rookeries. A radiobeacon is about 2.7 miles NE of the village of St. Paul, and a tall loran tower is about 0.8 mile SW of the beacon. An aerolight is about 0.5 mile ESE of the beacon.

(394) A rocky ledge covered less than 3 fathoms with no visible kelp is 5 miles NE of Northeast Point. Kelp-marked reefs extend about 0.4 mile SE from the two low points S of Northeast Point. A dangerous ledge with two rocks covered less than 2 fathoms is 1 mile N of Hutchinson Hill. With a moderate swell the sea breaks over these rocks.

(395) On the N side of St. Paul Island, depths of 5 fathoms or more are 1 mile offshore.

(396) A shoal covered 2 fathoms is 7.5 miles W of St. Paul Island.

(397) Breakers extend 0.3 mile of more off Southwest Point.

(398) A dangerous ledge, usually marked by breakers, extends 0.6 mile SW and S from Reef Point, the S point of the island.

(399) Sea Lion Rock, about 0.3 mile S of Reef Point, is prominent when approaching the point from an E or W direction.

(400) A reef extends about 0.3 mile off Stony Point, the NE point of Lukanin Bay.

(401) Pilotage, except for certain exempted vessels, is compulsory for all vessels navigating the inside waters of the State of Alaska. (See Pilotage, chapter 3, for details.)

(402) The Bering Sea is served by the Alaska Marine Pilots and Southwest Alaska Pilots Association.

(403) Vessels using Southwest Alaska Pilots Association pilots and en route to St. Paul can meet the pilot boat about 4 miles W of Reef Point (57°06.5'N., 170°17.7'W.).

(404) The pilot boat can be contacted by calling "ST. PAUL PILOT BOAT" on VHF-FM channel 16 or on a prearranged frequency between pilot and agent/vessel.

(405) Anchorage.–The usual anchorage at St. Paul Island is W of Village Cove between Zapadni Point and Reef Point in the vicinity of the 10-fathom curve. The bottom, in general, is sandy, but rocky bottom will be found in the vicinity of Zapadni Point and Tolstoi Point. Anchorage can be found NE from Reef Point, off Black Bluffs and East Landing, and in Lukanin Bay.

(406) Lukanin Bay has a sandy bottom and is used when W swells make the Village Cove anchorage undesirable. From the Village Cove anchorage the village of St. Paul is obscured by a bluff although it is in full view from the Black Bluffs anchorage.

(407) In the spring (April-May) as the ice edge moves N, the winds can radically change its configuration. Vessels anchoring in Village Cove or other areas around the Pribilof Islands should maintain a careful ice watch so as not to become entrapped.

(408) Vessels should not attempt to ride out a gale at anchor near the islands, unless to leeward and well sheltered. The surf is apt to make quickly and is dangerous on the weather side of the island.

(409) Prominent in the approach to the anchorage off Village Cove are the three large steel tanks on a bluff just W of the village. Also on the bluff, just to the N, are eight smaller white tanks. Vessels should steer 082° for the center of the three large steel tanks and anchor in about 8 fathoms with Reef Point and the center of Sea Lion Rock in range.

(410) Zapadni Point, Tolstoi Point, and Reef Point, 2.5 miles WNW, 0.6 mile NW, and 1 mile SW of Village Cove, respectively, are the best radar targets in the area at a range of 5 to 7 miles.

(411) There is no protected harbor nor satisfactory landing facilities. Vessels are often delayed at St. Paul in landing cargo and personnel because of strong winds that build up heavy seas and make landing dangerous or impossible. In Village Cove, on the W side of Reef Point, the landing is at a reinforced concrete pier just N of the bluff point. The approach to this landing is shoal, and incoming swells frequently break across the entire entrance. Extreme caution should be used when any swell is running because the swells build up as they approach the shoal water, or round the bluff point, and break unexpectedly. The pier has a face of about 100 feet with depths alongside of 3 to 4 feet. Supplies are lightered ashore by power barge or bidarkas (native skin boats). A self-propelled crane is used on the pier to load and unload lighters.

(412) St. Paul, about midway along a peninsula extending from the S side of St. Paul Island, has small wooden dwellings painted white with dark-colored roofs, a church, hotel, a small hospital, several large buildings, and a machine shop with limited facilities. The hospital patients requiring surgery are transferred to Anchorage by jet medevac. A 10-ton marine skidway is available for emergency repairs.

(413) A commercial airline provides weekly mail and passenger service to and from Anchorage via Cold Bay or Dutch Harbor when weather permits. A weather station and a loran station are on St. Paul Island. The weather station monitors CB channel 9, and the loran station monitors VHF-FM channel 16 (156.80 MHz).

(414) Landing is forbidden at the fur seal rookeries on St. Paul Island during the breeding season, June 1 to October 15.

(415) Weather.–The climate is typically maritime, resulting in considerable cloudiness, heavy fog, high humidity, and rather well restricted daily temperature ranges. Humidities remain uniformly high from May to late September, and during the summer period there is almost continuous low cloudiness and occasional heavy fog. The differences between average maximum and minimum temperatures for the entire year are only slightly above 7° F, and the greatest monthly variation in March is slightly less than 12° F. Temperatures remain on the cool side even during the summer, and the highest temperature on record is 64° F in August of both 1936 and 1941. Extreme highs in summertime usually range around the middle fifties. Although record low readings fall well below the zero mark, such extremely cold days are rather rare. On the average only 5 days each winter season have temperatures falling below the zero mark.

(416) Despite an environment of high humidities, precipitation on St. Paul Island is surprisingly light. The annual average is slightly above 24 inches, which is slightly below the

average for Alaska as a whole. The greatest 24-hour precipitation on record fell slightly short of 2 inches. April is generally the driest month, with a gradual increase of precipitation until a mean monthly total of over 3 inches is reached during August, September, and October. This is followed by a gradual decrease during the succeeding months until the return of April. Thunderstorms are extremely rare on St. Paul Island. The only isolated occurrence ever reported was in June 1939.

(417) Frequent windy periods are characteristic of the island area throughout the year. Frequent storms occur from October to April, and these often are accompanied by gale force winds to produce general blizzard conditions. Under the influence of prolonged N and NE winds between January and April, the ice pack occasionally moves S to surround the island. During recent years, the S limit of this movement has been between St. Paul and St. George Islands, some 40 miles to the SE of St. Paul.

(418) (See page T-9 for St. Paul Island Climatological Table.)

(419) Tides and currents.–The diurnal range of the tide at Village Cove is 3.2 feet. Around the island the current sets NW on the flood and S on the ebb, following the trend of the shore. The greatest velocity occurs at Northeast Point and between Reef Point and Otter Island. Average velocity at strength of current is 1 to 2 knots, but with continued strong winds from one direction it may increase to 3 knots.

(420) There are heavy rips around Northeast and Southwest Points, also between Reef Point and Otter Island, where they are worse on the ebb. The tides and tidal currents are greatly influenced by the winds.

(421) Chart 16006.–Nunivak Island, in the Bering Sea near the Alaska mainland, is about 330 miles N of Unimak Pass. Dangerous shoals and uneven bottom have been reported and are shown on the chart; the island should be approached with extreme caution.

(422) From W, Nunivak Island shows gentle slopes terminating seaward in reddish cliffs 150 to 462 feet high. The highest point of the W part of the island rises to 866 feet 10 miles ESE from Cape Mohican. Near the center of the island is Roberts Mountain, 1,675 feet high, the highest of a group; this mountain is built up of a series of volcanic benches, the top being the steep side of a breached crater. The E end of the island is low, for the most part, except for some low hills and Twin Mountain, a breached crater 627 feet high.

(423) In clear weather the island generally can be made out for 30 miles from any direction. The island is inhabited by herds of reindeer.

(424) 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 depths of 7 to 10 fathoms. The coast is generally abrupt and rocky, with numerous bights in which anchorage was found in 3½ to 7 fathoms.

(425) Cape Mohican, the W point of Nunivak Island, is a narrow promontory about 2 miles long. The point of the cape is a cliff 266 feet high from which the terrain descends E to 150 feet for 2 miles before ascending gradually to the higher ground inland.

(426) Cape Mohican Light (60°13.0'N., 167°27.0'W.), 285 feet above the water, is shown seasonally from a skeleton tower with a red and white diamond-shaped daymark on the end of the cape.

(427) A shoal about 1 mile wide extends 5 miles 059° from Cape Mohican and has depths of 2 to 4 fathoms over it. The shoal area should be avoided until it has been completely surveyed. The 10-fathom curve extends 7.5 miles 058° from the cape.

(428) In 1979, the U.S. Const Guard Cutter IRONWOOD reported possible shoreline charting inaccuracies on the NW side of Nunivak Island between Cape Mohican and Nash Harbor. Until surveys are made of this area, mariners are advised to use caution when using shoreline features for navigation.

(429) Nash Harbor, on the N coast of Nunivak Island 16 miles E of Cape Mohican, is a good anchorage except with winds from NW through N to NE. The coast to the W of the harbor is fairly high and is backed by cliffs, while to the NE it is low. The S side of the harbor has a sand-and-gravel beach at the foot of a 30-foot bluff. The bottom slopes gradually from 10 fathoms outside Nash Harbor to the beach at the head.

(430) The harbor is 1.5 miles wide and about 1 mile in depth. The bottom is sand except near the rocky parts of the shore, and there are no indications of dangers over a large 4- to 6-fathom area in midharbor. Boats usually land off the village of Nash Harbor, on the W side of a creek that empties into the SW part of the harbor; however, there are boulders close to shore at this landing as well as in the cove on the W shore. The creek drains a lake, but the water is brackish because the lake level is affected by the tides. The lake freezes every winter and makes an excellent landing place for airplanes fitted with skis; it is also large enough for seaplanes to use in summer.

(431) In 1951, the survey ship PATHFINDER made the approach to Nash Harbor (see chart 16006) on course 090° for 21 miles from a position 4.5 miles N of Cape Mohican until abeam of the harbor, then steered 180° for midharbor to anchorage in 6 fathoms.

(432) Cape Etolin, 40 miles ENE of Cape Mohican, is the northernmost point of Nunivak Island. The cape is a narrow strip of land with a ridge of low hills midway along its outer part; it appears as two or more islands from a distance W. A small island is about 2 miles off the end of the cape; between are ledges. A dangerous rocky area extends W from Cape Etolin for about 1.5 miles.

(433) Mekoryuk, about 2 miles W of the inner end of Cape Etolin, and Nash Harbor are the only villages on Nunivak Island that are inhabited the year round. A weather station is maintained at Mekoryuk, and the village has weekly mail service by air; radiotelegraph communication is maintained.

(434) Anchorage can be found NW of Mekoryuk in 25 to 32 feet of water.

(435) In 1951, the PATHFINDER anchored on the W side of Cape Etolin, 4.5 miles NW of Mekoryuk, in 5 fathoms, sand bottom, on bearings 080° to N tangent of Cape Etolin, 089°30' to highest knoll on Cape Etolin, 122° to center of schoolhouse, the largest building in Mekoryuk, and 246° to N tangent of point 5.5 miles to the SW. From this anchorage the N tangent of Cape Etolin was open 001°30' from the S tangent of Cape Vancouver. The anchorage was approached from W on a heading of 092° for the highest knoll on Cape Etolin. The approach should be made with caution as the area shoals rapidly and the reference points are apt to be obscured by fog except during N winds. From the anchorage, a launch ran on a general course of 120° toward Mekoryuk for 3 miles and obtained a minimum depth of 25 feet.

(436) Shoals covered 3 fathoms have been reported about 7.5 miles N and 15.5 miles NW from Cape Etolin, and a shoal covered 4½ fathoms has been reported 12.5 miles NNE from the cape; all with deep water surrounding them. Keeping Cape Vancouver bearing N of 086°, Cape Etolin can be rounded when coming from W in 10 fathoms. When

AMP Ex. B

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Cape Vancouver bearing 080° or E of this bearing, considerable shoal water and irregular depths are found.

(437) Cape Etolin Anchorage, the bight on the E side of the cape, has fair holding ground in 2 to 5 fathoms, but is open to the NE. Near the S side, and about 0.3 mile from the head of the bight, is anchorage in 3 fathoms; the holding ground is gravel and only moderately good. Further out it is deeper but more exposed to the strong tidal currents and rips of Etolin Strait, the wide passage between Nunivak Island and the mainland.

(438) Several shoals have been reported in Etolin Strait. In 1968, the U.S. Coast Guard Cutter NORTHWIND in transiting the strait, reported that depths in some cases were found to be greater or lesser than now charted. Until surveys are made of this area, mariners are advised to use extreme caution.

(439) In 1971, the Coast Guard Cutter STORIS observed the following conditions on the E side of Etolin Strait. Depths of 2½ fathoms were found in 59°59.0'N., 164°56.0'W. Proceeding essentially W from that position depths increased to 5 fathoms, then quickly shoaled to 1½ fathoms in 60°01.0'N., 165°05.0'W. The bottom was sand and mud. The 3-fathom shoal centered in 59°49.0'N., 164°55.0'W. was found in charted position. The STORIS further reported that the depths were found to be generally as noted on chart 16006 in the area SE of the charted shoals and changes in depth were very gradual.

(440) In May 1977, the NOAA Ship MILLER FREEMAN reported shoaling to 4¼ fathoms centered in about 59°49.9'N., 165°33.0'W. Caution is advised in this area.

(441) Cape Manning is 15 miles SE of Cape Etolin. Triangle Island is 5 miles NW of Cape Manning and 2 miles from the nearest shore of the main island, with foul ground reported between.

(442) Cape Corwin, 20 miles E of Cape Manning, is the easternmost point of Nunivak Island. The cape is low and has a rocky shore on its N side. The two peaks of Twin Mountain are 7 miles NNW of the point of Cape Corwin and can be seen for 25 miles in clear weather.

(443) Cape Mendenhall, 18 miles WSW of Cape Corwin, is the southernmost point of Nunivak Island. The cape is 255 feet high and has a low rock bluff 10 to 20 feet high on its E side. A 2½-fathom shoal is 4 miles SW of Cape Mendenhall.

(114) During a N blow in August 1951, the survey ship EXPLORER found satisfactory anchorage in 8½ fathoms about 10 miles NW of Cape Mendenhall. The anchorage is about 1.5 miles off the beach of the second bight NW of the cape and is protected from NW through N to E. As the ship approached on a SE course, the water shoaled uniformly from 14 to 8½ fathoms. The fine gray sand bottom is good holding ground. Currents along the coast had velocities estimated to be as much as 1 knot.

(445) From Cape Mendenhall the coast extends NW for about 40 miles to what may be called the SW cape of Nunivak Island. The few soundings obtained show deep water fairly close to shore, and it is apparently safe to follow the shore at a distance of 2 miles. Depths of 4¾ to 6 fathoms have been found on an extensive shoal about 10 miles off this stretch of coast.

(446) The SW cape has cliffs 100 to 150 feet high; the summit is gently sloping tundra. In the small cove E of the cape, landings can be made on the sandy beach in front of the few barabaras of Tachikuga, an abandoned native village. Water can be obtained from the stream just E of the abandoned village; at low water the stream is fresh to its mouth. Temporary anchorage is possible in 7 to 9 fathoms about 0.8 mile E of the entrance to the cove.

(447) From the SW cape, the coast of Nunivak Island extends N for about 8 miles to Cape Mohican. Along this stretch are impassable cliffs 150 to 450 feet high, and there are no landing places. The 6-fathom curve is about 1.3 miles offshore.

(448) Tides.-The diurnal range of tide at Tachikuga, on the SW side of Nunivak Island, is 4.3 feet. At Nash Harbor, on the N side, the diurnal range is 5.3 feet, and the tide occurs about 1 hour later than at Tachikuga.

(449) Currents.-On the N and SW sides of Nunivak Island the current has a large diurnal inequality. NE of Cape Mohican a 4-hour series of current observations in July 1951 showed a NE current which at strength had a velocity of 1.5 knots. Observations made in June and August 1951 W of Cape Etolin showed tidal currents setting along the shore in both directions with velocities of about 1 knot at strength of current. On the E side of the island in Etolin Strait, it is stated that tidal currents are so strong that the middle portion does not freeze over in winter. (See the Tidal Current Tables for predictions off the W coast of Nunivak Island.)

(450) Ice.-(See page T-21 for dates of ice breakup and freezeup.) Navigation is difficult from mid-December to mid-May and usually is suspended from early January to late March.

(451) St. Matthew Island and adjoining islands are 145 miles W from Nunivak Island. They are rocky, uninhabited islands whose shores are poorly charted except for a small area between Sugarloaf Mountain and Pinnacle Island. St. Matthew Island is a succession of hills and low valleys. During the season of navigation, fog is prevalent in this vicinity. Anchorage can be made with an offshore wind on the N or S sides of the island.

(452) Cape Upright, the E point of St. Matthew Island, is high and vertical, and the land in its immediate vicinity is mountainous. A mountain 1,505 feet high is 0.7 mile back of the cape, and another mountain 1,280 feet high is 0.9 mile SW of the cape. Off the cape is a detached rock 25 feet high. W of the highland of the cape is a low neck, apparently of sand, and the cape might be easily mistaken for a detached island.

(453) Glory of Russia Cape, the N point of St. Matthew Island, is also high and mountainous. A 1,475-foot peak is about 1.3 miles S of the cape.

(454) Numerous detached rocks along the shores of St. Matthew Island should not be approached too closely. On the island is an abundance of freshwater in streams and lakes.

(455) Sugarloaf Mountain, 1,380 feet high, is 11.5 miles W from Cape Upright. From Sugarloaf Mountain the coast trends about 0.8 mile SE to the westernmost point of a wide bight that extends to Cape Upright. A rock is about 350 yards S of this point.

(456) Good anchorage may be had in about 14 fathoms, sheltered from winds between SE and SW, in a bight on the E side of St. Matthew Island, about 10 miles NW of Cape Upright, with Sugarloaf Mountain bearing 220°, and W of some rocks which show well out of the water and should not be approached closely. Landing is difficult with any swell, as the beach is stony and steep. In 1951, the PATHFINDER anchored frequently in 9 to 10 fathoms, about 3.5 miles WNW of Sugarloaf Mountain, with broken bottom and satisfactory holding ground. The PATHFINDER also anchored in about 14 fathoms, with protection from N gales, 4 miles E by S of Sugarloaf Mountain.

(457) Sarichef Strait is a 2.5-mile-wide passage between St. Matthew Island and Hall Island. Tidal currents and rips were not found to be strong in 1951. The PATHFINDER obtained a least depth of 10 fathoms in two passages of the

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ST PAUL ISLAND, ALASKA (57°08'N, 170°13'W.) Elevation 22 ft. (6.7m)

WEATHER ELEMENTS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR	YEARS OF RECORD
SEA LEVEL PRESSURE														
Mean (Millibars)	1004.6	1001.4	1008.9	1008.9	1010.8	1012.2	1013.4	1009.8	1008.4	1003.7	1002.7	1003.8	1007.2	19
TEMPERATURE (DEGREES F)														
Mean	26.1	23.0	23.8	28.5	34.8	40.9	45.7	47.5	44.4	37.8	33.2	27.8	34.5	29
Mean Daily Maximum	30.1	27.4	28.6	32.5	38.8	45.0	49.4	50.8	48.2	41.7	38.9	31.7	38.4	29
Mean Daily Minimum	22.0	18.6	19.0	24.4	31.0	36.7	42.0	44.1	40.6	33.8	29.5	23.8	30.5	29
Extreme Highest	48	44	44	44	56	62	63	64	59	54	50	52	64	58
Extreme Lowest	-20	-15	-19	-2	8	24	28	30	25	13	9	-5	-20	58
RELATIVE HUMIDITY														
Average Percentage	85.8	86.3	85.1	88.1	90.2	91.7	94.8	93.8	89.0	82.8	84.4	82.7	87.9	25
CLOUD COVER														
Average Amount (Tenths)	8.0	8.0	8.0	8.5	9.0	9.1	9.5	9.5	8.8	8.3	8.2	8.1	8.8	23
PRECIPITATION														
Mean Amount (Inches)	1.84	1.37	1.28	1.09	1.28	1.25	2.23	3.44	3.02	3.15	2.58	2.03	24.56	29
Greatest Amount (Inches)	4.09	5.69	3.28	3.10	3.11	3.59	5.85	9.32	8.02	5.18	5.31	4.18	0	51
Least Amount (Inches)	0.25	0.33	0.08	0.18	0.21	0.18	0.32	1.32	1.05	1.03	0.87	0.08	0	51
Maximum in 24 hrs. (Inches)	1.38	1.51	1.28	1.19	1.27	1.48	1.92	1.91	1.58	1.93	1.78	1.15	1.93	51
Mean Amount of Snow (Inches)	12.8	10.3	9.4	5.8	2.3	.01	0.0	0.0	0.1	2.7	5.9	9.7	59.1	50
Mean Number of Days with Precipitation	25	24	28	24	28	23	27	27	26	29	28	27	310	21
Snow (Mean Number of Days)	21	22	24	21	13	2	0	0	1	14	20	23	287	21
WIND														
Percent of Observations with Gales	3.9	4.7	3.2	1.5	0.3	*	0	0.2	0.8	3.1	2.8	3.5	2.1	24
Mean Wind Speed (Knots)	17.0	17.8	18.3	15.1	13.4	11.4	10.7	12.4	13.5	16.5	16.8	17.4	14.9	25
Direction (Percentage of Obs.)														
North	9.9	12.2	9.4	8.8	9.5	7.1	5.1	4.4	7.7	9.5	9.4	10.4	8.6	25
North Northeast	10.1	14.8	9.5	7.5	7.5	6.5	3.8	3.1	5.6	8.0	10.2	12.8	8.2	25
Northeast	7.1	8.8	7.4	8.1	5.8	7.4	3.4	2.8	4.8	3.5	5.7	8.3	6.1	25
East Northeast	9.0	8.2	9.7	8.3	6.2	7.7	4.2	2.7	3.0	3.3	8.8	7.7	6.3	25
East	10.5	7.0	8.1	5.1	6.1	5.9	6.2	3.5	4.1	3.9	6.3	8.8	6.1	25
East Southeast	7.5	6.5	6.3	6.8	6.0	7.5	5.4	3.4	3.7	3.5	5.3	8.2	5.7	25
Southeast	6.5	5.8	4.5	4.3	5.2	6.1	6.2	4.9	4.2	3.1	3.7	5.0	4.9	25
South Southeast	5.0	4.8	4.5	4.8	5.2	4.5	5.4	5.5	5.2	3.4	4.5	4.5	4.7	25
South	6.1	5.3	5.4	6.7	7.4	8.1	9.4	10.1	7.2	5.8	5.5	5.1	6.8	25
South Southwest	4.1	4.8	4.7	4.5	6.5	4.3	8.9	10.5	6.5	4.7	4.5	4.0	5.6	25
Southwest	3.2	3.5	3.3	4.5	4.1	3.8	6.8	10.5	5.2	5.3	5.3	3.6	4.9	25
West Southwest	2.7	3.6	3.3	5.0	5.1	5.5	8.1	9.4	5.1	5.6	5.2	2.5	5.0	25
West	3.1	3.4	3.7	4.0	4.3	5.7	8.8	9.1	7.5	9.2	6.3	3.8	5.7	25
West Northwest	3.0	2.8	3.7	5.3	4.0	4.5	4.7	5.5	6.9	8.4	5.1	3.7	4.8	25
Northwest	4.1	2.7	6.6	8.8	6.8	7.1	6.8	8.0	12.1	13.7	8.8	7.2	7.7	25
North Northwest	5.5	5.1	8.1	8.7	8.6	7.5	5.2	5.2	9.4	9.4	6.3	6.8	7.2	25
Calm	2.5	1.6	1.8	1.4	1.4	1.0	1.7	1.6	1.8	1.5	1.4	1.7	1.6	25
Direction (Mean Speed, knots)														
North	18.5	19.2	18.9	15.8	14.4	12.1	10.7	12.9	13.5	15.9	16.8	17.0	16.0	21
North Northeast	17.4	18.3	14.5	14.0	15.5	13.1	11.7	11.9	13.4	18.6	15.6	17.9	15.8	25
Northeast	19.1	19.8	18.2	14.4	15.4	12.6	11.6	14.0	14.4	16.5	16.6	20.2	16.7	25
East Northeast	18.9	19.8	19.5	15.4	14.8	11.3	10.8	13.4	13.7	18.7	17.9	19.5	16.9	25
East	18.3	19.4	18.8	16.0	12.7	11.5	10.1	12.5	13.9	19.8	18.4	19.9	16.4	25
East Southeast	17.1	17.7	18.4	15.0	12.8	10.3	9.7	11.9	13.8	18.1	19.4	19.1	15.3	25
Southeast	16.8	16.0	14.8	14.4	12.7	11.5	10.4	12.0	13.1	18.9	17.9	19.2	14.8	25
South Southeast	16.0	16.9	14.5	14.7	12.7	10.1	10.4	11.8	15.8	17.7	17.[illegible]	17.8	14.6	25
South	16.5	18.3	15.5	16.1	12.4	10.3	10.4	12.5	14.5	18.1	18.[illegible]	16.[illegible]	14.5	25
South Southwest	17.2	18.8	15.7	15.4	13.1	11.3	10.9	13.5	15.0	16.7	17.7	17.[illegible]	14.8	25
Southwest	16.3	16.9	18.1	15.1	13.9	11.5	10.9	13.9	14.6	16.0	16.5	16.[illegible]	14.6	25
West Southwest	15.8	16.5	18.6	14.0	11.8	10.5	11.4	12.4	13.0	16.7	16.7	15.9	13.8	25
West	14.7	15.8	14.5	14.0	11.2	11.2	11.5	11.2	11.5	15.0	14.2	15.5	13.0	25
West Northwest	14.7	16.1	14.8	13.9	13.1	10.7	11.3	11.9	11.5	14.7	15.1	13.9	13.4	25
Northwest	16.4	14.8	18.2	15.1	13.9	12.6	12.2	12.9	13.7	16.7	16.3	15.3	14.9	25
North Northwest	17.7	17.4	18.7	17.1	14.5	12.7	11.2	13.0	14.4	17.5	17.0	16.9	15.7	25
VISIBILITY														
Mean Number of Days with Fog	12	10	12	15	20	24	28	28	15	9	10	9	190	21

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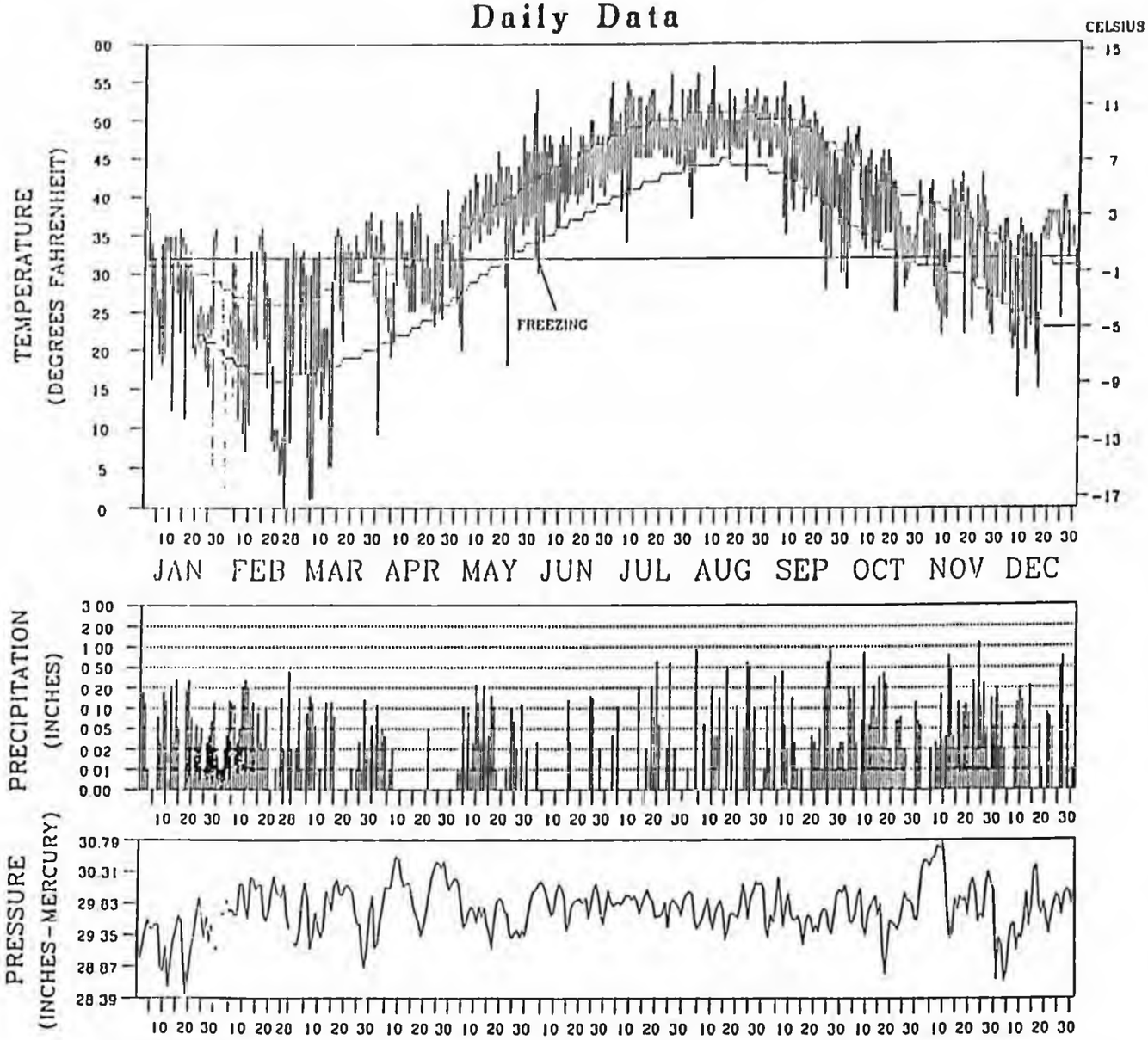
ISSN 0190-0513

1990 LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA
ST. PAUL ISLAND,
ALASKA

Daily Data



TEMPERATURE DEPICTS NORMAL MAXIMUM, NORMAL MINIMUM AND ACTUAL DAILY HIGH AND LOW VALUES (FAHRENHEIT)
PRECIPITATION IS MEASURED IN INCHES. SCALE IS NON-LINEAR
STATION PRESSURE IS MEASURED IN INCHES OF MERCURY

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Kenneth D Hadley
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

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AMP Ex. C

METEOROLOGICAL DATA FOR 1990

ST. PAUL ISLAND, ALASKA

LATITUDE: 57°09' N LONGITUDE: 170°13' W ELEVATION: FT. GRND 22 BARO 20 TIME ZONE: YUKON WBAN: 25713

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	31.5	25.9	31.4	33.9	42.0	47.4	51.6	52.0	49.0	42.1	37.7	35.4	40.0
-Daily Minimum	22.4	13.2	21.1	27.2	33.4	39.1	44.0	45.8	39.1	34.2	29.3	28.3	31.4
-Monthly	27.0	19.6	26.3	30.6	37.7	43.3	47.8	48.9	44.1	38.2	33.5	31.9	35.7
-Monthly Dept	24.0	15.8	24.3	27.0	32.1	38.9	45.2	47.2	40.7	34.6	28.0	29.4	32.3
Extremes													
-Highest	39	36	38	41	51	54	56	57	55	49	43	40	57
-Date	1	15	20	27	31	1	24	9	6	5	24	27	AUG 9
-Lowest	5	0	1	19	18	30	34	37	28	25	22	14	0
-Date	27	24	6	5	21	2	7	1	23	21	28	8	FEB 24
DEGREE DAYS BASE 65 °F:													
Heating	1172	1265	1193	1027	840	648	525	494	619	825	935	1023	10566
Cooling	0	0	0	0	0	0	0	0	0	0	0	0	0
% OF POSSIBLE SUNSHINE													
AVG. SKY COVER (tenths)													
Sunrise - Sunset	9.1	8.3	8.0	8.3	9.3	9.7	9.7	9.7	8.5	8.9	8.8	9.1	9.0
Midnight - Midnight	8.8	8.2	7.9	8.7	9.2	9.8	9.7	9.8	8.4	8.7	8.7	8.8	8.9
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	1	0	2	4	0	0	0	0	2	0	1	2	12
-Partly Cloudy	2	8	6	1	5	1	0	1	4	4	3	2	37
-Cloudy	28	20	23	25	26	29	31	30	24	27	25	27	316
Precipitation .01 inches or more	25	24	18	7	20	6	11	15	22	27	25	20	220
Snow, Ice pellets 1.0 inches or more	10	10	8	1	0	0	0	0	0	0	4	4	37
Thunderstorms	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Fog, visibility 1/4 mile or less	0	0	2	4	4	6	7	12	3	0	0	9	47
Temperature °F													
-Maximum													
70° and above	0	0	0	0	0	0	0	0	0	0	0	0	0
32° and below	15	20	13	11	1	0	0	0	0	0	2	4	66
-Minimum													
32° and below	30	27	29	27	6	2	0	0	4	12	21	18	176
0° and below	0	1	0	0	0	0	0	0	0	0	0	0	1
AVG. STATION PRESS. (mb)	990.5	1010.5	1004.1	1015.2	1003.4	1011.2	1009.5	1007.8	1003.1	1004.1	1018.0	1001.7	1006.4
RELATIVE HUMIDITY (%)													
Hour 03	87	81	90	89	84	91	96	99	90	87	84	90	89
Hour 09 (Local Time)	85	80	90	90	83	89	95	98	89	89	84	89	88
Hour 15	86	84	86	82	79	84	89	92	81	82	78	89	84
Hour 21	84	86	89	85	82	86	92	96	90	84	83	87	87
PRECIPITATION (inches):													
Water Equivalent													
-Total	2.50	2.45	1.25	0.31	1.56	0.53	2.01	3.43	3.38	3.69	4.39	2.87	28.37
-Greatest (24 hrs)	0.39	0.45	0.21	0.12	0.33	0.21	0.65	0.94	1.04	0.87	1.22	0.78	1.22
-Date	18-19	27	6- 7	1	10-11	24-25	20	4	26	8- 9	24	27-28	NOV 24
Snow, Ice pellets													
-Total	23.4	25.1	16.6	2.9	0.1	0.0	0.0	0.0	0.2	3.3	9.7	7.2	88.5
-Greatest (24 hrs)	5.7	4.3	2.7	1.0	0.1	0.0	0.0	0.0	0.2	0.8	2.5	1.9	5.7
-Date	18-19	27	6- 7	1	3				29	23	8- 9	10	JAN 18-19
WIND:													
Resultant													
-Direction (11)	019	001	057	349	114	288	161	194	332	278	265	070	349
-Speed (mph)	4.9	5.7	6.0	10.8	4.7	3.7	1.9	8.1	4.3	7.8	6.1	7.8	1.8
Average Speed (mph)	20.6	19.1	16.6	16.3	14.9	12.8	13.0	13.7	16.0	15.8	18.5	19.3	16.4
Fastest Obs 1 Min.													
-Direction (11)	05	09	34	09	13	24	13	17	36	31	28	09	28
-Speed (mph)	49	46	36	43	28	26	33	31	45	33	56	53	56
-Date	18	10	12	1	10	21	20	25	26	24	25	1	NOV 25
Peak Gust													
-Direction (11)	NE	E	N	E	SE	SW	SE	S	N	W	SW	E	SW
-Speed (mph)	61	59	41	55	38	37	47	43	59	51	84	67	84
-Date	18	10	12	1	10	20	20	25	26	12	25	1	NOV 25

(11) See Reference Notes on Page 68

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NORMALS, MEANS, AND EXTREMES

ST. PAUL ISLAND, ALASKA

LATITUDE: 57°09'N LONGITUDE: 170°13'W ELEVATION: FT. GRND 22 BARO 28 TIME ZONE: YUKON WBAN: 25713

	Yrs	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:														
Normals														
-Daily Maximum		30.4	26.4	28.2	32.0	38.6	45.1	49.4	50.8	48.4	41.7	37.2	32.2	38.4
-Daily Minimum		22.2	17.3	18.5	23.4	30.9	36.8	41.9	44.1	40.5	33.5	29.4	24.0	30.2
-Monthly		26.3	21.9	23.3	27.7	34.8	40.9	45.7	47.5	44.5	37.6	33.3	28.1	34.3
Extremes														
-Record Highest	73	48	44	50	48	58	62	63	66	61	54	50	52	66
-Year		1976	1947	1980	1980	1979	1976	1977	1987	1979	1976	1975	1936	AUG 1987
-Record Lowest	73	-26	-15	+19	-8	8	16	28	29	25	12	4	-5	-26
-Year		1979	1984	1971	1976	1971	1985	1961	1981	1989	1983	1988	1916	JAN 1979
NORMAL DEGREE DAYS:														
Heating (base 65°F)		1200	1207	1293	1119	936	723	598	643	615	849	951	1144	11178
Cooling (base 65°F)		0	0	0	0	0	0	0	0	0	0	0	0	0
% OF POSSIBLE SUNSHINE														
MEAN SKY COVER (tenths)														
Sunrise - Sunset:	57	8.3	8.1	7.9	8.3	8.9	9.0	9.4	9.3	8.8	9.5	8.4	8.5	8.6
MEAN NUMBER OF DAYS:														
Sunrise to Sunset														
-Clear	61	2.4	2.5	3.2	2.1	1.2	1.2	0.9	0.7	0.7	0.7	1.2	1.5	16.2
-Partly Cloudy	61	5.7	6.0	7.3	6.0	3.9	3.1	2.3	2.7	5.5	7.4	6.4	5.5	61.7
-Cloudy	61	23.0	19.7	20.5	21.8	25.9	25.7	27.1	27.5	23.7	22.9	22.4	24.0	285.2
Precipitation														
.01 inches or more	72	18.3	14.8	15.6	14.4	14.2	10.5	15.4	18.5	19.8	22.2	21.6	19.7	207.0
Snow, Ice pellets														
1.0 inches or more	64	3.6	3.5	3.0	1.4	0.8	0.*	0.0	0.0	0.*	0.4	2.2	3.3	18.4
Thunderstorms	49	0.0	0.0	0.0	0.0	0.0	0.*	0.0	0.0	0.0	0.0	0.*	0.0	*
Heavy Fog Visibility														
1/4 mile or less	49	2.0	2.7	3.2	3.2	7.1	9.8	12.8	10.3	3.9	0.7	0.8	1.1	57.5
Temperature														
-Maximum														
70° and above	73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32° and below	71	14.9	16.5	16.9	10.9	2.1	0.0	0.0	0.0	0.0	0.5	5.6	12.5	79.8
-Minimum														
32° and below	73	26.3	26.3	29.2	26.9	18.9	3.2	0.2	0.1	1.6	10.3	19.1	25.2	187.6
0° and below	73	1.0	2.5	1.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	5.4
AVG. STATION PRESS. (mb)	5	997.3	1006.2	1004.2	1007.0	1005.9	1011.3	1013.4	1009.4	1005.7	1004.9	1003.9	997.8	1005.6
RELATIVE HUMIDITY (%)														
Hour 03	12	83	85	86	86	90	94	96	96	91	84	82	83	88
Hour 09	12	83	85	86	96	89	92	95	96	90	84	83	85	88
Hour 15 Local Time	13	83	84	82	81	82	83	89	90	84	79	80	84	83
Hour 21	6	85	89	87	87	87	89	94	94	90	84	82	84	88
PRECIPITATION (inches):														
Water Equivalent														
-Normal		1.78	1.28	1.26	1.21	1.23	1.24	2.02	3.07	2.52	2.95	2.49	1.76	22.7
-Maximum Monthly	68	4.99	5.69	3.28	3.21	3.11	3.59	5.85	9.32	6.02	6.21	5.31	4.18	9.32
-Year		1964	1964	1973	1979	1931	1950	1950	1953	1924	1987	1925	1949	AUG 1953
-Minimum Monthly	68	0.25	0.02	0.08	0.16	0.21	0.18	0.32	0.17	0.62	0.96	0.67	0.09	0.02
-Year		1919	1984	1960	1948	1948	1954	1931	1977	1977	1977	1939	1933	FEB 1984
-Maximum in 24 hrs	68	1.38	1.51	1.26	1.00	1.27	1.48	1.92	2.00	1.58	1.93	1.76	1.15	2.00
-Year		1964	1932	1973	1965	1931	1949	1950	1984	1947	1949	1925	1930	AUG 1984
Snow, Ice pellets														
-Maximum Monthly	67	40.6	35.8	31.4	19.1	12.7	2.0	0.0	0.0	1.0	14.0	27.3	22.7	55.6
-Year		1931	1964	1973	1928	1971	1927			1965	1948	1964	1930	FEB 1964
-Maximum in 24 hrs	66	13.8	13.6	12.4	10.0	4.0	2.0	0.0	0.0	1.0	10.9	13.4	8.0	13.8
-Year		1964	1964	1973	1966	1935	1927			1965	1978	1964	1930	JAN 1964
WIND:														
Mean Speed (mph)	10	20.4	21.1	19.4	18.6	15.5	13.9	12.4	14.2	15.9	18.6	21.0	21.9	17.7
Prevailing Direction														
Fastest Obs. 1 Min														
-Direction (!!)	24	20	03	05	17	23	05	18	25	14	28	35	26	35
-Speed (MPH)	24	63	69	72	51	54	44	39	46	53	60	82	62	82
-Year		1969	1964	1975	1973	1985	1955	1973	1978	1964	1964	1964	1970	NOV 1964
Peak Gust														
-Direction (!!)	11		N	N	SE	SW	S	SE	N	N	W	SW	N	SW
-Speed (mph)	11	63	72	67	67	74	53	47	58	61	70	84	75	84
-Date		1969	1987	1987	1987	1985	1982	1990	1980	1985	1989	1990	1980	NOV 1990

(!!) See Reference Notes on Page 68.

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PRECIPITATION (inches)

ST. PAUL ISLAND, ALASKA

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
1961	3.32	0.40	0.89	1.73	1.01	1.22	2.33	1.35	3.45	3.85	4.31	2.98	26.84
1962	1.08	1.22	1.69	1.05	1.98	0.93	1.97	1.89	2.20	2.41	2.15	1.24	22.81
1963	2.03	0.37	2.37	2.15	1.30	2.19	4.29	2.89	2.37	2.60	1.24	2.13	26.53
1964	4.99	5.69	2.65	1.78	1.84	0.68	1.51	2.39	4.45	4.55	3.84	2.24	36.61
1965	3.65	1.59	1.92	1.52	1.35	0.94	2.67	3.97	2.87	1.45	3.84	2.65	28.42
1966	2.87	2.65	1.64	2.09	2.24	0.35	1.41	2.21	2.49	2.37	3.44	1.05	24.81
1967	2.02	1.64	1.85	3.10	0.71	1.21	1.45	2.59	1.59	1.89	3.20	2.70	23.95
1968	1.63	0.49	0.84	0.94	0.79	0.35	2.81	2.29	1.86	3.77	2.59	2.74	21.10
1969	2.25	1.68	0.71	1.00	1.28	0.68	1.32	4.01	1.44	2.30	1.92	0.98	19.57
1970	0.88	0.96	1.24	1.36	0.76	1.45	1.91	1.52	2.24	3.01	2.34	3.63	21.30
1971	0.83	1.03	1.14	0.83	0.94	0.73	2.77	2.78	2.64	2.11	2.03	3.30	21.13
1972	1.45	0.80	1.22	1.83	0.98	1.80	1.28	1.69	3.21	3.52	2.50	1.44	21.72
1973	1.79	3.34	3.28	0.60	1.08	1.07	1.18	2.40	1.64	2.75	3.23	2.22	24.58
1974	2.11	1.33	0.75	0.88	1.26	1.42	2.40	3.29	1.39	1.42	1.63	1.55	19.43
1975	1.47	1.54	1.02	1.30	0.50	1.07	1.20	1.40	1.45	2.07	0.88	0.73	14.63
1976	0.74	0.80	0.74	1.22	1.48	0.90	1.58	1.50	1.44	1.57	0.94	0.76	13.67
1977	0.57	0.89	1.41	1.09	1.19	0.31	0.86	0.17	0.62	0.96	1.10	0.65	9.82
1978	0.61	0.47	0.53	0.92	0.74	1.33	2.52	2.72	1.87	4.45	2.10	1.95	20.21
1979	2.62	1.01	1.22	3.21	1.52	2.18	2.67	2.57	3.51	3.79	4.78	1.19	30.27
1980	1.13	0.37	0.99	0.76	0.83	3.05	1.20	3.78	2.82	2.85	2.06	0.84	20.69
1981	1.58	0.52	0.79	0.54	1.45	1.15	0.85	2.50	1.07	2.48	2.63	1.01	16.57
1982	0.95	0.38	1.47	0.65	1.40	1.08	1.82	1.64	2.31	1.99	3.01	2.17	18.67
1983	0.28	1.09	0.14	2.43	1.08	0.55	2.39	3.44	2.34	2.22	3.32	3.98	23.26
1984	1.22	0.02	0.31	0.48	0.82	0.85	0.91	4.09	2.93	1.76	3.77	3.54	20.70
1985	2.86	0.84	1.56	1.23	2.04	1.91	1.04	2.27	3.75	4.22	4.56	2.41	28.69
1986	1.11	0.39	0.09	0.83	1.17	1.23	3.25	5.50	4.81	2.45	3.61	3.19	27.63
1987	3.36	1.99	2.02	1.53	1.47	2.94	3.13	3.46	4.69	6.21	1.24	3.28	35.32
1988	1.38	1.40	0.28	1.32	1.74	1.73	0.36	3.93	2.59	2.58	3.53	3.37	24.21
1989	2.12	2.56	0.53	2.33	1.91	0.95	2.00	1.81	3.61	2.94	3.92	1.77	26.45
1990	2.50	2.45	1.25	0.31	1.56	0.53	2.01	3.43	3.38	3.69	4.39	2.87	28.37
Record Mean	1.76	1.23	1.20	1.13	1.24	1.24	2.15	3.13	3.02	2.98	2.63	1.94	23.62

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AVERAGE TEMPERATURE (deg. F)

ST. PAUL ISLAND, ALASKA

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
1961	27.3	17.9	18.8	28.4	37.2	41.4	44.9	46.6	45.0	37.8	33.8	22.2	33.5
1962	20.1	28.9	26.2	29.0	33.8	40.6	46.7	47.4	42.1	36.1	32.0	27.1	34.2
1963	30.3	21.2	29.2	29.3	36.1	40.2	45.3	46.2	43.9	36.0	29.7	29.9	34.8
1964	26.5	15.5	22.9	29.3	34.3	41.9	44.9	46.7	43.1	37.1	31.3	29.6	33.6
1965	22.6	16.7	24.4	29.6	32.7	39.7	44.7	46.4	43.9	35.5	34.3	27.6	33.2
1966	32.5	30.4	21.8	27.8	33.6	40.7	45.5	46.8	44.1	35.0	34.8	27.7	35.1
1967	28.9	27.9	33.2	35.6	38.2	44.0	48.2	49.5	45.4	37.8	35.3	31.2	37.9
1968	30.1	17.6	23.8	25.2	33.9	39.2	45.8	47.4	42.9	37.0	33.3	29.9	33.9
1969	31.7	24.2	25.5	29.6	36.7	42.1	48.3	49.9	46.5	39.1	32.5	29.4	36.3
1970	19.5	26.3	25.3	26.4	34.2	41.2	45.0	45.5	43.9	38.8	36.9	29.2	34.4
1971	23.3	15.3	14.9	21.5	27.8	36.2	41.9	44.5	42.3	37.8	32.4	30.0	30.6
1972	25.9	14.6	10.9	25.0	32.8	37.7	42.5	45.9	44.0	37.8	33.2	30.0	31.7
1973	23.1	25.5	20.1	26.3	30.4	39.4	44.3	45.9	43.9	37.5	37.2	27.4	33.4
1974	26.4	14.9	25.9	25.0	35.3	39.4	45.4	47.3	44.8	36.2	29.6	21.6	32.7
1975	17.6	15.3	19.7	27.4	32.2	38.1	43.7	47.4	42.5	36.2	29.3	29.3	31.6
1976	22.0	9.0	12.8	17.3	30.7	39.9	45.1	47.6	43.2	37.8	31.3	23.6	30.0
1977	30.6	27.4	23.2	26.3	36.1	43.3	48.7	51.1	47.8	37.0	30.0	31.1	36.1
1978	33.6	27.4	25.5	34.9	38.9	44.2	46.5	48.7	47.5	39.2	38.0	32.1	38.1
1979	34.3	30.0	30.4	36.1	40.6	46.7	48.7	50.5	48.1	43.3	36.7	31.5	39.8
1980	27.2	23.7	31.6	30.9	38.1	44.5	47.5	46.5	44.2	37.1	33.9	29.9	36.3
1981	27.9	23.9	30.7	34.3	40.4	43.0	47.8	47.3	44.3	37.7	30.8	28.1	36.4
1982	26.4	27.6	29.5	29.9	35.2	41.4	44.2	48.4	42.8	38.3	34.8	29.6	35.6
1983	22.4	28.3	27.8	31.8	36.9	43.7	47.3	48.1	44.1	36.9	30.8	34.4	36.1
1984	26.8	9.9	24.7	26.0	33.5	43.3	46.2	48.9	46.1	39.0	34.5	32.8	34.3
1985	33.8	23.5	21.9	20.2	34.8	38.7	45.8	47.5	44.4	37.2	37.2	33.9	34.9
1986	22.1	25.7	20.4	27.9	35.9	42.5	47.3	47.8	46.5	39.1	35.2	31.7	35.2
1987	27.4	27.9	29.4	29.5	36.6	42.9	47.7	49.3	43.4	38.5	28.1	25.9	35.6
1988	27.3	24.2	17.8	25.8	35.1	42.2	47.7	48.7	44.9	39.2	29.5	27.5	34.2
1989	22.3	34.1	30.4	33.8	37.8	42.6	47.3	49.8	47.1	40.2	30.2	29.4	37.1
1990	27.6	19.6	26.3	30.6	37.7	43.3	47.8	48.9	44.1	38.2	33.5	31.9	35.7
Record Mean	25.8	23.0	24.2	28.7	35.0	41.3	45.9	47.7	44.7	38.3	33.2	28.8	34.7
Max	29.7	27.3	28.9	32.9	39.1	45.6	49.5	50.9	48.5	42.1	36.8	32.6	38.7
Min	21.8	18.6	19.5	24.4	31.0	37.0	42.2	44.4	40.9	34.5	29.5	24.9	30.7

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HEATING DEGREE DAYS Base 65 deg. F

ST. PAUL ISLAND, ALASKA

SEASON	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TOTAL
1961-62	616	562	591	835	929	1320	1388	1004	1198	1074	961	726	11206
1962-63	56.	536	681	889	982	1172	1068	1221	1101	1065	890	738	10904
1963-64	600	573	624	891	1052	1080	1189	1433	1298	1063	947	686	11436
1964-65	615	562	650	857	1004	1091	1307	1347	1252	1054	995	750	11484
1965-66	622	569	620	907	917	1153	1002	963	1334	1111	965	724	10895
1966-67	599	559	619	926	901	1151	1113	1033	980	876	824	622	10203
1967-68	511	474	581	836	883	1040	1079	1367	1271	1184	954	769	10949
1968-69	589	539	652	858	946	1079	1022	1135	1216	1056	872	681	10645
1969-70	512	459	548	798	967	1097	1404	1079	1224	1154	949	707	10898
1970-71	611	598	624	806	818	1104	1288	1388	1552	1300	1148	859	12116
1971-72	713	628	677	835	872	1079	1205	1458	1670	1193	993	813	12236
1972-73	691	585	625	840	947	1077	1292	1102	1385	1156	1064	760	11524
1973-74	634	586	625	848	827	1157	1188	1397	1204	1194	914	758	11332
1974-75	604	539	598	882	1053	1337	1462	1389	1399	1120	1013	799	12195
1975-76	653	539	670	886	1064	1102	1327	1622	1612	1422	1055	745	12697
1976-77	610	532	649	838	1006	1280	1059	1048	1291	1156	889	642	11000
1977-78	439	420	508	862	1043	1045	968	1049	1216	896	803	616	9925
1978-79	564	496	518	792	802	1011	946	976	1065	860	747	548	9325
1979-80	497	444	501	667	843	1030	1165	1190	1030	1016	823	608	9814
1980-81	532	568	617	861	924	1079	1142	1145	1057	916	757	651	10249
1981-82	527	541	613	839	1018	1138	1188	1044	1093	1074	915	702	10692
1982-83	638	507	661	819	900	1092	1313	1019	1147	988	868	632	10584
1983-84	541	519	620	862	1018	942	1178	1592	1245	1166	968	646	11297
1984-85	579	492	561	796	909	993	959	1154	1326	1338	926	783	10816
1985-86	589	537	612	852	824	957	1323	1093	1378	1104	895	670	10834
1986-87	543	527	546	796	885	1029	1160	1034	1098	1057	871	656	10202
1987-88	526	480	642	816	1097	1205	1160	1179	1454	1170	916	677	11322
1988-89	530	499	595	792	1059	1155	1319	859	1067	930	834	666	10305
1989-90	543	463	532	763	1037	1093	1172	1265	1193	1027	840	648	10576
1990-91	525	494	619	825	935	1023							

See Reference Notes on Page 6B.

COOLING DEGREE DAYS Base 65 deg. F

ST. PAUL ISLAND, ALASKA

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0

See Reference Notes on Page 6B.

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SNOWFALL (inches)

ST. PAUL ISLAND, ALASKA

SEASON	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TOTAL
1961-62	0.0	0.0	0.0	5.9	9.3	16.6	6.0	4.9	7.6	4.9	7.5	T	62.7
1962-63	0.0	0.0	0.0	5.3	8.0	11.9	1.6	2.8	9.5	15.7	0.2	T	55.0
1963-64	0.0	0.0	T	3.5	6.1	7.5	35.7	55.8	10.1	11.1	1.6	0.0	139.4
1964-65	0.0	0.0	0.0	2.9	27.3	6.5	28.3	11.0	9.0	4.0	2.7	1.6	93.3
1965-66	0.0	0.0	1.0	3.7	8.1	8.9	5.7	16.0	16.3	14.3	1.2	0.0	75.2
1966-67	0.0	0.0	0.0	8.3	4.0	5.9	10.2	15.2	9.0	2.9	T	0.0	55.5
1967-68	0.0	0.0	0.0	7.2	7.9	14.6	6.0	3.9	12.7	9.7	4.0	0.2	66.2
1968-69	0.0	0.0	T	10.1	10.2	10.0	11.7	16.4	12.1	7.3	3.3	0.0	81.1
1969-70	0.0	0.0	0.0	0.8	4.9	8.7	14.7	8.7	12.0	8.5	1.3	0.1	59.7
1970-71	0.0	0.0	T	0.4	2.0	17.5	6.3	9.6	12.3	13.6	12.7	T	74.4
1971-72	0.0	0.0	0.0	4.3	5.1	13.1	12.9	9.3	10.8	15.6	3.2	T	74.3
1972-73	0.0	0.0	0.2	1.8	6.7	5.5	13.0	27.6	31.4	6.3	7.9	0.2	100.6
1973-74	0.0	0.0	0.0	3.8	3.9	12.4	7.7	11.0	5.6	8.9	2.2	T	55.5
1974-75	0.0	0.0	0.0	2.2	4.6	15.7	14.4	11.4	10.1	5.6	4.5	1.2	69.7
1975-76	0.0	0.0	0.4	2.0	5.9	4.7	9.4	7.9	7.9	6.8	1.0	0.0	45.9
1976-77	0.0	0.0	0.0	2.9	7.1	10.3	2.1	7.1	16.0	5.*	1.4	0.0	52.5
1977-78	0.0	0.0	0.0	1.6	7.9	3.9	2.9	5.2	5.9	0.4	T	0.0	27.8
1978-79	0.0	0.0	0.0	12.5	2.4	9.0	17.9	1.6	3.7	0.9	0.5	0.0	48.5
1979-80	0.0	0.0	T	T	14.6	8.7	8.5	5.0	12.1	9.6	1.7	0.0	60.2
1980-81	0.0	0.0	T	2.6	6.1	6.1	10.5	5.5	7.2	2.0	1.3	0.0	41.3
1981-82	0.0	0.0	0.0	0.9	9.1	4.8	2.1	1.5	5.8	3.0	T	0.0	27.2
1982-83	0.0	0.0	T	0.2	4.0	10.7	2.9	8.4	1.2	5.3	0.2	0.0	32.9
1983-84	0.0	0.0	T	4.8	7.4	1.7	6.5	0.2	3.0	3.0	3.3	0.0	29.9
1984-85	0.0	0.0	0.0	2.9	3.4	3.7	4.5	7.8	10.1	13.3	2.2	0.7	48.6
1985-86	0.0	0.0	0.0	1.7	2.5	3.7	12.6	3.2	1.1	4.8	1.9	0.0	31.5
1986-87	0.0	0.0	0.0	T	3.6	4.9	13.5	16.1	13.2	3.3	2.4	0.0	57.0
1987-88	0.0	0.0	T	0.9	10.3	18.6	6.5	7.0	4.9	11.7	1.9	0.0	61.8
1988-89	0.0	0.0	0.0	2.8	25.7			6.8	3.6	5.5	1.4	0.0	
1989-90	0.0	0.0	0.0	0.7	18.2	10.6	23.4	25.1	16.6	2.9	0.1	0.0	97.6
1990-91	0.0	0.0	0.2	3.3	9.7	7.2							
Record Mean	0.0	0.0	0.1	2.7	6.5	9.3	11.9	9.6	8.9	5.7	2.1	0.1	56.9

See Reference Notes on Page 6B.

REFERENCE NOTES

ST. PAUL ISLAND, ALASKA

GENERAL
T - TRACE AMOUNT
BLANK ENTRIES DENOTE MISSING/UNREPORTED DATA.
# INDICATES A STATION OR INSTRUMENT RELOCATION.
SEE STATION LOCATION TABLE ON PAGE 8.

SPECIFIC
PAGE 2
PM - INCLUDES LAST DAY OF PREVIOUS MONTH

PAGE 3
Tal - LENGTH OF RECORD IN YEARS, ALTHOUGH INDIVIDUAL MONTHS MAY BE MISSING.
0.* OR *. THE VALUE IS BETWEEN 0.0 AND 0.05
NORMALS - BASED ON THE 1951-1980 RECORD PERIOD.
EXTREMES - DATES ARE THE MOST RECENT OCCURRENCE
WIND DIR.- NUMERALS SHOW TENS OF DEGREES CLOCKWISE FROM TRUE NORTH. '00' INDICATES CALM.
RESULTANT DIRECTIONS ARE GIVEN TO WHOLE DEGREES.

PAGE 4B
MAX AND MIN ARE LONG TERM MEAN DAILY MAXIMUM AND MEAN DAILY MINIMUM TEMPERATURES.

EXCEPTIONS

PAGE 3
1. MEAN WIND SPEED IS THROUGH 1974.
PAGES 4A, 4B, 6A
RECORD MEANS ARE THROUGH THE CURRENT YEAR, BEGINNING IN 1915 FOR TEMPERATURE
1915 FOR PRECIPITATION
1924 FOR SNOWFALL

AMP Ex. C

Page 6 of 8

ST. PAUL ISLAND,
ALASKA

St Paul Island, one of the Pribilof group, is located in the central-southeast Bering Sea area. The climate is typically maritime, resulting in considerable cloudiness, heavy fog, high humidity, and rather well restricted daily temperature ranges. Humidities remain uniformly high from May to late September, and during the summer period there is almost continuous low cloudiness and occasional heavy fog. The differences between the high and low temperatures for the entire year are only slightly above 7 degrees and the greatest monthly variation in March is slightly less than 12 degrees. Temperatures remain on the cool side even during the summer with extreme highs usually around the middle 50s. Although record low readings fall well below the zero mark, such extremely cold days are rather rare. There are only five days each winter with temperatures falling below the zero mark. The climatic environment makes the Pribilofs ideal for their numerous summer inhabitants, the Alaskan Fur Seals.

In spite of an environment of high humidities, precipitation on St Paul Island is surprisingly light. The annual average of near 24 inches is slightly below the average for Alaska as a whole. April is generally the driest month, with a gradual increase of precipitation until a monthly total of over 3 inches is reached during August, September, and October. This is followed by a gradual decrease during the succeeding months until the return of April.

Frequent windy periods are characteristic of the island area throughout the year. Frequent storms occur from October to April, and these often are accompanied by gale-force winds to produce general blizzard conditions. Under the influence of prolonged north and northeasterly winds between January and April, the ice pack occasionally moves south to surround the Island. During recent years, the southward limit of this movement has been between St. Paul and St. George Islands, some 40 miles to the southeast of St. Paul.

Thunderstorms are extremely rare on St. Paul Island.

AMP Ex. C

STATION LOCATION

SAINT PAUL ISLAND, ALASKA

LOCATION	OCCUPIED FROM	OCCUPIED TO	AIRLINE DISTANCES AND DIRECTIONS FROM PREVIOUS LOCATION	LATITUDE NORTH	LONGITUDE WEST	ELEVATION ABOVE SEA LEVEL GROUND TEMPERATURE	ELEVATION ABOVE GROUND SITE	WIND INSTRUMENTS	EXTREME THERMOMETERS	PSYCHROMETER	SUNSHINE SWITCH	RIPING BUCKET	RAIN GAGE	WEIGHING RAIN GAGE	8 INCH RAIN GAGE	HYGROTHERMOMETER	AUTOMATIC OBSERVING EQUIPMENT *	REMARKS
Naval Radio Station	8/08/15	7/17/20		57° 07'	170°16'				5	5					4			
Native Residence	7/17/20	12/15/23	1/8 mi. SW	57° 07'	170°16'				3	3					4			
FWS Company House	12/15/23	4/05/28	Approx. 800 ft. N	57° 07'	170°16'			10	4	4					4			
Weather Bureau Building	6/05/28	8/29/30	400 ft. SW	57° 07'	170°16'			26	4	4					4			Location of building indefinite.
Naval Radio Station	8/29/30	6/01/42	800 ft. NE	57° 07'	170°16'			a59	4	4					4			a - 64 ft. to 8/22/40.
Army Weather Station	11/1943	10/15/45	800 ft. SW	57° 07'	170°16'													
Weather Bureau Building	10/15/45	7/02/47		57° 07'	170°16'			29	5	5					2			
Weather Bureau Airport Station	7/02/47	9/10/51	3.4 mi. NE of Village	57° 09'	170°13'	22		39	5	5					2			s - Standby equipment.
Weather Bureau Airport Station*	9/10/51	Present	No Change	57° 09'	170°13'	22		c42 e30	s10 h	s10 h	NA	NA	NA	b6	NA b6	d5 f5 g5	NA	b - Added 8/1/60. c - Raised from 29 ft. in 1961. d - Commissioned 9/9/75 on site 66 ft. NE of instrument shelter. e - Moved to ground location 7/2/78. f - Minor adjustment 7/15/78. g - Type change 8/20/85. h - Instrument shelter removed 11/1987.

*Nat. Weather Service Building St. Paul Is. Airport eff. 12/1970.

* Type
H = AMOS
T = AUTOB
S = ASOS
W = AWOS

SUBSCRIPTION:
Price and ordering information available through: National Climatic Data Center, Federal Building, Asheville, North Carolina 28801.

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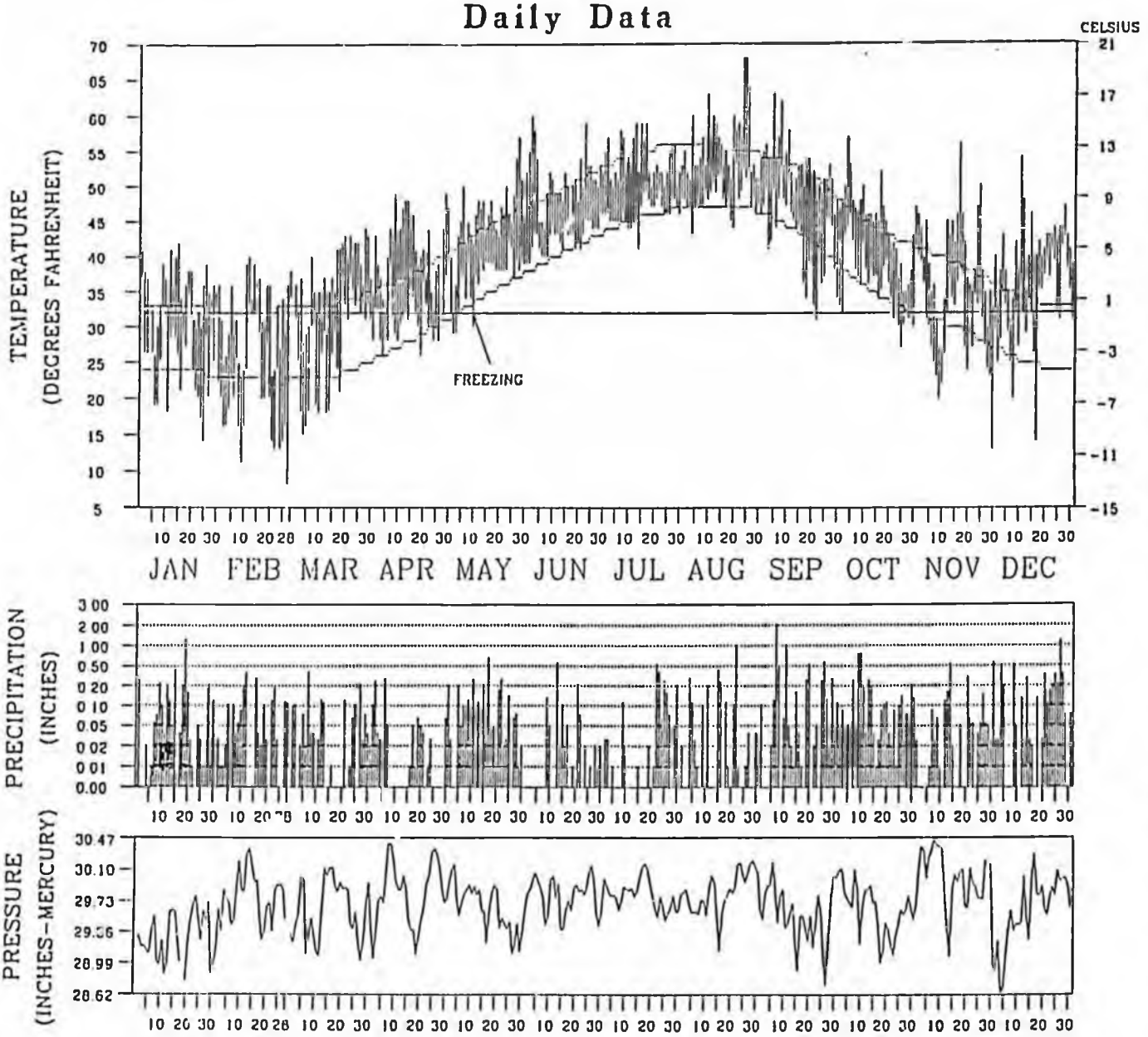
1990 LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA
COLD BAY, ALASKA

Daily Data



TEMPERATURE DEPICTS NORMAL MAXIMUM, NORMAL MINIMUM AND ACTUAL DAILY HIGH AND LOW VALUES (FAHRENHEIT)
PRECIPITATION IS MEASURED IN INCHES, SCALE IS NON-LINEAR
STATION PRESSURE IS MEASURED IN INCHES OF MERCURY

I CERTIFY THAT THIS IS AN OFFICIAL PUBLICATION OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, AND IS COMPILED FROM RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER, ASHEVILLE, NORTH CAROLINA, 28801

Kenneth D. Hadeen
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

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AMP Ex. D

METEOROLOGICAL DATA FOR 1990

COLD BAY, ALASKA

LATITUDE: 55°12' N LONGITUDE: 162°43' W ELEVATION: FT. GRND 96 BARO 99 TIME ZONE: YUKON WBAN: 25624

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:													
Averages													
-Daily Maximum	35.2	31.5	37.1	41.4	45.8	51.0	53.8	56.3	52.8	44.8	39.4	40.7	44.2
-Daily Minimum	25.5	21.0	27.1	31.3	36.9	42.8	46.3	48.1	42.3	35.8	29.7	32.1	34.9
-Monthly	30.4	26.3	32.1	36.4	41.4	46.9	50.1	52.2	47.6	40.3	34.6	36.4	39.6
-Monthly Dept	27.5	24.0	28.9	32.3	37.8	43.6	47.1	49.5	44.1	36.0	30.4	33.5	36.2
Extremes													
-Highest	42	40	44	49	57	60	59	68	63	57	56	54	68
-Date	15	12	28	29	28	2	17	25	5	4	17	11	AUG 25
-Lowest	14	8	15	26	29	39	41	43	31	27	13	14	8
-Date	25	27	4	19	3	1	14	4	22	25	30	17	FEB 27
DEGREE DAYS BASE 65 °F:													
Heating	1063	1077	1010	853	727	535	455	390	516	757	905	879	9167
Cooling	0	0	0	0	0	0	0	0	0	0	0	0	0
% OF POSSIBLE SUNSHINE													
AVG. SKY COVER (tenths)													
Sunrise - Sunset	8.1	9.5	8.1	8.7	9.6	9.7	9.6	9.4	8.9	9.0	8.7	9.3	9.1
Midnight - Midnight	8.2	9.5	8.2	8.8	9.4	9.8	9.6	9.4	8.8	9.1	8.8	9.1	9.1
NUMBER OF DAYS:													
Sunrise to Sunset													
-Clear	3	0	4	2	0	0	0	0	0	0	1	0	10
-Partly Cloud,	5	1	2	5	0	1	2	4	5	4	4	2	35
-Cloudy	23	27	25	23	31	29	29	27	25	27	25	29	320
Precipitation .01 inches or more	25	21	21	15	25	15	17	18	23	27	20	24	251
Snow, Ice pellets 1.0 inches or more	7	8	2	1	0	0	0	0	0	1	2	3	24
Thunderstorms	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy fog, visibility 1/4 mile or less	1	2	0	1	1	1	0	4	1	0	0	1	12
Temperature °F													
-Maximum													
70° and above	0	0	0	0	0	0	0	0	0	0	0	0	0
32° and below	7	15	6	2	1	0	0	0	0	0	4	2	37
-Minimum													
32° and below	29	25	23	23	5	0	0	0	1	9	18	16	148
0° and below	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG. STATION PRESS. (mb)	991.9	1007.1	1002.4	1009.1	1003.9	1008.8	1008.8	1010.2	1000.3	1002.9	1015.6	1001.7	1005.1
RELATIVE HUMIDITY (%)													
Hour 03	88	90	89	91	94	96	96	96	92	88	86	90	91
Hour 09 (Local Time)	87	89	90	91	91	94	94	96	90	87	85	92	91
Hour 15	84	89	84	80	64	85	85	89	81	79	84	89	84
Hour 21	91	90	87	89	92	92	92	95	90	87	87	89	90
PRECIPITATION (inches):													
Water Equivalent													
-Total	3.99	2.18	1.84	1.16	3.23	1.38	2.13	2.89	6.55	4.21	2.06	5.96	37.58
-Greatest 124 hrs!	1.36	0.42	0.42	0.34	0.71	0.59	0.98	1.13	2.35	1.60	0.73	1.54	2.35
-Date	19	11-12	7- 8	6- 7	17	13	22-23	21-22	7- 8	9-10	13-14	27-28	SEP 7- 8
Snow, Ice pellets													
-Total	16.4	18.7	8.8	3.9	0.6	0.0	0.0	0.0	T	4.7	10.6	6.3	70.0
-Greatest 124 hrs!	2.2	2.9	2.5	2.1	0.6	0.0	0.0	0.0	T	2.5	4.2	1.6	4.2
-Date	12	22-23	2	6	1- 2				30	25-26	21	9	NOV 21
WIND:													
Resultant													
-Direction (!!!)	212	317	148	345	167	246	181	190	199	276	308	158	216
-Speed (mph)	4.7	2.4	2.8	4.8	9.0	3.1	5.5	5.5	3.4	9.2	9.2	9.4	2.7
Average Speed (mph)	16.7	16.1	16.3	14.6	19.7	13.8	16.4	16.2	16.4	17.2	18.7	20.5	16.9
Fastest Obs 1 Min													
-Direction (!!!)	12	18	27	14	16	17	15	26	15	15	26	12	12
-Speed (mph)	46	40	40	35	40	37	36	41	40	46	51	52	52
-Date	30	12	7	1	25	15	18	16	4	9	25	1	DEC 1
Peak Gust													
-Direction (!!!)	SE	S	W	SE	SE	S	SE	S	S	SE	W	SE	W
-Speed (mph)	58	52	55	47	52	49	45	54	54	60	71	69	71
-Date	30	12	7	1	17	15	18	26	5	9	25	1	NOV 25

!!!! See Reference Notes on Page 68

AMP Ex. D

Page 2 of 8

NORMALS, MEANS, AND EXTREMES

COLD BAY, ALASKA

LATITUDE: 55°12'N LONGITUDE: 162°43'W ELEVATION: FT. GRND 96 BARO 99 TIME ZONE: YUKON WBAN: 25624

	Yrs	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F:														
Normals														
-Daily Maximum		32.8	32.2	33.6	37.7	44.3	50.0	54.9	55.4	52.0	44.2	38.8	33.9	42.5
-Daily Minimum		23.8	22.7	23.6	28.3	34.7	40.8	45.6	46.9	43.0	34.7	29.8	25.8	33.2
-Monthly		28.3	27.5	28.6	33.0	39.5	45.4	50.3	51.2	47.5	39.5	34.3	29.5	37.9
Extremes														
-Record Highest	46	50	50	56	60	67	69	77	78	76	69	59	54	78
-Year		1973	1957	1974	1948	1979	1953	1960	1948	1985	1964	1986	1990	AUG 1948
-Record Lowest	47	-8	-9	-13	4	18	29	33	33	27	10	1	-1	-13
-Year		1989	1947	1971	1976	1973	1952	1982	1946	1970	1976	1963	1979	MAR 1971
NORMAL DEGREE DAYS:														
Heating (base 65°F)		1138	1050	1128	960	791	508	456	428	525	791	921	1101	9877
Cooling (base 65°F)		0	0	0	0	0	0	0	0	0	0	0	0	
% OF POSSIBLE SUNSHINE														
MEAN SKY COVER (tenths)														
Sunrise - Sunset	35	8.2	8.3	8.3	9.0	9.2	9.2	9.4	9.5	9.1	8.7	8.5	8.5	8.8
MEAN NUMBER OF DAYS:														
Sunrise to Sunset														
-Clear	35	2.6	2.0	1.9	0.7	0.3	0.5	0.2	0.2	0.2	0.7	1.0	1.8	12.1
-Partly Cloudy	35	5.6	4.6	6.1	3.8	2.8	2.6	2.3	1.9	3.5	5.2	5.4	5.2	49.0
-Cloudy	35	22.8	21.7	23.1	25.5	27.8	26.9	28.4	28.9	26.3	25.1	23.6	24.1	304.2
Precipitation:														
.01 inches or more	45	19.0	17.1	17.8	16.2	17.1	15.6	16.4	19.6	20.4	22.8	21.6	20.4	224.0
Snow, Ice pellets														
1.0 inches or more	40	3.8	3.8	3.5	2.0	0.5	0.0	0.0	0.0	0.0	1.0	2.5	3.5	20.6
Thunderstorms	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.2
Heavy Fog Visibility														
1/4 mile or less	35	1.9	1.5	2.0	1.4	1.5	2.1	4.0	3.6	1.1	0.3	0.6	1.7	21.7
Temperature °F														
-Maximum														
70° and above	46	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.0	0.0	0.4
32° and below	46	11.3	11.1	10.2	5.9	0.5	0.0	0.0	0.0	0.0	0.5	3.7	9.8	53.0
-Minimum														
32° and below	47	24.4	23.7	25.3	21.5	8.5	0.4	0.0	0.0	0.4	8.6	18.8	24.0	155.6
0° and below	47	0.6	0.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.7
AVG. STATION PRESS (mb)	18	998.8	998.8	999.2	1004.7	1004.3	1008.0	1011.1	1009.3	1004.3	1000.5	998.4	995.9	1002.4
RELATIVE HUMIDITY (%)														
Hour 03	21	85	84	84	85	88	90	92	92	89	84	83	84	87
Hour 09	21	85	84	84	84	84	86	90	90	88	83	83	84	85
Hour 15 (Local Time)	21	82	80	78	77	76	77	82	82	80	77	80	83	80
Hour 21	21	84	83	84	83	83	84	88	90	87	83	83	84	85
PRECIPITATION (inches):														
Water Equivalent														
-Normal		2.70	2.27	2.31	1.95	2.47	2.16	2.50	3.70	3.77	4.29	4.04	2.85	35.01
-Maximum Monthly	45	8.46	7.87	4.70	6.55	6.37	6.98	6.13	9.97	9.79	8.02	8.94	7.31	9.97
-Year		1948	1944	1977	1979	1958	1952	1982	1951	1965	1968	1960	1983	AUG 1951
-Minimum Monthly	45	0.60	0.08	0.41	0.02	0.62	0.12	0.28	1.10	0.91	1.88	1.15	0.19	0.02
-Year		1956	1950	1972	1948	1967	1962	1950	1975	1952	1961	1975	1956	APR 1948
-Maximum in 24 hrs	45	2.49	2.49	2.06	1.76	2.22	2.10	1.77	2.17	3.43	4.90	3.43	2.44	4.90
-Year		1948	1956	1976	1951	1958	1971	1986	1951	1965	1968	1972	1978	OCT 1968
Snow, Ice pellets														
-Maximum Monthly	40	34.6	54.3	28.6	19.5	9.3	0.5	1	0.0	0.2	15.6	27.4	24.2	54.3
-Year		1982	1984	1985	1976	1971	1971	1976		1972	1968	1983	1976	FEB 1984
-Maximum in 24 hrs	40	18.0	17.7	7.4	6.0	4.0	2.6	1	0.0	0.2	11.4	21.4	9.4	21.4
-Year		1982	1984	1987	1956	1986	1971	1976		1972	1968	1983	1975	NOV 1983
WIND:														
Mean Speed (mph)	35	17.7	17.9	17.3	17.9	16.3	15.9	15.7	16.4	16.4	16.8	17.6	17.5	16.9
Prevailing Direction through 1963		SSE	SSE	NNW	SSE	SSE	NNW	SSE	SSE	SSE	WSW	SSE	NNW	SSE
Fastest Obs. 1 Min.														
-Direction (!!!)	35	17	16	17	15	14	11	17	16	17	21	14	11	17
-Speed (MPH)	35	71	73	67	60	60	63	54	64	75	60	66	64	75
-Year		1985	1967	1977	1987	1985	1959	1972	1985	1988	1978	1967	1960	SEP 1988
Peak Gust														
-Direction (!!!)	6	SE	SE	E	SE	SE	S	SE	SE	S	SW	SE	SW	S
-Speed (mph)	6	85	83	76	77	71	64	56	81	95	63	75	78	95
-Date		1987	1989	1987	1987	1985	1987	1987	1985	1988	1985	1986	1988	SEP 1988

!!!! See Reference Notes on Page 68.

AMP Ex. D

PRECIPITATION (inches)

COLD BAY, ALASKA

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
#1961	1.93	1.62	1.72	1.78	0.95	0.12	1.00	3.50	1.93	1.00	4.11	2.78	23.41
1962	2.53	1.50	2.10	0.76	2.37	0.12	3.41	1.98	3.84	4.16	2.57	1.02	26.39
1963	4.91	0.40	3.02	1.66	1.32	1.06	4.28	2.69	3.61	3.03	1.46	2.01	29.48
1964	1.33	1.75	1.32	0.21	1.15	1.85	1.74	3.56	5.25	3.33	3.71	1.31	26.51
1965	1.21	2.78	3.05	0.83	2.66	2.54	1.20	1.57	9.79	2.75	2.55	1.77	32.70
1966	2.21	1.59	1.40	1.31	2.49	0.79	4.63	3.73	4.28	2.96	2.80	2.09	30.28
1967	1.60	2.58	2.54	3.06	0.52	2.48	2.89	4.72	2.91	2.71	7.40	4.49	38.00
1968	2.77	1.29	1.21	1.37	1.30	0.84	0.99	3.53	2.55	8.02	3.32	1.17	28.36
1969	3.75	2.33	1.92	1.09	3.44	2.52	2.01	5.02	5.18	3.90	2.97	2.33	36.46
1970	2.11	4.15	3.32	3.83	2.06	2.99	3.86	3.82	5.62	5.82	2.89	5.94	46.41
1971	1.34	2.17	0.59	0.43	3.75	6.67	2.27	2.76	3.86	3.28	5.11	4.87	37.10
1972	4.08	1.09	0.41	3.09	2.06	2.91	1.82	3.84	1.30	3.91	6.96	6.49	37.96
1973	1.97	1.60	1.87	1.30	1.06	0.78	1.31	2.16	3.07	4.80	2.45	2.67	25.04
1974	2.96	2.72	0.72	1.69	3.12	0.92	1.93	2.63	2.55	2.15	3.78	1.73	26.90
1975	3.12	4.93	2.05	2.53	0.88	3.03	2.55	1.10	4.23	3.18	1.15	5.03	34.58
1976	1.88	2.88	3.76	2.09	0.94	2.69	1.92	2.01	2.38	5.63	2.51	2.89	31.58
1977	4.82	2.35	4.70	2.38	1.71	1.14	2.89	3.32	2.63	5.12	6.85	3.55	41.47
1978	3.70	1.74	2.22	5.42	3.63	2.84	5.67	2.88	3.82	7.67	6.67	6.89	53.15
1979	4.10	0.78	4.65	6.55	4.92	1.98	2.02	5.33	5.31	7.14	7.57	2.21	52.56
1980	3.51	1.69	3.52	1.71	4.22	3.67	2.68	3.95	5.23	4.42	2.88	2.24	39.72
1981	2.34	4.45	2.34	1.30	3.09	1.75	2.64	5.73	2.25	6.51	3.11	3.16	38.67
1982	5.41	1.13	3.45	1.33	4.13	2.93	6.13	2.17	6.44	2.41	5.12	3.10	43.75
1983	1.58	0.66	0.88	3.53	1.59	1.31	2.71	4.06	4.41	4.82	5.69	7.31	38.55
1984	2.30	2.82	1.56	1.79	1.20	1.45	1.77	1.48	2.87	3.64	7.61	3.19	31.68
1985	3.29	2.42	2.85	1.01	2.45	2.19	2.27	5.47	7.14	6.59	7.72	4.95	48.35
1986	2.05	2.20	0.55	1.12	2.02	1.91	2.48	2.63	7.37	3.03	5.08	4.94	35.41
1987	3.17	3.15	3.18	1.94	1.52	4.00	1.80	2.56	4.25	5.60	3.17	3.69	38.03
1988	3.70	2.91	0.89	1.81	2.70	1.69	1.12	3.03	3.90	3.28	3.97	6.37	35.37
1989	1.68	4.02	0.52	2.20	2.21	2.48	1.40	3.20	7.77	4.39	2.60	3.81	36.28
1990	3.99	2.18	1.84	1.16	3.23	1.38	2.13	2.89	6.55	4.21	2.06	5.96	37.58
Record Mean	2.76	2.56	2.04	1.84	2.28	2.16	2.35	3.59	4.11	4.48	4.34	3.37	35.89

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AVERAGE TEMPERATURE (deg. F)

COLD BAY, ALASKA

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
#1961	31.0	23.5	25.1	33.1	41.4	45.2	49.6	50.5	48.0	38.8	35.5	26.3	37.3
1962	22.7	33.2	31.2	31.9	38.2	44.6	51.4	52.1	46.8	39.6	35.8	29.3	38.1
1963	34.1	29.1	34.4	32.9	40.8	45.9	50.6	50.6	48.5	38.1	28.4	31.8	38.8
1964	30.0	26.2	29.3	32.7	38.1	46.4	47.8	48.6	47.1	39.7	32.9	30.3	37.4
1965	27.3	24.7	35.6	35.2	36.3	44.4	48.7	50.3	48.9	36.7	36.0	28.5	37.7
1966	32.8	31.7	21.4	34.4	37.4	44.2	48.6	49.1	44.6	33.9	32.3	27.7	36.5
1967	26.5	28.5	34.5	38.2	41.5	46.8	52.9	51.3	46.3	38.2	38.0	30.4	39.5
1968	29.3	24.0	30.4	34.2	42.7	45.4	52.9	52.0	46.8	38.9	36.0	30.9	38.6
1969	31.8	28.0	32.5	34.5	41.7	46.9	53.2	53.4	50.2	42.9	33.5	31.3	40.0
1970	22.4	28.1	31.8	31.8	40.8	47.8	51.3	50.2	46.9	40.0	37.6	30.5	38.3
1971	22.1	26.0	20.2	28.0	34.3	40.5	47.8	48.5	44.5	38.7	32.4	32.4	34.6
1972	27.2	21.4	16.3	29.5	38.6	41.6	48.6	50.0	47.9	39.8	34.3	30.4	35.5
1973	22.9	30.6	29.0	31.5	36.0	42.5	47.5	50.0	46.4	38.5	37.5	30.1	36.9
1974	29.7	19.0	28.9	32.2	41.4	45.8	49.9	53.2	49.2	40.4	34.2	27.5	37.6
1975	24.4	23.7	26.8	32.0	38.4	46.2	50.5	52.5	46.4	39.3	30.1	27.9	36.5
1976	25.5	23.9	22.0	27.2	36.6	44.6	49.7	50.8	45.3	39.1	30.5	28.2	35.3
1977	35.3	33.5	30.7	31.3	39.3	49.6	54.0	53.6	50.1	38.9	31.2	29.4	39.8
1978	33.4	28.4	30.8	37.9	40.5	47.0	49.6	54.3	48.8	40.1	38.1	35.2	40.3
1979	35.1	28.4	35.4	40.8	43.4	50.6	52.3	51.9	49.0	41.9	35.0	26.7	40.9
1980	23.5	25.4	33.7	35.6	41.4	45.9	52.9	51.5	48.1	40.3	36.4	32.1	38.9
1981	30.9	29.4	35.9	38.4	44.8	47.6	52.9	52.2	48.1	40.8	33.8	30.7	40.5
1982	29.8	27.1	33.9	32.1	38.0	45.0	46.8	50.2	45.1	37.5	35.3	30.5	37.6
1983	24.6	31.5	33.5	36.8	41.7	48.4	51.6	52.2	47.3	39.7	34.6	37.5	40.0
1984	31.2	18.7	33.7	31.6	38.0	47.0	49.7	54.7	49.7	40.8	37.0	37.3	39.1
1985	36.1	27.9	30.1	26.8	38.3	42.5	50.6	50.8	49.5	39.6	38.9	35.6	38.9
1986	24.4	28.4	27.0	32.2	38.0	44.7	51.7	51.2	49.8	42.2	37.0	34.4	38.4
1987	30.5	31.2	33.6	34.2	38.8	44.5	50.9	52.8	46.9	41.0	30.0	28.3	38.6
1988	31.2	30.2	26.1	31.1	40.3	46.0	51.0	51.1	46.9	40.5	32.5	30.9	38.2
1989	22.3	35.0	31.5	34.3	40.6	46.0	50.9	53.3	49.8	42.3	32.1	31.3	39.1
1990	30.4	26.3	32.1	36.4	41.4	46.9	50.1	52.2	47.6	40.3	34.6	36.4	39.6
Record Mean	28.4	27.9	29.3	33.0	39.5	45.4	50.1	51.4	47.4	39.8	34.3	30.3	38.0
Max	32.9	32.5	34.1	37.6	44.3	50.0	54.5	55.6	51.8	44.4	38.7	34.6	42.6
Min	23.9	23.2	24.4	28.3	34.7	40.8	45.7	47.2	42.9	35.1	29.9	25.9	33.5

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AMP Ex. D

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CORRECTION

THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY

PRECIPITATION (inches)

COLD BAY, ALASKA

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
#1961	1.93	1.62	1.72	1.78	0.95	0.12	1.08	3.50	1.93	1.88	4.11	2.79	23.41
1962	2.53	1.53	2.10	0.76	2.37	0.12	3.41	1.98	3.84	4.16	2.57	1.02	26.39
1963	4.91	0.43	3.02	1.66	1.32	1.06	4.28	2.69	3.61	3.03	1.46	2.01	29.48
1964	1.33	1.75	1.32	0.21	1.15	1.85	1.74	3.56	5.25	3.33	3.71	1.31	26.51
1965	1.21	2.78	3.05	0.83	2.66	2.54	1.20	1.57	7.79	2.75	2.55	1.77	32.70
1966	2.21	1.59	1.40	1.31	2.49	0.79	4.63	3.73	4.28	2.96	2.80	2.09	30.28
1967	1.60	2.58	2.54	3.06	0.62	2.48	2.89	4.72	2.91	2.71	7.40	4.49	38.00
1968	2.77	1.29	1.21	1.37	1.30	0.84	0.99	3.53	2.55	8.02	3.32	1.17	28.36
1969	3.75	2.33	1.92	1.09	3.44	2.52	2.01	5.02	5.18	3.90	2.97	2.33	36.46
1970	2.11	4.15	3.32	3.83	2.06	2.99	3.86	3.82	5.62	5.82	2.89	5.94	46.41
1971	1.34	2.17	0.59	0.43	3.75	6.67	2.27	2.76	3.86	3.28	5.11	4.87	37.10
1972	4.08	1.09	0.41	3.09	2.06	2.91	1.82	3.84	1.38	3.91	6.96	6.49	37.96
1973	1.97	1.60	1.87	1.30	1.05	0.78	1.31	2.16	3.07	4.80	2.45	2.67	25.04
1974	2.96	2.72	0.72	1.69	3.12	0.92	1.93	2.63	2.55	2.15	3.78	1.73	26.90
1975	3.12	4.93	2.85	2.53	0.88	3.03	2.55	1.10	4.23	3.18	1.15	5.03	34.58
1976	1.88	2.88	3.76	2.09	0.94	2.69	1.92	2.01	2.38	5.63	2.51	2.89	31.58
1977	4.82	2.36	4.70	2.38	1.71	1.14	2.89	3.32	2.63	5.12	6.85	3.55	41.47
1978	3.70	1.74	2.22	5.42	3.63	2.84	5.67	2.88	3.82	7.67	6.67	6.89	53.15
1979	4.10	0.78	4.65	6.55	4.92	1.98	2.02	5.33	5.31	7.14	7.57	2.21	52.56
1980	3.51	1.69	3.52	1.71	4.22	3.67	2.68	3.95	5.23	4.42	2.88	2.24	39.72
1981	2.34	4.45	2.34	1.30	3.09	1.75	2.64	5.73	2.25	6.51	3.11	3.16	38.67
1982	5.41	1.13	3.45	1.33	4.13	2.93	6.13	2.17	6.44	2.41	5.12	3.10	43.75
1983	1.58	0.66	0.88	3.53	1.59	1.31	2.21	4.06	4.41	4.82	5.69	7.31	38.55
1984	2.30	2.82	1.56	1.79	1.20	1.45	1.77	1.48	2.87	3.64	7.61	3.19	31.68
1985	3.29	2.42	2.85	1.01	2.45	2.19	2.27	5.47	7.14	6.59	7.72	4.95	48.35
1986	2.05	2.23	0.55	1.12	2.02	1.91	2.48	2.63	7.37	3.03	5.08	4.94	35.41
1987	3.17	3.15	3.18	1.94	1.52	4.00	1.80	2.56	4.25	5.60	3.17	3.69	38.03
1988	3.70	2.91	0.89	1.81	2.70	1.69	1.12	3.03	3.90	3.28	3.97	6.37	35.37
1989	1.68	4.02	0.52	2.20	2.21	2.48	1.40	3.20	7.77	4.39	2.60	3.81	36.28
1990	3.99	2.18	1.84	1.16	3.23	1.38	2.13	2.89	6.55	4.21	2.06	5.96	37.58
Record Mean	2.76	2.56	2.04	1.84	2.28	2.16	2.35	3.59	4.11	4.48	4.34	3.37	35.89

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AVERAGE TEMPERATURE (deg. F)

COLD BAY, ALASKA

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
#1961	31.0	23.3	25.1	33.1	41.4	45.2	49.6	50.5	48.0	38.8	35.5	26.3	37.3
1962	22.7	33.2	31.2	31.9	38.2	44.6	51.4	52.1	46.8	39.6	35.8	29.3	38.1
1963	34.1	29.1	34.4	32.9	40.8	45.9	50.6	50.6	48.5	38.1	28.4	31.8	38.8
1964	30.0	26.2	29.3	32.7	38.1	46.4	47.8	48.6	47.1	39.7	32.9	30.3	37.4
1965	27.3	24.7	35.6	35.2	36.3	44.4	48.7	50.3	48.9	36.7	36.0	28.5	37.7
1966	32.8	31.7	21.4	34.4	37.4	44.2	48.6	49.1	44.6	33.9	32.3	27.7	36.5
1967	25.5	28.5	34.5	38.2	41.5	46.8	52.9	51.3	46.3	38.2	38.0	30.4	39.5
1968	29.3	24.0	30.4	34.2	42.7	45.4	52.9	52.0	46.8	38.9	36.0	30.9	38.6
1969	31.8	28.0	32.5	34.5	41.7	46.9	53.2	53.4	50.2	42.9	33.5	31.3	40.0
1970	22.4	28.1	31.8	31.8	40.8	47.8	51.3	50.2	46.9	40.0	37.6	30.5	38.3
1971	22.1	26.0	20.2	28.0	34.3	40.5	47.8	48.5	44.5	38.7	32.4	32.4	34.6
1972	27.2	21.4	16.3	29.5	38.6	41.6	48.6	50.0	47.9	39.8	34.3	30.4	35.5
1973	22.9	30.6	29.0	31.5	36.0	42.5	47.5	50.0	46.4	38.5	37.5	30.1	36.9
1974	29.7	19.0	28.9	32.2	41.4	45.8	49.9	53.2	49.2	40.4	34.2	27.5	37.6
1975	24.4	23.7	26.8	32.0	38.4	46.2	50.5	52.5	46.4	39.3	30.1	27.9	36.5
1976	25.5	23.9	22.0	27.2	36.6	44.6	49.7	50.8	45.3	39.1	30.5	28.2	35.3
1977	35.3	33.5	30.7	31.3	39.3	49.6	54.0	53.6	50.1	38.9	31.2	29.4	39.8
1978	33.4	28.4	30.8	37.9	40.5	47.0	49.6	54.3	48.8	40.1	38.1	35.2	40.3
1979	35.1	28.4	35.4	40.8	43.4	50.6	52.3	51.9	49.0	41.9	35.0	26.7	40.9
1980	23.5	25.4	33.7	35.6	41.4	45.9	52.9	51.5	48.1	40.3	36.4	32.1	38.9
1981	30.9	29.4	35.9	38.4	44.8	47.6	52.9	52.2	48.1	40.8	33.8	30.7	40.5
1982	29.8	27.1	33.9	32.1	38.0	45.0	46.8	50.2	45.1	37.5	35.3	30.5	37.6
1983	24.6	31.5	33.5	36.8	41.7	48.4	51.6	52.2	47.3	39.7	34.6	37.5	40.0
1984	31.2	18.7	33.7	31.6	38.0	47.0	49.7	54.7	49.7	40.8	37.0	37.3	39.1
1985	36.1	27.9	30.1	26.8	38.3	42.5	50.6	50.8	49.5	39.6	38.9	35.6	38.9
1986	24.4	28.4	27.0	32.2	38.0	44.7	51.7	51.2	49.8	42.2	37.0	34.4	38.4
1987	30.5	31.2	33.6	34.2	38.8	44.5	50.9	52.8	46.9	41.0	30.0	28.3	38.6
1988	31.2	30.2	26.1	31.1	40.3	46.0	51.0	51.1	46.9	40.5	32.5	30.9	38.2
1989	22.3	35.0	31.5	34.3	40.6	46.0	50.9	53.3	49.8	42.3	32.1	31.3	39.1
1990	30.4	26.3	32.1	36.4	41.4	46.9	50.1	52.2	47.6	40.3	34.6	36.4	39.6
Record Mean	26.4	27.9	29.3	33.0	39.5	45.4	50.1	51.4	47.4	39.8	34.3	30.3	38.0
Max	32.9	32.5	34.1	37.6	44.3	50.0	54.5	55.6	51.8	44.4	38.7	34.6	42.6
Min	23.9	23.2	24.4	28.3	34.7	40.8	45.7	47.2	42.9	35.1	29.9	25.9	33.5

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HEATING DEGREE DAYS Base 65 deg. F — COLD BAY, ALASKA

SEASON	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TOTAL
1961-62	470	442	501	806	877	1192	1301	882	1042	987	821	606	9930
1962-63	418	392	536	780	868	1103	949	997	940	955	745	565	9248
1963-64	439	436	488	823	1090	1022	1081	1118	1101	961	830	550	9939
1964-65	522	501	529	778	957	1068	1162	1121	907	886	884	608	9923
1965-66	497	450	477	871	864	1126	991	924	1346	914	850	616	9926
1966-67	500	486	607	956	977	1153	1185	1017	936	798	717	540	9872
1967-68	369	417	555	820	804	1064	1133	1183	1067	917	682	577	9591
1968-69	368	394	538	804	865	1053	1225	1028	999	907	714	537	9232
1969-70	361	353	436	680	939	1039	1311	1025	1024	987	745	512	9412
1970-71	416	452	538	766	815	1059	1323	1086	1381	1103	945	728	10612
1971-72	527	504	608	809	973	1004	1165	1260	1503	1056	814	697	10920
1972-73	500	457	505	774	915	1065	1295	960	1105	998	895	668	10137
1973-74	537	459	549	815	817	1076	1089	1281	1113	977	725	569	10007
1974-75	460	360	466	756	917	1157	1252	1149	1176	984	816	557	10050
1975-76	443	380	553	790	1038	1145	1217	1184	1324	1125	877	603	10679
1976-77	463	434	585	797	1029	1134	914	874	1057	1006	789	456	9538
1977-78	334	344	441	805	1006	1095	972	1017	1053	808	750	535	9160
1978-79	471	325	481	766	799	917	921	1020	910	720	661	425	8416
1979-80	387	400	474	712	893	1179	1279	1143	964	876	726	569	9602
1980-81	368	414	499	757	851	1014	1051	990	898	791	621	512	8766
1981-82	368	390	500	742	929	1058	1083	1056	956	980	828	592	9482
1982-83	559	451	590	848	884	1062	1246	934	969	838	718	493	9592
1983-84	408	388	523	779	907	847	1045	1338	967	995	834	533	9564
1984-85	467	310	452	744	834	854	889	1033	1075	1140	821	669	9288
1985-86	440	434	455	779	775	905	1251	1018	1173	976	832	605	9643
1986-87	406	423	448	699	834	939	1063	943	965	916	806	607	9049
1987-88	431	373	538	737	1042	1131	1043	1003	1203	1014	754	565	9834
1988-89	427	423	537	755	970	1050	1318	834	1034	917	751	564	9580
1989-90	432	353	447	695	978	1037	1063	1077	1010	853	727	535	9207
1990-91	455	390	516	757	905	879							

See Reference Notes on Page 6B.
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COOLING DEGREE DAYS Base 65 deg. F — COLD BAY, ALASKA

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL
1969	C	0	0	0	0	C	0	0	0	0	0	0	0
1970	C	0	0	0	0	0	0	1	0	0	0	0	1
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	C	0	0	0	0	0	0	0	0	0	0	0	0
1974	C	0	0	0	0	0	0	0	0	0	0	0	0
1975	C	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	C	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	C	0	0	0	0	0	0	0	0	0	0	0	0
1982	C	0	0	0	0	0	0	0	0	0	0	0	0
1983	C	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0

See Reference Notes on Page 6B.
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SNOWFALL (inches)

COLD BAY, ALASKA

SEASON	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	TOTAL
1961-62	0.0	0.0	T	0.7	3.5	4.9	3.1	3.6	4.6	2.9	0.1	0.1	23.5
1962-63	0.0	0.0	0.0	4.3	2.1	6.7	0.9	1.6	2.8	3.8	0.9	0.0	23.1
1963-64	0.0	0.0	0.0	4.2	4.6	0.5	6.1	8.3	7.3	1.1	1.2	0.0	33.3
1964-65	0.0	0.0	0.0	3.4	16.2	9.1	16.4	23.4	1.6	3.2	5.3	0.0	78.6
1965-66	0.0	0.0	0.1	7.7	9.7	9.7	9.3	8.8	14.0	1.4	0.7	0.0	61.4
1966-67	0.0	0.0	0.0	10.7	6.0	12.8	11.4	15.4	4.5	1.0	0.0	0.0	61.8
1967-68	0.0	0.0	T	4.5	4.8	12.2	6.8	10.3	7.8	5.1	2.1	0.0	53.6
1968-69	0.0	0.0	T	15.6	6.7	7.8	10.1	21.0	13.4	6.2	4.8	0.0	85.6
1969-70	0.0	0.0	0.0	2.2	4.5	7.2	9.4	8.6	10.6	6.8	6.8	0.0	56.1
1970-71	0.0	0.0	0.0	1.0	3.3	8.8	19.9	10.5	3.9	6.1	9.3	0.5	63.3
1971-72	0.0	0.0	0.0	T	2.1	9.3	15.6	9.8	4.2	9.9	1.4	T	52.3
1972-73	0.0	0.0	0.2	T	4.0	14.6	10.6	11.5	9.8	10.1	3.5	T	64.3
1973-74	0.0	0.0	T	3.9	2.4	13.0	6.5	17.1	5.9	4.5	1.8	0.0	55.1
1974-75	0.0	0.0	0.0	0.4	10.8	11.7	6.2	13.5	20.5	8.6	2.5	0.0	74.2
1975-76	0.0	0.0	0.0	3.7	12.3	20.4	16.2	16.9	13.9	19.5	0.8	0.0	103.7
1976-77	T	0.0	0.0	6.9	10.4	24.2	4.8	7.5	27.0	7.1	3.6	0.0	91.5
1977-78	0.0	0.0	0.0	9.4	15.0	4.8	14.4	13.9	16.4	3.5	0.1	0.0	77.5
1978-79	0.0	0.0	T	6.4	2.7	9.7	12.4	4.4	11.5	2.1	0.3	0.0	49.5
1979-80	0.0	0.0	T	0.3	15.2	10.5	14.1	11.1	23.7	13.6	1.1	0.0	89.6
1980-81	0.0	0.0	T	2.2	7.6	9.6	10.4	12.0	11.8	2.1	1.4	0.0	57.1
1981-82	0.0	0.0	T	5.5	13.2	14.0	34.6	5.8	15.7	5.6	1.0	0.0	95.4
1982-83	0.0	0.0	T	0.4	3.0	17.6	14.2	10.7	9.1	5.7	-	0.0	61.0
1983-84	0.0	0.0	T	4.0	27.4	2.6	14.3	54.3	4.3	7.6	1.4	0.0	115.9
1984-85	0.0	0.0	0.0	5.3	10.6	6.9	4.2	8.2	28.6	8.8	1.5	0.4	74.5
1985-86	0.0	0.0	T	2.8	1.1	12.1	24.2	11.3	6.1	5.3	6.2	0.0	69.1
1986-87	0.0	0.0	0.0	T	7.6	7.2	12.4	10.5	20.3	7.6	1.0	T	66.6
1987-88	0.0	0.0	0.1	0.7	8.1	14.3	11.0	5.9	7.5	11.6	0.1	0.0	59.3
1988-89	0.0	0.0	0.0	0.3	15.2	22.1	11.2	13.7	3.1	10.4	0.3	0.0	76.3
1989-90	0.0	0.0	0.0	0.1	14.0	6.9	16.4	18.7	8.8	3.9	0.5	0.0	69.4
1990-91	0.0	0.0	T	4.7	10.6	6.3							
Record Mean	T	0.0	T	3.0	7.8	10.0	10.8	11.6	10.6	6.2	1.8	T	61.9

See Reference Notes on Page 6B.

REFERENCE NOTES

COLD BAY, ALASKA

GENERAL
T - TRACE AMOUNT
BLANK ENTRIES DENOTE MISSING/UNREPORTED DATA.
# INDICATES A STATION OR INSTRUMENT RELOCATION.
SEE STATION LOCATION TABLE ON PAGE 8.

SPECIFIC
PAGE 2
PM - INCLUDES LAST DAY OF PREVIOUS MONTH

PAGE 3
( ) - LENGTH OF RECORD IN YEARS, ALTHOUGH INDIVIDUAL MONTHS MAY BE MISSING.
0.0 OR 0 - THE VALUE IS BETWEEN 0.0 AND 0.05
NORMALS - BASED ON THE 1951-1980 RECORD PERIOD.
EXTREMES - DATES ARE THE MOST RECENT OCCURRENCE
WIND DIR. - NUMERALS SHOW TENS OF DEGREES CLOCKWISE FROM TRUE NORTH. '00' INDICATES CALM.
RESULTANT DIRECTIONS ARE GIVEN TO WHOLE DEGREES.

PAGE 4B
MAX AND MIN ARE LONG TERM MEAN DAILY MAXIMUM AND MEAN DAILY MINIMUM TEMPERATURES.

EXCEPTIONS

PAGES 4A, 4B, 6A
RECORD MEANS ARE THROUGH THE CURRENT YEAR, BEGINNING IN 1943 FOR TEMPERATURE
1943 FOR PRECIPITATION
1951 FOR SNOWFALL

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COLD BAY, ALASKA

The station at Cold Bay is located approximately 30 miles from the end of the Alaskan Peninsula on the northwest side of Cold Bay. Ten miles south-southwest of the station, Frosty Peak rises to an elevation of 6,700 feet. Across the bay to the east several mountains rise to elevations in excess of 5,000 feet. The mountains to the east and southwest provide a sheltering effect from winds and precipitation approaching from these directions. Winds reaching the station from southwesterly or easterly directions rarely exceed 25 mph. The open bay area to the south-southeastward tends to provide a funneling effect upon all winds approaching the Cold Bay area from the southwest to the southeast. From west to the northeast the land is relatively flat with numerous lakes and swamps. Winds from northerly directions are influenced very little by this flat terrain.

The high frequency of cyclonic storms crossing the Northern Pacific and the Bering Sea are the dominant factors in the weather at Cold Bay. These storms account for the high winds and the frequent occurrences of low ceilings and low visibilities encountered at this station. The winds generally result from the strong pressure gradient developing between the Pacific High and the cyclonic storms in the Northern Pacific and Bering Sea.

The climate at Cold Bay is basically maritime, due to the nearness to extensive open ocean areas, and temperature extremes, both seasonal and diurnal, are generally confined to fairly narrow limits. Differences between maximum and minimum temperatures for all individual months average less than 10 degrees. Although it is practically impossible for cold, continental air masses to reach the Cold Bay area by moving overland along the somewhat narrow Alaskan Peninsula, air overlying the frozen ocean surface of the Bering Sea may take on continental characteristics and bring rather cold temperatures to the area. Although below-zero readings have been recorded from December to March, inclusive, below-zero readings are infrequent.

Due to the moderating effects of nearby ocean areas, it is difficult to define the seasonal periods at Cold Bay. The beginning of spring is late. The vegetation does not begin to grow until late May or early June. August is regarded as the midsummer period and autumn arrives in early October. The greatest frequency of fog usually comes in the summer season, with the foggy period extending from mid-July to mid-September. During the winter months visibilities are frequently restricted due to blowing snow. Precipitation is frequent but not abundant. The shortest day of the year at Cold Bay has 7 hours and 7 minutes of possible sunshine, the longest day has 17 hours and 27 minutes of possible sunshine.

STATION LOCATION

COLD BAY, ALASKA

LOCATION	OCCUPIED FROM	OCCUPIED TO	AIRLINE DISTANCES AND DIRECTIONS FROM PREVIOUS LOCATION	LATITUDE NORTH	LONGITUDE WEST	ELEVATION ABOVE SEA LEVEL GROUND TEMPERATURE SITE	ELEVATION ABOVE GROUND WIND INSTRUMENTS	EXTREME THERMOMETERS	PSYCHROMETER	SUNSHINE SWITCH	TIPPING BUCKET RAIN GAGE	WEIGHING RAIN GAGE	8 INCH RAIN GAGE	HYGROTHERMOGRAPH	AUTOMATIC OBSERVING EQUIPMENT *	REMARKS
Fort Randall	2/17/42	4/1/48	NA	55° 12'	162°43'	98										Change of name
Thorrborough Air Force Base	4/1/48	10/30/53	No Change	55° 12'	162°43'	98										
1:2 Headquarters Bldg. Air Force Base	10/30/53	6/30/54	0.25 mi.NE	55° 12'	162°43'	85										
Northwest Airlines Radio Building	7/1/54	8/4/55	0.25 mi.SW	55° 12'	162°43'	98	20	5	5				3			
Cold Bay Airport	8/4/55	4/21/61	0.25 mi. N	55° 12'	162°43'	90	28 a 88	6	6				4			WB station established. a - Anemometer raised, wind vane at 35' effective 3/6/56.
IFSS Building #400 Cold Bay Airport	4/21/61	Present	2000 ft. SSE	55° 12'	162°43'	94 b 84 196	85 c 21	6 86 g	6 86 h Unk	NA	NA	4 d 75	4 e 84 14	NA e 84 14	NA	b - Instrument shelter moved 106' N to lower ground 9/1/62. c - Moved to runway intersection 11/13/62. d - Minor relocation 11/18/62. e - Commissioned 515' SW of thermometer site 8/9/83. f - Effective 8/9/63. g - Removed 8/8/77. h - Effective 8/8/77. i - Moved 231' S 5/10/83. j - Type change 10/2/85.

* Type
M = AMOS
I = AUTOB
S = ASOS
W = AWOS

SUBSCRIPTION:
Price and ordering information available through: National Climatic Data Center, Federal Building, Asheville, North Carolina 28801

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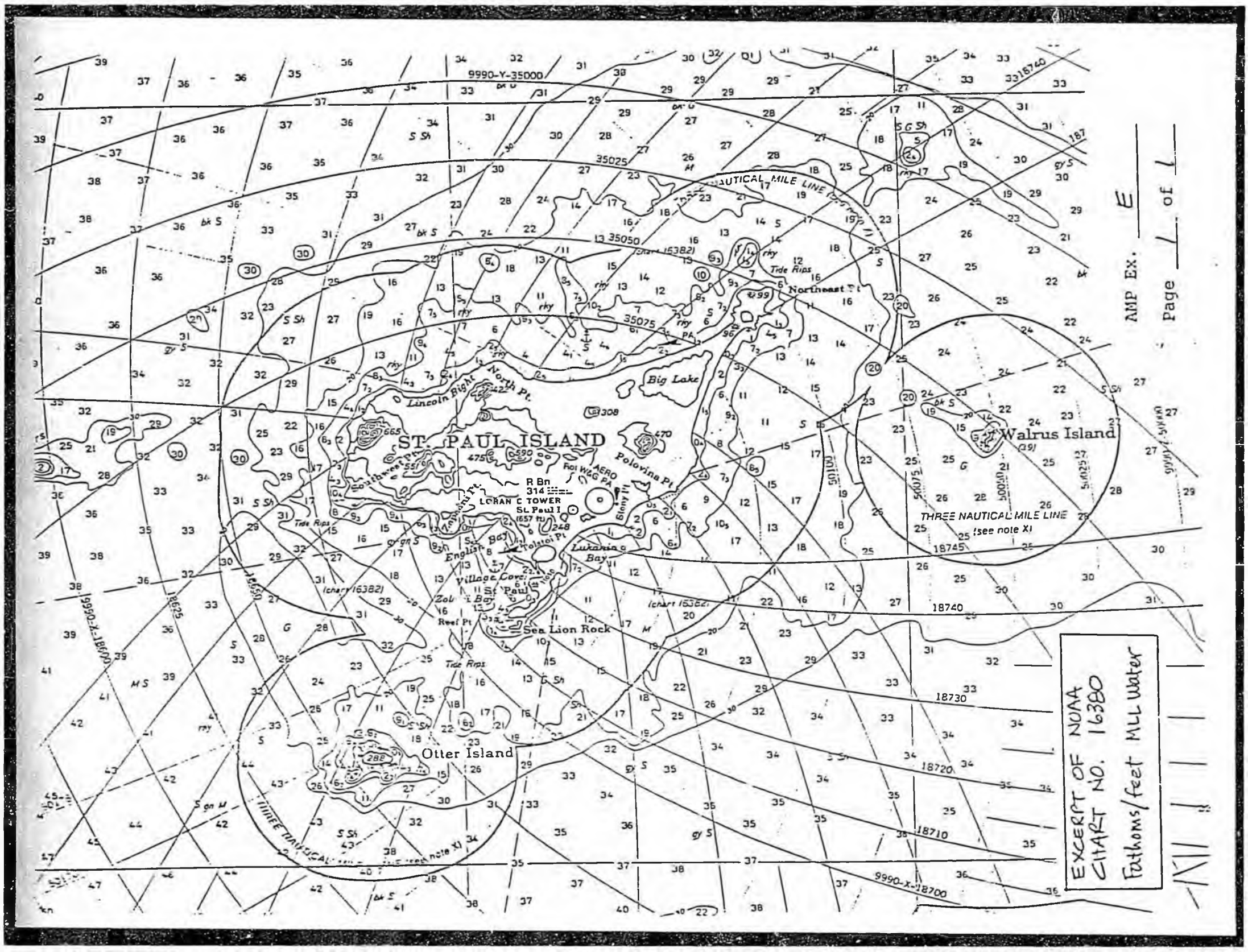
ST. PAUL ISLAND
Walrus Island
Otter Island
Big Lake
Lincoln Right
North Pt.
Southwest Pt.
Polovina Pt.
Tolstoi Pt.
English Bay
Village Cove
St. Paul
Zoltoi Bay
Reef Pt.
Sea Lion Rock
Lukania Bay
Northeast Pt.
Tide Rips
R Bn
314
LORAN C TOWER
St. Paul
(657 ft)
AERO
Fl(2) W&G 20 sec
THREE NAUTICAL MILE LINE
(see note XI)
9990-Y-35000
35025
35050
35075
9990-X-18700
18625
18740
18745
18730
18720
18710
(chart 16382)
EXCERPT OF NOAA CHART NO. 16380
Fathoms/feet MLL Water
AMP Ex. E
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