

Diagram No. 8551-4

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY

## DESCRIPTIVE REPORT

Type of Survey ... Field Examination .....  
Field No. .... DA-10-3-82 .....  
Office No. .... FE-252 .....

### LOCALITY

State ..... Alaska .....  
General Locality ... Orca Inlet .....  
Locality ..... Cordova Small Boat Harbor .....

1983

CHIEF OF PARTY  
CDR J.M. Wintermyre

### LIBRARY & ARCHIVES

DATE ..... May 14, 1984 .....

FE-252

AREA 6

CHTS:

16709

16710

16700 NC

} to sign off see  
Record of Application



**HYDROGRAPHIC TITLE SHEET**

FE-252

**INSTRUCTIONS** - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

DA-10-3-82

State Alaska

General locality Orca Inlet

Locality Cordova Small Boat Harbor

Scale 1:2,500

Date of survey June 19 - July 18, 1983

Instructions dated February 19, 1982

Project No. OPR-P132-DA-82

Vessel Launch 3131, 3132

Chief of party CDR J. M. Wintermyre

Surveyed by ENS. E. Hawk; ENS J. Waddell

Soundings taken by echo sounder, hand lead, pole Ross Model 5000 Fathometer and Leadline

Graphic record scaled by Ship's personnel

Graphic record checked by Ship's personnel

Verified

~~XXXXXX~~ by I. A. Almacen

Automated plot by PMC Xynetics Plotter

Evaluated

~~XXXXXX~~ by G. E. Kay

Soundings in ~~fathoms~~ feet at ~~MLW~~ MLLW

REMARKS: Annotations in black were made during evaluation at the Pacific Marine

Center, Seattle, Washington - notes in red were appended during Examination in Rockville.

*✓ Aulois Hud 8/15/84*

*Appd to Std 5-16-84 Per*



PROGRESS SKETCH

OPR-PI32-DA-82

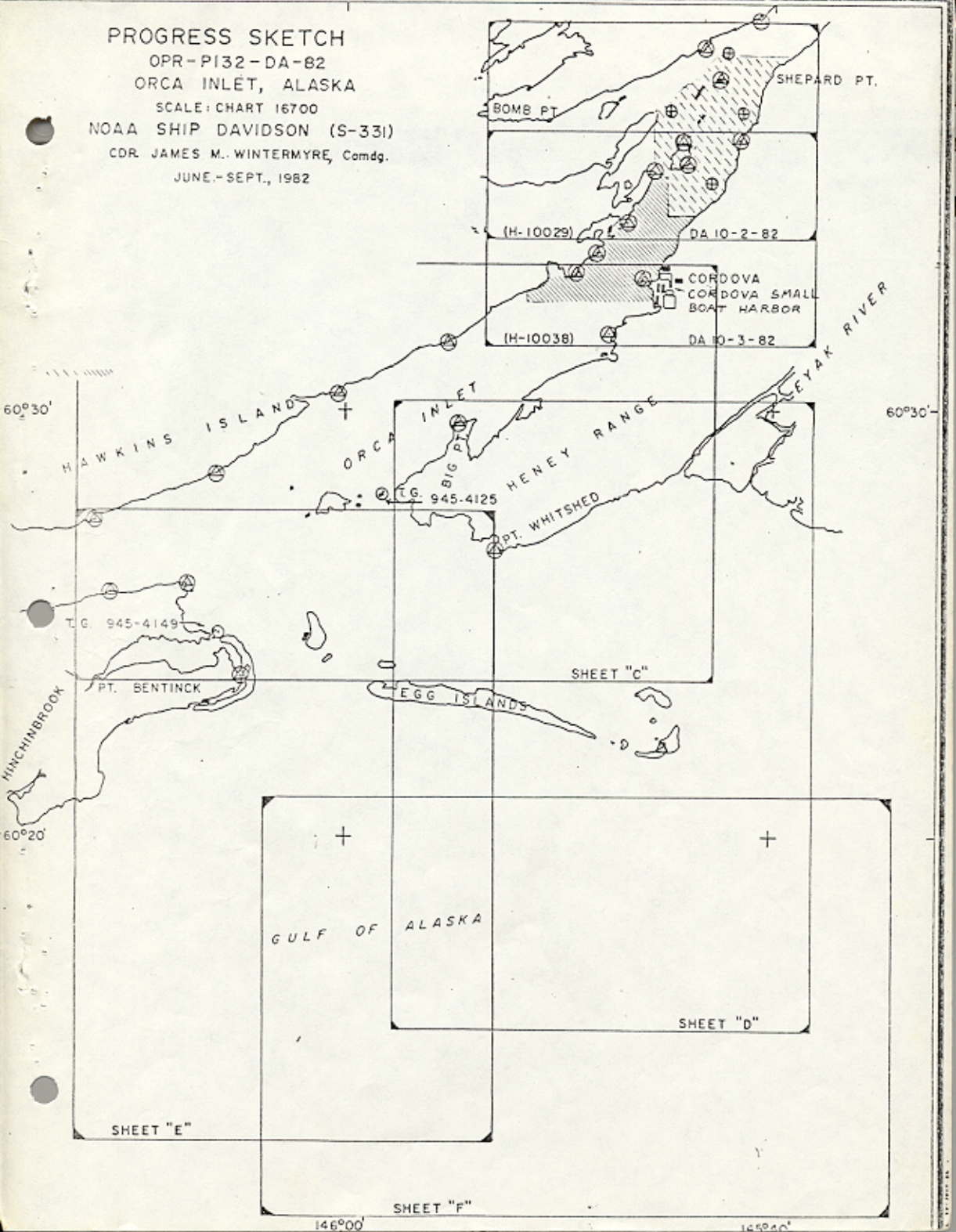
ORCA INLET, ALASKA

SCALE: CHART 16700

NOAA SHIP DAVIDSON (S-331)

CDR. JAMES M. WINTERMYRE, Comdg.

JUNE-SEPT., 1982





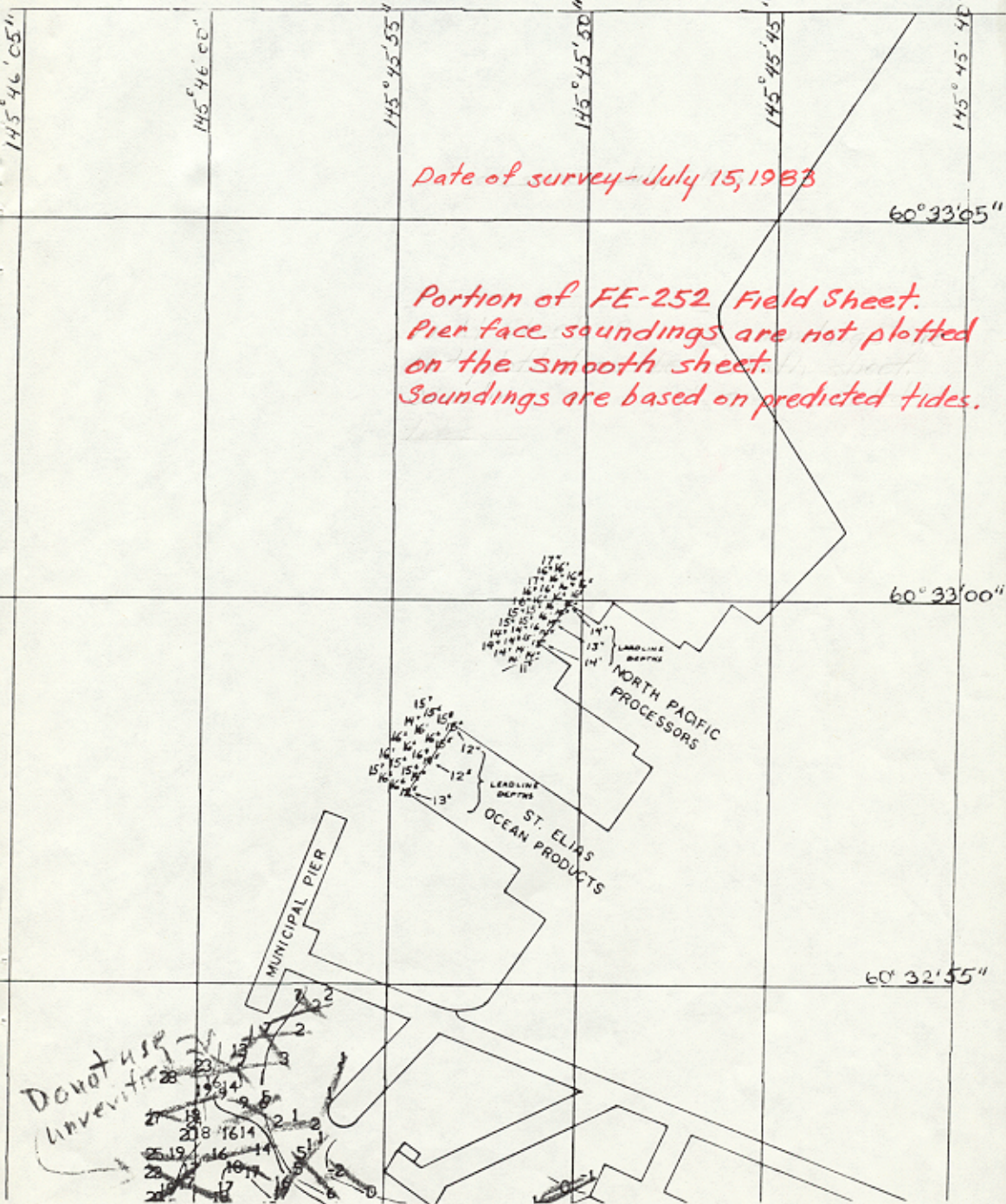
FE-252 Field Sheet  
DA-10-3-82 (H-10038)

COPY OF  
CHART LETTER  
656 (1985)

ENLARGEMENT SCALE 1:2,000  
SOUNDINGS IN FEET

Date of survey - July 15, 1983

Portion of FE-252 Field Sheet.  
Pier face soundings are not plotted  
on the smooth sheet.  
Soundings are based on predicted tides.





ADDENDUM TO H-10038 (FE-252)  
SURVEY OF CORDOVA SMALL BOAT HARBOR

A. PROJECT

The survey of the Cordova Small Boat Harbor was completed during OPR-P132-DA-83 as a supplement to H-10038 (DA-10-3-82). Project instructions in effect for Small Boat Harbor operations were those dated February 19, 1982 under operation number OPR-P132-DA-82. The purpose of this survey was to determine post-dredging depths, bottom topography and existing hazards to navigation. ✓

B. AREA SURVEYED

Survey coverage included the Cordova Small Boat Harbor, and areas along the St. Elias Ocean Products and North Pacific Processors pier faces. The St. Elias Ocean Products and North Pacific Processors piers were resurveyed due to dredging operations conducted by the Army Corps of Engineers during which a discharge pipe from the dredge broke in front of the pier heads. Dates on which survey operations in this area were conducted are as follow: 19 June 1983 (JD 170), 24 June 1983 (JD 175), 15 July 1983 (JD 196), and 18 July 1983 (JD 199). ✓

C. SOUNDING VESSELS

DAVIDSON launches DA-1 (3131) and DA-2 (3132) participated in the survey of the Cordova Small Boat Harbor. Range azimuth hydrography was employed with the aid of a flagged two-by-two mounted against the R/T unit to aid in vessel positioning amidst the harbor craft. Care was taken not to encroach within the 100 meter minimum acceptable Mini-Ranger range. System calibration, horizontal control, and position control accuracy were based on a scale of 1:10,000 but plotted at a scale of 1:2,000 for legibility. ✓

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

For information concerning sounding equipment and problems as well as corrections to echo soundings, refer to the appended Corrections to Echo Soundings Report for H-10090. Sounding data in this area were gathered and plotted in feet. ✓

E. HYDROGRAPHIC SHEETS

FE-252

The Final Field Sheet and all field plots were rendered on a 1:2,000 scale enlargement of DA-10-3-82 (H-10038) in the area of the Cordova Small Boat Harbor. Sounding overprints were omitted on the final field sheet by using the manual override control of the complot pen for legibility. (Smooth Sheet plot is 1:2,500) ✓



F. CONTROL STATIONS

Reference should be made to the appended Horizontal Control Report for H-10090 for information regarding control stations and survey methods used to locate horizontal positions in the Cordova Small Boat Harbor area. ✓

G. HYDROGRAPHIC POSITION CONTROL

A Motorola Mini-Ranger III system was used in accomplishment of range-azimuth hydrography. Equipment serial numbers, electronic correctors, and shore station information are contained in the appended Electronic Control Report for H-10090. ✓

The cannery pier faces were completed by running dead reckoning lines along the face as well as 5, 10, and 15 meters off-shore (see Cordova Small Boat Harbor Sounding Volume). *Not plotted on EE-252 smooth sheet. Portion of field sheet that contains pier face sdgs is inserted in this report as CL-656(1985).* ✓

H. SHORELINE

Features and detail of the Cordova Small Boat Harbor were scaled and placed on the 1:2,000 enlargement from the 1:10,000 scale, BP Number 118507. The encompassing breakwater was depicted by applying a scaled width to control points. When conflict occurred between pier and sounding positions, the pier's location jogged slightly to allow for clear presentation. Such a discrepancy is attributed to inherent scaling distortion. ✓

Detached position taken in the Cordova Small Boat Harbor consisted of three piles (Fix numbers 2146 - 2148) and three fixes locating existing seaward ends of floating docks (Fix numbers 2149 - 2151). At the time when DAVIDSON was departing from Cordova, Alaska, the extensions of the piers from Fix numbers 2149, 2150, and 2151 were being completed. The position of piers can be found on the Cordova Small Boat Harbor Expansion Blueprint. The Cordova Small Boat Harbor Master, Mr. Joe Graham, was contacted via telephone on 18 October 1983 to determine if the boat harbor was finished. He stated that the harbor was to be finished within the month. ✓

I. COMPARISON WITH PRIOR SURVEYS

Sounding data from the 1982 survey (OPR-P132-DA-82) in the entrance to the harbor were comparable to recently gathered data, whereas recent soundings along the St. Elias Ocean Products and North Pacific Processors Piers are <sup>1-3</sup> 2 feet deeper than last year's due to dredging activity. Recent survey information is more accurate and more complete than 1982 data and should supersede it and any prior survey data. *(H-10038) see H-10038 - see copy of CL-656(1985) in this report.* ✓

The Army Corps of Engineers Survey Field Sheet, appended to the data, was compared to DAVIDSON's harbor survey. Comparisons showed areas of good agreement along with areas of shoaler discrepancies. The deeper soundings of the DAVIDSON survey are a result of dredging clean-up. The Army Corps of Engineers dredged the shoals. ✓



and took additional soundings to ensure that the shoals had been removed. Their survey does not reflect the additional soundings. ✓

J. COMPARISON WITH THE CHART

The current edition of Chart 16710 which includes the Small Boat Harbor indicates that the harbor is under construction. Although pier construction was continuing during OPR-P132-DA-83, dredging activity had been completed. ✓

K. ADEQUACY OF SURVEY

The survey of the Cordova Small Boat Harbor was complete and adequate to sufficiently supercede prior surveys for nautical charting. No additional work is needed. ✓

L. AIDS TO NAVIGATION

A single fixed aid to navigation is located in the Cordova Small Boat Harbor. The Cordova Boat Harbor Light 2 (LL No. 3470) was located during OPR-P132-DA-82 (H-10038). Refer to the appended NOAA Form 76-40. ✓

M. STATISTICS

<u>VESSEL</u>	<u>NO. OF POSITIONS</u>	<u>SOUNDING LINES</u>	<u>SQUARE NM</u>
DA-1 (3131)	84 174	2.16	
DA-2 (3132)	192 65	5.33	
TOTAL	286 239	7.49	0.25

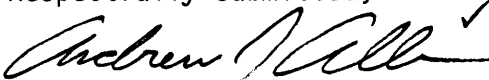
N. MISCELLANEOUS

Substantial cooperation was achieved with the Army Corps of Engineers concerning Small Boat Harbor particulars. Corps representative, Mark Gorman, provided the DAVIDSON with copies of harbor blueprints, Corps of Engineers survey sheets, aerial photos, and information regarding Corps activity in the harbor. ✓

Additional information concerning the construction of the harbor can be obtained from the appended Cordova Small Boat Harbor Expansion Blueprint and the Aerial Photograph Blueprint. ✓ ✓

*\* included with field examination raw records*

Respectfully submitted,



Andrew J. Allen  
ENS, NOAA

Approved and Forwarded,



James M. Wintermyre, CDR, NOAA  
Commanding Officer  
NOAA Ship DAVIDSON



OPR-P132-DA-82  
DA-10-3-82(H-10038)  
ENLARGEMENT PARAMETER TAPE  
PRINTOUT, SCALE 1:2,000

CORDOVA SMALL BOAT HARBOR SURVEY

FEST=24000  
CLAT=6572000  
CMER=145/55/00  
GRID=05  
PLSCL=2000  
PLAT=60/32/30  
PLON=145/45/25  
VESNO=3131  
YR=83  
ANDIST=00.0

SKEW: 90, 16, 23

✓



PREDICTED TIDES CORR. TAPE PRINTOUT

CORDOVA, ALASKA

CORDOVA (1649)

60 34 145 45 0.0 0.0 0.0 0.0 1.0 1.0

000

FT

0.1





OPR-P132-DA-82  
DA-10-3-82(H-10038)  
VELOCITY TAPE PRINTOUT

CORDOVA SMALL BOAT HARBOR SURVEY

VELOCITY TABLE 1:

000128 0 0000 0001 000 000000 010038 ✓  
000212 0 0002  
000350 0 0004

VELOCITY TABLE 2:

000105 0 0000 0002 000 000000 010038 ✓  
000175 0 0002  
000230 0 0004  
000306 0 0006  
000384 0 0008

VELOCITY TABLE 3:

000065 0 0000 0003 000 000000 010038 ✓  
000165 0 0002  
000175 0 0004  
000202 0 0006  
000255 0 0008  
000305 0 0010











RVAZ CORRECTOR ABSTRACT

VESSEL : 3131

SHEET : DA-10-3-82

TIME	DAY	PATTERN 1	PATTERN 2
183529	175	+000000	*NO CORRECTION
000300	176	+000000	*NO CORRECTION
235425	196	+000001	*NO CORRECTION
000119	197	+000001	*NO CORRECTION
220406	199	+000001	*NO CORRECTION
000013	200	+000001	*NO CORRECTION
000842	200	+000001	*NO CORRECTION
001731	200	+000001	*NO CORRECTION

R/AZ CORRECTOR ABSTRACT

VESSEL : 3132

SHEET : DA-10-3-82

TIME	DAY	PATTERN 1	PATTERN 2
200430	170	-000003	'NO CORRECTION



OPR-P132-DA-82  
DA-10-3-82(H-10038)  
SIGNAL TAPE PRINTOUT

CORDOVA SMALL BOAT HARBOR SURVEY

010	0	60	34	2072 <sup>48</sup>	145	46	475 <sup>30</sup>	139	0004	000000	GRASS 1899
012	1	60	35	4438 <sup>4</sup>	145	43	5900 <sup>17</sup>	139	0010	000000	NISBY 1899
014	0	60	33	0870 <sup>4</sup>	145	49	2052 <sup>0</sup>	139	0008	000000	STUMP 2 USGS 1952
017	0	60	33	3766 <sup>11</sup>	145	48	1648 <sup>11</sup>	139	0012	000000	ACROSS 1933
020	6	60	32	5889 <sup>37</sup>	145	45	3320 <sup>13</sup>	139	0000	000000	CORDOVA RCA TOWER, 1979
022	6	60	32	5067 <sup>31</sup>	145	45	5948 <sup>31</sup>	139	0004	000000	CORDOVA HARBOR LT 2, 1982
023	5	60	32	5018 <sup>07</sup>	145	45	5997 <sup>07</sup>	250	0003	000000	USCE (unstamped)
025	1	60	28	0340 <sup>9</sup>	145	57	2648 <sup>07</sup>	139	0000	000000	GRAVEL POINT NRT R MAST 1964
027	6	60	32	4413 <sup>67</sup>	145	46	0861 <sup>77</sup>	250	0003	000000	USCE 20, 1983
<del>028</del>	<del>6</del>	<del>60</del>	<del>32</del>	<del>34060</del>	<del>145</del>	<del>45</del>	<del>58660</del>	<del>252</del>	<del>0003</del>	<del>000000</del>	<del>USCE 19</del>

ABSTRACT OF POSITIONS  
 DA-10-3-82 (H-10038)  
 CORDOVA SMALL BOAT HARBOR SURVEY

LAUNCH DA-1 (3131)

DAY	POSITIONS	CONTROL			REMARKS
		CODE	S1	M	
175	2001-2003	112	023	- - - -	R/A Hydro
175	2006-2011	112	023	- - - -	R/A Hydro
175	2013-2015	112	023	- - - -	R/A Hydro
175	2021-2027	112	023	- - - -	R/A Hydro
175	2029-2031	112	023	- - - -	R/A Hydro
175	2032-2033	112	027	- - - -	R/A Hydro
175	2035-2038	112	027	- - - -	R/A Hydro
175	2040-2056	112	027	- - - -	R/A Hydro
175	2058-2062	112	027	- - - -	R/A Hydro
175	2065-2071	112	027	- - - -	R/A Hydro
175	2074-2084	112	027	- - - -	R/A Hydro
175	2094-2096	112	027	- - - -	R/A Hydro
176	2097-2099	112	027	- - - -	R/A Hydro
176	2103-2105	112	027	- - - -	R/A Hydro
196	2115-2138	---	-----	-----	DR Hydro
196	2188-2191	112	027	- - - -	R/A Hydro
197	2192-2215	112	027	- - - -	R/A Hydro
197	2217-2226	112	027	- - - -	R/A Hydro
197	2231-2233	112	027	- - - -	R/A Hydro
197	2235-2238	112	027	- - - -	R/A Hydro
197	2240-2244	112	027	- - - -	R/A Hydro
199	2245-2248	112	023	- - - -	R/A Hydro
199	2250-2253	112	023	- - - -	R/A Hydro
199	2256-2260	112	023	- - - -	R/A Hydro
199	2285-2286	112	023	- - - -	R/A Hydro
199	2297-2309	112	023	- - - -	R/A Hydro
200	2310-2314	112	023	- - - -	R/A Hydro
200	2316-2323	112	023	- - - -	R/A D.P.'s



ABSTRACT OF POSITIONS  
 DA-10-3-82 (H-10038)  
 CORDOVA SMALL BOAT HARBOR SURVEY

LAUNCH DA-2 (3132)

<u>DAY</u>	<u>POSITIONS</u>	<u>CONTROL CODE</u>	<u>S1</u>	<u>M</u>	<u>S2</u>	<u>REMARKS</u>
170	4001-4003	112	023	- - - -	R/A	Hydro
170	4008-4014	112	023	- - - -	R/A	Hydro
170	4017-4038	112	023	- - - -	R/A	Hydro
170	4061-4073	112	023	- - - -	R/A	Hydro
170	4075-4094	112	023	- - - -	R/A	Hydro





FIELD TIDE NOTE  
OPR-P132-DA-83  
ORCA INLET, ALASKA

Predicted tides for Cordova, AK (Reference Station 945-4050) were used to reduce survey sounding data for OPR-P132-DA-83, the Basic Hydrographic Survey of Orca Inlet, to the Mean Lower Low Water (MLLW) chart datum.

ASCII and BINARY predicted tides tapes based on daily tidal predictions for Cordova were generated on the shipboard PDP8/e computer system using standard NOS software. Version 11/10/72 of AM500, "Predicted Tides Generator," was used to create paper tapes for field and processing use.

Height correction factors were applied to daily Cordova tidal predictions (times were applied direct on Cordova). Tide tapes incorporating the different height correction factors were applied to field sheets and final sounding plots in accordance with the zoning diagram outlined in the Project Instructions.

A correction factor of 0.94 was applied to Orca Inlet sounding data gathered on JD 159-182 and JD 205 for the area between one and six nautical miles SW of Spike Island. ✓

A factor of 0.90 was applied to soundings from the area between six and seventeen nautical miles SW of Spike Island, bordered on the north and south by Hawkins Island and Mummy Island, respectively. Hydrography in this area was run on JD 191-201.

A factor of 0.86 was applied to soundings from the area bordered by Mummy Island on the north, Egg Island on the south, and Point Whitshed and Cape Hinchinbrook on the east and west, respectively. Hydrography in this area was run on JD 191-193.

Soundings in the Cordova Small Boat Harbor and along pier faces at St. Elias Ocean Products and North Pacific Processors were obtained by lead line, dead reckoning, and range azimuth methods. Soundings were reduced to MLLW using predicted tides based direct on Cordova. Velocity corrections were applied to echo soundings in the Small Boat Harbor.

CORDOVA (945-4050)

The Cordova tide station was the primary reference station used to control sounding data in Orca Inlet. The tide station

is located in a small building on the SE corner of the Municipal (Ferry) Dock approximately 0.8 n.mi. north of the city of Cordova. A Leupold-Stevens (L&S) analog to digital recording (ADR) tide gage operated continuously during the survey. DAVIDSON personnel inspected the station on 10 June 1983 and found the backup gage (Metercraft gas-purged type, S/N 7603715164) inoperative. It was replaced the same day with Bristol gage S/N 71A21485. A 3-hour gage acceptance test was performed on the Bristol gage on 13 June 1983. DAVIDSON divers inspected and cleaned the floatwell, orifice, and staff on 16 June 1983 (see attachment 1). LT. A. Snella, Chief, Pacific Tides Party (PTP) inspected the station on 27 June 1983, repaired the Metercraft gage and replaced the Bristol gage with the former.

The Cordova tide station is maintained by a contract observer, Mr. Jim Cunningham (P.O. Box 1139, Cordova, AK, 99574).

Levels were run from the Cordova tide staff to six permanent bench marks, including the primary bench mark, before and after hydrography. Third-order Class I results agreed favorably with DAVIDSON and PTP historic levels. Elevation differences between bench marks determined during the open and closing level runs of 5 June 1983 and 25 July 1983, respectively, differed by 0.005 m or less. There was no evidence of staff or crustal movement. It is recommended that a new primary bench mark be designated. To level to the present primary mark (BM No. 9, 1964) it is necessary to set up on a shakey (and usually congested) pier. ✓

#### SHAG ROCK (945-4125)

The Shag Rock tide station was installed on 3 June 1983 to control hydrography in Orca Inlet south of Cordova and north of 60°23.5'N, as per Project Instructions. Shag Rock is located approximately 2.9 n.mi. WNW of Point Whithshed, 0.6 n.mi. ENE of Mummy Island Light, and 7.7 n.mi. SW of Cordova. The Shag Rock gage was mounted on a small rock step near the highest point of the rock, partially protected from the elements. The tide staff was mounted against the west side of the rock facing a heavily transited shallow channel into Orca Inlet. The staff was braced with lumber and guyed in place with wires secured to eyebolts set in bedrock.

The first gage installed at the site (S/N 67A16205) on 3 June 1983 failed to pass the acceptance test (5 June 1983). Oil was subsequently discovered in the constant pressure regulator. Replacement gage S/N 68A14940, installed on 6 June 1983, provided continuous good data through the remainder of the survey period. The gage required only infrequent time adjustments. On the basis of 26 staff to gage comparisons throughout the survey period including a mean value for the



3-hour gage acceptance test (7 June 1983), a marigram reading of 6.5 feet  $\pm$  0.1 (standard deviation) corresponds to a staff value of 0.0 feet.

Third-order Class I levels run before and after hydrography, on 3 June 1983 and 25 July 1983, respectively, were in excellent agreement with historic values. Elevation differences determined between bench marks on opening and closing level runs agreed exactly. There was no indication of staff or crustal movement.

The orifice for the Shag Rock gage was secured to the top of a 4.5 foot length of  $\frac{1}{2}$ -inch iron rod driven about three feet into the sandy channel bottom. This was done to prevent the orifice from being covered by shifting sands. There was no evidence of the latter or of orifice movement. However, an unexplained anomaly was noted on the marigram between 0945-1430 UTC, 11 June 1983 (see Attachment 2). Staff-to-gage differences before and after the event are not significantly different, and gage performance appeared normal.

As per Change No. 3 to the Project Instructions, the requirement for leveling to five permanent bench marks was waived for the Shag Rock station in consideration of the small size of the rock and the close proximity of the existing bench marks. Accordingly, levels were run from the staff to the three historic marks and no additional marks were established. ✓

#### BOSWELL ROCK (945-4149)

A tide station was established at Boswell Rock to control hydrography in Orca Inlet south of 60°28.0'N as per Project Instructions. Boswell Rock is located approximately 6.8 n.mi. WSW of Point Whitshed, 4.5 n.mi. SW of Mummy Island Light, and 1.5 n.mi. NW of Point Bentinck on the west side of the entrance to Boswell Bay. The staff was installed on the SE tip of the island, mounted on a large and stable round-top boulder and guyed in place with wire secured to eyebolts set in the rock. The orifice was placed in the channel south of Boswell Rock, secured to a 15-lb. concrete anchor. The gage was set in the approximate center of the island, about ten feet above the Mean High Water (MHW) line and was well protected from the elements by a rock wall and boulders on three sides.

Gage S/N 68A14940 was installed on Boswell Rock on 4 June 1983. It was removed and reinstalled at Shag Rock on 6 June 1983 where it operated satisfactorily through the remainder of the survey. The Boswell replacement gage S/N 64A11033 passed a 3-hour acceptance test on 8 June 1983. This gage had previously been installed at Shag Rock, had malfunctioned and been repaired aboard ship (oil was found in the constant

pressure regulator). The gage operated satisfactorily through 13 June 1983. Based on 18 staff to gage comparisons, including three hours of comparisons at 12-minute intervals, a reading of 8.6 feet  $\pm$  0.1 corresponds to staff zero. On 13 June a shift in the staff to gage difference was noted. Five subsequent comparisons made between 13-18 June 1983 resulted in a mean value of 9.0 feet  $\pm$  0.1 equivalent to staff zero. The gage was replaced on the assumption it was malfunctioning. In reality, the orifice was probably disturbed by a fishing boat dragging anchor (see Attachment 3). Replacement gage S/N 64A11032 operated satisfactorily through completion of the survey with the exception that another abrupt shift in the mean staff to gage difference occurred on 9 July 1983. Based on 12 observations between 18 June-5 July 1983, a marigram value of 9.6 feet  $\pm$  0.05 corresponds to staff zero; based on 11 observations between 9 July-25 July 1983, a marigram value of 9.0 feet  $\pm$  0.1 feet corresponds to staff zero. The shift is attributed to a pen malfunction (see Attachment 4) as the gage appeared to function properly before and after the event. Another anomaly was noted on the Boswell Rock marigram (see Attachment 5). A curious rippling or undulating effect was observed, particularly at low tides, that persisted from 16 July 1983 (1900 UTC) to 18 July 1983 (0200 UTC). The effect was not seen before or after the stated times, and staff to gage differences before and after the event appeared normal. ✓

Time constraints and adverse sea conditions precluded diver inspection of the gage orifices immediately prior to their removal. The Shag Rock orifice was not located; divers following the orifice tubing back from the gage reported the weighted tubing was deeply buried under sand. High current and poor visibility caused a cessation of the orifice recovery effort; the tubing was cut and the orifice abandoned. At Boswell Rock, the orifice was simply lifted from the bottom by hauling up on the tubing from a boat. The orifice came free from the anchor while lifting it off the bottom (apparently the wires securing it to the anchor had rusted through). It is possible that the wires had previously rusted through and the orifice was swaying with the currents, causing the anomalous rippling effect on the marigram. It is recommended that in future hydrographic operations involving temporary tide gage installations, visual inspections of anchored orifices be made by divers prior to orifice removal. Additional diver inspections could be made throughout the survey if marigrams exhibited unusual or anomalous features.

Opening levels were run at Boswell Rock on 4 June 1983 between the staff and five permanent tidal bench marks established by DAVIDSON in 1982. Levels closed within Third-order Class I standards but did not agree with the previous year's closing elevation differences for the leg between bench marks 4149C

and 4149D. The discrepancy probably arises from compensating misreads during the 1982 season (observations over approximately 100 m of open water are necessary to tie bench mark 4149C to 4149D). Elevation differences for the C-D leg determined on three independent level runs (4 June, 18 June, 25 July) agreed within 0.002 m. Elevation differences between the remaining benchmarks on opening and closing level runs agreed within 0.004 m of each other and 1982 results. There was no evidence of staff or crustal movement.

The following table summarizes tide gage distribution during OPR-P132-DA-83:

<u>Site and Reference Station Number</u>	<u>Location</u>	<u>Gage S/N</u>	<u>Period of Operation</u>
Shag Rock (945-4125)	60°27.9'N 145°59.3'W	67A16205 64A11033 68A14940	3-6 June 1983 6 June 1983 6 June-25 July 1983
Boswell Rock (945-4149)	60°24.8'N 146°06.2'W	68A14940 64A11033 64A11032	4-6 June 1983 7-18 June 1983 18 June-25 July 1983

#### Gage Problems

The DAVIDSON carried to Alaska six Bristol bubbler-type tide recording gages from Pacific Marine Center; five had varying amounts of oil in their constant pressure regulator. PTP was informed and immediately sent four replacement gages. Three of the latter also had oil in their constant pressure regulator, though they had apparently been examined prior to shipment. The following gages were received from PTP in oil-damaged condition: 73A231, 68A9335, 67A16209, 64A11033, 67A16205, 67A10294, 67A10292, 64A11032. As per PTP suggestions, several of the gages were repaired aboard DAVIDSON for immediate and backup use; the remainder were returned to PTP on 21 June 1983.

All gages were operated by DAVIDSON personnel and annotated in Universal Coordinated Time (UTC) except the contract-observer maintained Cordova gages which were kept on Alaska Standard Time (AST).

When abstracting hourly heights of tides from the marigrams, time errors were distributed linearly throughout the period between observations.



As observed during the 1982 field season, the marigrams from Shag Rock and Boswell Rock exhibited a characteristic flattening at the lower portion of the tidal cycle (see Attachments 6 and 7). The effect was not noticeable at high water. The orifices at both sites were set in channels with relatively unrestricted tidal flow. Since the gages appeared to function properly, the flattening effect is probably real and a function of the morphology of the tidal basin. The effect is probably only significant at low water when the extensive mud flats largely expose with consequent restriction to narrow channels of the tidal flow into and out of the basin. The flattening effect is more pronounced the lower the stage of the tide. When greater than 7-8 feet of water covered the orifices, the effect was not noticeable. At higher tides the mud flats cover and the restrictive effects of channels on tidal flats are minimized, hence the upper portion of the tide curves appear normal.

The times of tidal extrema were compared for Shag Rock and Boswell Rock to determine if any differences existed. Thirty-three differences were taken between actual times of high and low tides at each station, from the scaled and abstracted hourly heights of tides (NOAA Form 77-29) for each station between 9 June-11 July 1983. The mean difference between 17 times of low tides at Shag Rock and Boswell Rock was  $3.4 \pm 7.2$  minutes, i.e. low tides at Boswell generally occur slightly earlier than at Shag. The mean difference between 16 times of high tides at Shag Rock and Boswell Rock was  $3.4 \pm 7.7$  minutes, i.e. high tides at Boswell generally occur slightly earlier than at Shag. The closer proximity of Boswell Rock to the Gulf of Alaska and relatively unimpeded tidal flow into Orca Inlet through Strawberry Channel may account for the slight time differences. ✓

Respectfully submitted,

*Michael E. Wheaton*

*Eric G. Hawk*  
Eric G. Hawk  
ENS, NOAA

Approved and forwarded,

*James M. Wintermyre*  
James M. Wintermyre, CDR,  
NOAA  
Commanding Officer  
NOAA Ship DAVIDSON



146° 10'

145° 50'

# TIDE GAGE LOCATION SKETCH

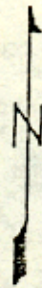
## OPR-PI32-DA-83

### ORCA INLET, ALASKA

SCALE: CHART 16700

NOAA SHIP DAVIDSON (S-331)

CDR. J.M. WINTERMYRE, Comdg.

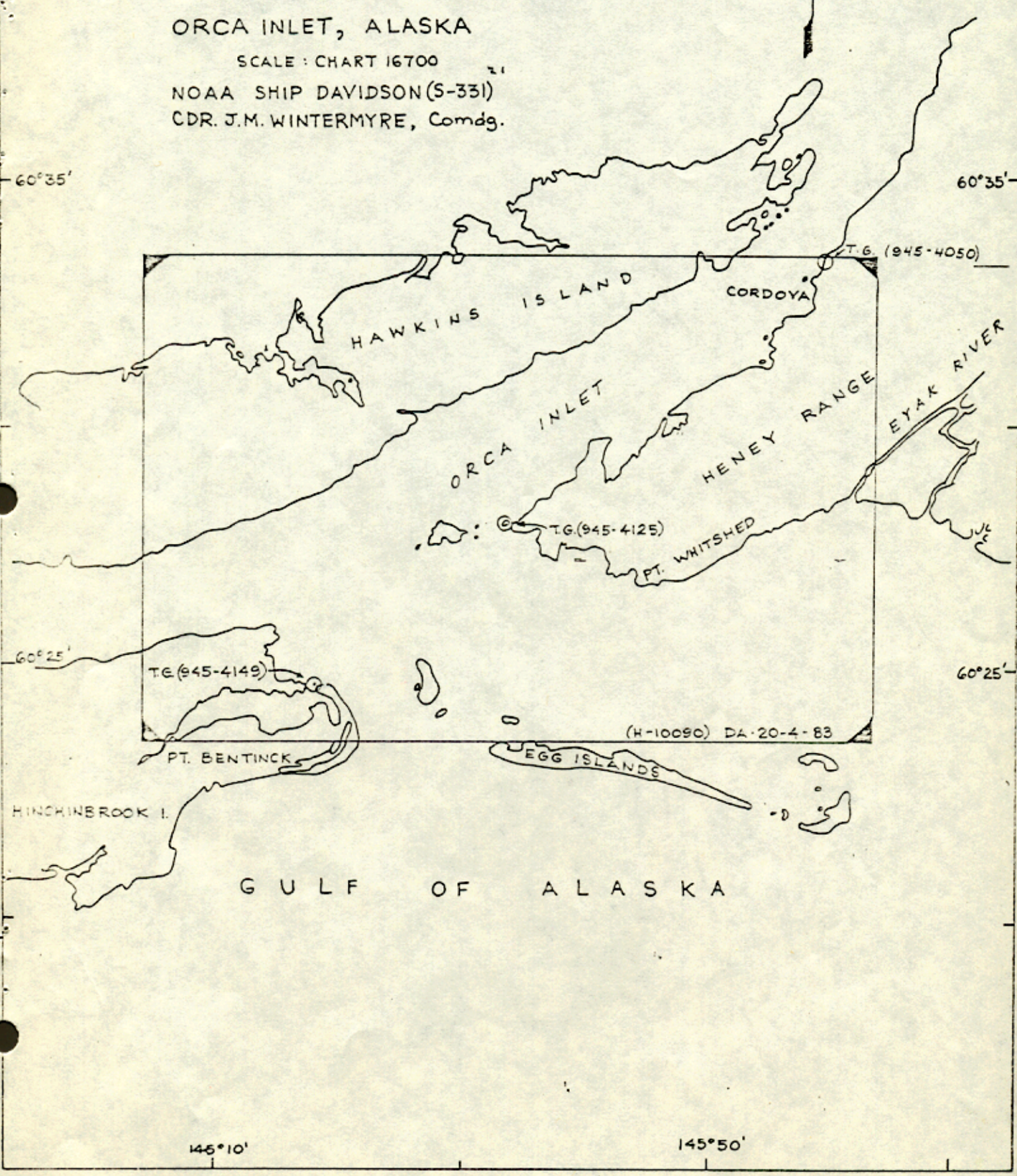


60° 35'

60° 35'

60° 25'

60° 25'



T.G. (945-4050)

HAWKINS ISLAND

CORDOYA

ORCA INLET

HENEY RANGE

EYAK RIVER

T.G. (945-4125)

PT. WHITSHED

T.G. (945-4149)

PT. BENTINCK

HINCHINBROOK I.

EGG ISLANDS

GULF OF ALASKA

(H-10090) DA-20-4-83

146° 10'

145° 50'



February 8, 1984

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SERVICE

TIDE NOTE FOR HYDROGRAPHIC SHEET

Marine Center: Pacific

OPR: P132

HYDROGRAPHIC SHEET: FE - 252, (addendum to H - 10038, (1982) )

Locality: Orca Inlet, Alaska

Time Period: June 19 - July 19, 1983

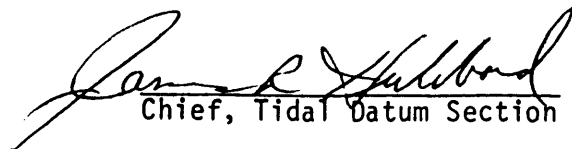
Tide Station Used: 945-4050, Cordova, Alaska

Plane Of Reference (Mean Lower Low Water): 5.95 Ft.

Height Of Mean High Water Above Plane Of Reference: 11.6 Ft.

Remarks: Recommended Zoning:

Zone Direct

  
Chief, Tidal Datum Section



GEOGRAPHIC NAMES

Name on Survey	Source of Name											
	A	B	C	D	E	F	G	H	K			
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	RAND McNALLY ATLAS	U.S. LIGHT LIST				
ALASKA (title)												1
CORDOVA												2
CORDOVA SMALL BOAT HARBOR												3
ORCA INLET												4
												5
												6
												7
												8
												9
												10
												11
												12
												13
												14
												15
												16
												17
												18
												19
												20
												21
												22
												23
												24
												25

Approved:

*Charles E. Harrington*  
Chief Geographer - N/CG2xp

27 March 1984

PACIFIC MARINE CENTER  
EVALUATION REPORT

REGISTRY NO: FE-252

FIELD NO: DA-10-3-82

Alaska, Orca Inlet, Cordova Small Boat Harbor

SURVEYED: June 19 - July 18, 1981

SCALE: 1:2,500

SOUNDINGS: Ross Model 5000 Fathometer

PROJECT NO: OPR-P132-DA-82

CONTROL: Range/Azimuth  
Motorola Mini-  
Ranger III/Wild T-2

Chief of Party.....CDR J. M. Wintemyre

Surveyed By.....ENS E. Hawk

ENS J. Waddell

Automated Plot By.....PMC Xynetics Plotter

Verified By.....I. A. Almacen

Evaluated By.....Gordon E. Kay

1. INTRODUCTION

FE-252 (1983) is a field examination survey of the Cordova Small Boat Harbor, to determine post dredging depths. This field examination was conducted by the NOAA Ship DAVIDSON (S-332) in accordance with the following: ✓

- o Project Instructions, OPR-P132-DA-82, Orca Inlet, Alaska, dated February 19, 1982
- o Change No. 1, dated May 4, 1982
- o Change No. 2, dated July 13, 1982

FE-252 was intended as an inset to H-10038 (1982). However, processing of H-10038 had reached the smooth sheet stage when FE-252 was received. Therefore, it was processed as a field examination. ✓

The 42 cm by 28 cm smooth sheet is being forwarded to Headquarters without being folded to page size in order to facilitate use in nautical chart revision. Subsequent folding should be accomplished to conform to the requirements of paragraph 7.4 of the Hydrographic Manual. *(Folded & inserted in this D.R.)*

During verification the following data was changed:

- a. Projection parameters were changed to center the hydrography on the smooth sheet and to change the projection to polyconic. ✓
- b. Tide level values are from observed tides, see Form 712. ✓
- c. Velocity correctors were changed to reflect a corrected velocity. ✓

2. CONTROL AND SHORELINE

Horizontal control and hydrographic positioning are discussed in paragraph G of the Descriptive Report and is the appended Horizontal and Electronic Control Report for OPR-P132-DA-83. ✓

The smooth sheet was plotted using preliminary adjusted field positions on the North American Datum of 1927. ✓

a. Shoreline is from the following sources:

<u>Sheet Number</u>	<u>Date of Photography</u>	<u>Date of Field Edit</u>	<u>Date of Review</u>
*T-12653	August 1964, July 1966	Sept 1965, May 1966	May 1967 ✓

\*Revision print (Blue Print No. 118507) updated for 1981 photography

b. Brown shoreline is from Peratrovich and Nottingham Engineering Consultants, site plan sheet 1A, of the Cordova Small Boat Harbor Expansion. (Copy enclosed with field records) ✓

3. HYDROGRAPHY

Soundings at crosslines are in good agreement. The hydrography contained in this survey is adequate ~~to determine the least depths and bottom configuration.~~ *for its intended purpose.*

Standard depth curves were drawn. The 0-fathom curve is not complete due to a lack of soundings near shore. *Also portions of the 6, 12 & 18 depth curves are incomplete because of a lack of bottom coverage.*

Three soundings in the vicinity of latitude 60°32'51.5"N, longitude 145°45'49"W have been offset from a pier face on the smooth sheet for legibility. ✓

4. CONDITION OF SURVEY

The hydrographic records and final reports adequately conform to the requirements of the Hydrographic Manual, 4th edition, revised through change 3.

5. JUNCTIONS

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Note</u>	<u>Color</u>	<u>Joins on</u>
H-10038	1982	1:10,000	Joins	red	north-west

The junction has been accomplished *& is adequate.*

6. COMPARISON WITH PRIOR SURVEYS

There are no prior surveys or pre-survey review items contained within the limits of this Field Examination.

7. COMPARISON WITH CHART

<u>Chart Number</u>	<u>Edition</u>	<u>Date</u>
16710	13th	January 29, 1983

a. Hydrography - The chart does not contain soundings within the area of this Field Examination. The area charted as under construction was verified. Construction was still going on after the completion of this Field Examination.

*U.S.A. C&E has probably resurveyed this area. Compiler should check if subsequent survey information is available.*



There have been no dangers to navigation reported, or identified within the limits of this Field Examination. ✓

FE-252 is adequate to supersede the charted information within the common areas. ✓

b. Controlling Depths - There are no controlling depths within the limits of FE-252. ✓

c. Aids to Navigation - There are no floating aids. There is one fixed aid; it is Cordova Boat Harbor Light 2 which adequately marks the intended feature. ✓

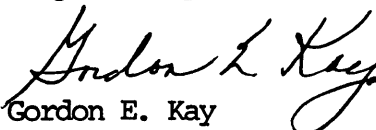
8. COMPLIANCE WITH INSTRUCTIONS

FE-252 complies with the project instructions and changes listed in section 1 of this report. ✓

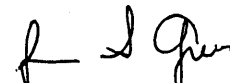
9. ADDITIONAL FIELD WORK

FE-252 is a good field examination. Additional field work is not recommended. ~~CONCERN~~

Respectfully submitted,

  
Gordon E. Kay  
Cartographer-Evaluator  
April 9, 1984

This survey has been verified and evaluated. I have examined the survey and it meets Charting and Geodetic Services survey standards and requirements for use in nautical charting except as noted in the Evaluation Report. The survey is recommended for approval. ✓

  
James S. Green  
Supervisory Cartographer

ATTACHMENT TO DESCRIPTIVE REPORT FOR FE-252

I have reviewed the smooth sheet, accompanying data, and reports of this hydrographic survey. Except as noted in the Evaluation Report, the hydrographic survey meets or exceeds Charting and Geodetic Services (C&GS) standards, complies with instructions, and is accurately and completely represented by the smooth sheet and digital data file for use in nautical charting.

Daniel W. Yeager 4/20/84  
Chief, Nautical Chart Branch (Date)

CLEARANCE:

N/MOP2:LWMordock

SIGNATURE AND DATE:

L. Mordock 4/20/84

After review of the smooth sheet and accompanying reports, I hereby certify this survey is accurate, complete, and meets appropriate standards with only the exceptions as noted above. The above recommendations are forwarded with my concurrence.

Charles J. ... 4/20/84  
Director, Pacific Marine Center (Date)

HYDROGRAPHIC SURVEY STATISTICS

FE-252

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS		1	
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS. ARC, EXCESS		2	
DESCRIP-TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES						
CAHIERS						
VOLUMES						
BOXES			1			

T-SHEET PRINTS (List) T-12653 (Revision Print) enlarged to scale 1:2,500

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS		
	PRE-VERIFICATION	VERIFICATION	TOTALS
POSITIONS ON SHEET			
POSITIONS CHECKED		239	239
POSITIONS REVISED		15	15
SOUNDINGS REVISED		113	115
SOUNDINGS ERRONEOUSLY SPACED			
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED			
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	2	VERI EVAL	2
VERIFICATION OF CONTROL		1 1	2
VERIFICATION OF POSITIONS		24 3	27
VERIFICATION OF SOUNDINGS		8 4	12
COMPILATION OF SMOOTH SHEET		7 3	10
APPLICATION OF TOPOGRAPHY		3 3	6
APPLICATION OF PHOTOBATHYMETRY			
JUNCTIONS		1 1	2
COMPARISON WITH PRIOR SURVEYS & CHARTS			4
VERIFIER'S REPORT		1 16	17
OTHER		1	1
Digitization	2		2
TOTALS	4	46 35	85
Pre-Verification by Stanley H. Otsubo	Beginning Date 1-11-84	Ending Date 1-11-84	
Verification by Isagani A. Almacen	Beginning Date 1-12-84/3-27-84	Ending Date 3-14-84/4-9-84	
Verification Check by Stanley H. Otsubo, James S. Green	Time (Hours) 18	Date 4-10-84	
Marine Center Inspection by	Time (Hours)	Date	
Quality Control Inspection by	Time (Hours)	Date	
Requirements Evaluation by F. P. Saulsbury	Time (Hours)	Date	1985





**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
 NATIONAL OCEAN SERVICE  
 OFFICE OF CHARTING AND GEODETIC SERVICES  
 ROCKVILLE, MARYLAND 20852

N/CG242:FPS

November 14, 1985

TO: N/CG24 - Roy K. Matsushige *ROM*  
 FROM: N/CG242 - *George K. Myers, Jr.*  
 SUBJECT: Examination of Hydrographic Survey FE-252 (1983), Alaska, Orca Inlet, Cordova Small Boat Harbor

Chief of Party ..... J. M. Wintermyre  
 Field Unit ..... NOAA Ship DAVIDSON  
 Processed by ..... Pacific Marine Center  
 Examined by ..... F. P. Saulsbury

An examination of hydrographic survey FE-252 (1983) was accomplished to monitor the survey for adequacy with respect to data acquisition, conformance with applicable project instructions, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, shoreline transfer, digital data standards, decisions made and actions taken by the evaluator, and the cartographic presentation of data.

Digital data and/or programming deficiencies are identified on a full-scale plot made from the magnetic tape transmitted by the marine center. This plot with the digital data listing will be forwarded to the marine center.

In general, the survey was found to conform to National Ocean Service standards and requirements except as stated in the Evaluation Report and as follows:

1. Pier face soundings originally acquired on hydrographic survey H-10038 (1982) at North Pacific Processors Pier in latitude 60°33'00"N, longitude 145°45'51"W and St. Elias Ocean Products Pier in latitude 60°32'58"N, longitude 145°45'54"W were again acquired in 1983 on the present survey. Subsequent to the 1982 survey these areas were dredged. The hydrographer, to his credit, resurveyed the pier face areas on the present survey. These soundings, while shown on the field sheet of the present survey, are not shown on the smooth sheet. In order to archive this information and make it available to the chart compiler, a chart letter was generated during the survey examination. A copy of Chart Letter 656 (1985), showing the pier face soundings, is inserted in this Descriptive Report and supersedes counterpart information shown on H-10038 (1982). Soundings shown on the chart letter are based on predicted tides.



2. A comparison between a Rockville check plot of resubmitted marine center digitized data and the data as shown on the smooth sheet revealed the following deficiencies:

a. Portions of the low water depth curves and a limit line were inaccurately digitized. Also, a dashed low water depth curve was shown as a solid line.

b. An elevation of a pile was overlooked.

c. The positions of dolphins in a ferry slip are slightly off center.

145° 46' 10"      145° 46' 00"      145° 45' 50"      145° 45' 40"  
 60° 33' 00"      60° 33' 00"

ORCA INLET

20 CORDOVA RCA TOWER, 1979  
 (landmark: 50 ft above ground)

CORDOVA

22 CORDOVA BOAT HARBOR  
 LIGHT 2, 1982

60° 32' 50"

23 USCE, 1983

60° 32' 50"

27 USCE 20, 1983

60° 32' 40"

60° 32' 40"

CORDOVA SMALL BOAT HARBOR

ALASKA  
 ORCA INLET  
 CORDOVA SMALL BOAT HARBOR  
 FE - 252  
 OPR - P132 - DA - 82  
 Scale - 1:2500  
 Surveyed by: NOAA Ship DAVIDSON  
 Date of survey: June - July 1983  
 Sounding datum: MLLW  
 Sounding unit: FEET

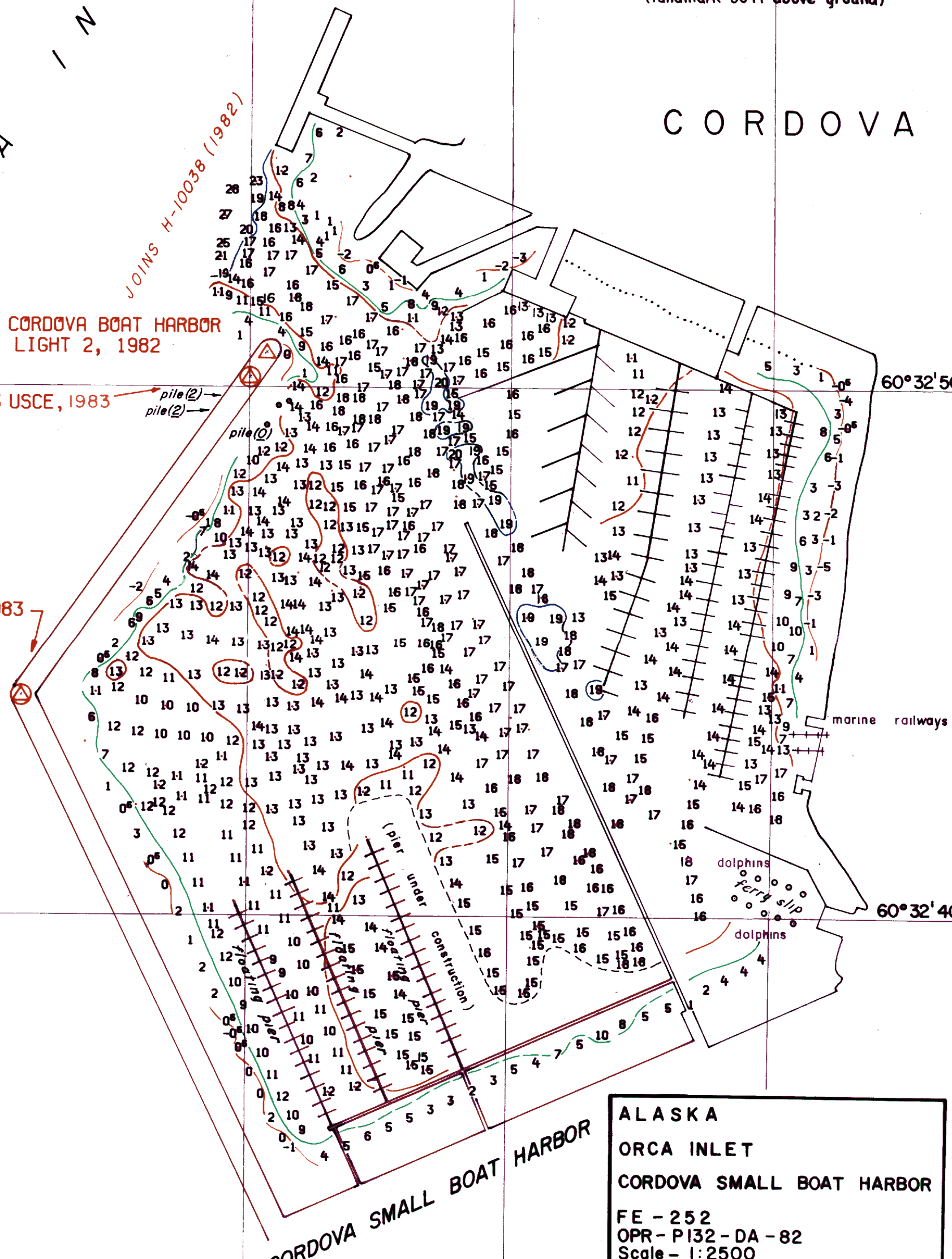
Shoreline in brown from Army Corps of Engineers harbor expansion plan for orientation purposes only.

145° 46' 10"

145° 46' 00"

145° 45' 50"

145° 45' 40"





145° 46' 10"

145° 46' 00"

145° 45' 50"

145° 45' 40"

60° 33' 00"

20 CORDOVA ROA TOWER, 1979

22 CORDOVA BOAT HARBOR LIGHT 2, 1982

60° 32' 50"

23 USCE

60° 32' 50"

27 USCE 20, 983

60° 32' 40"

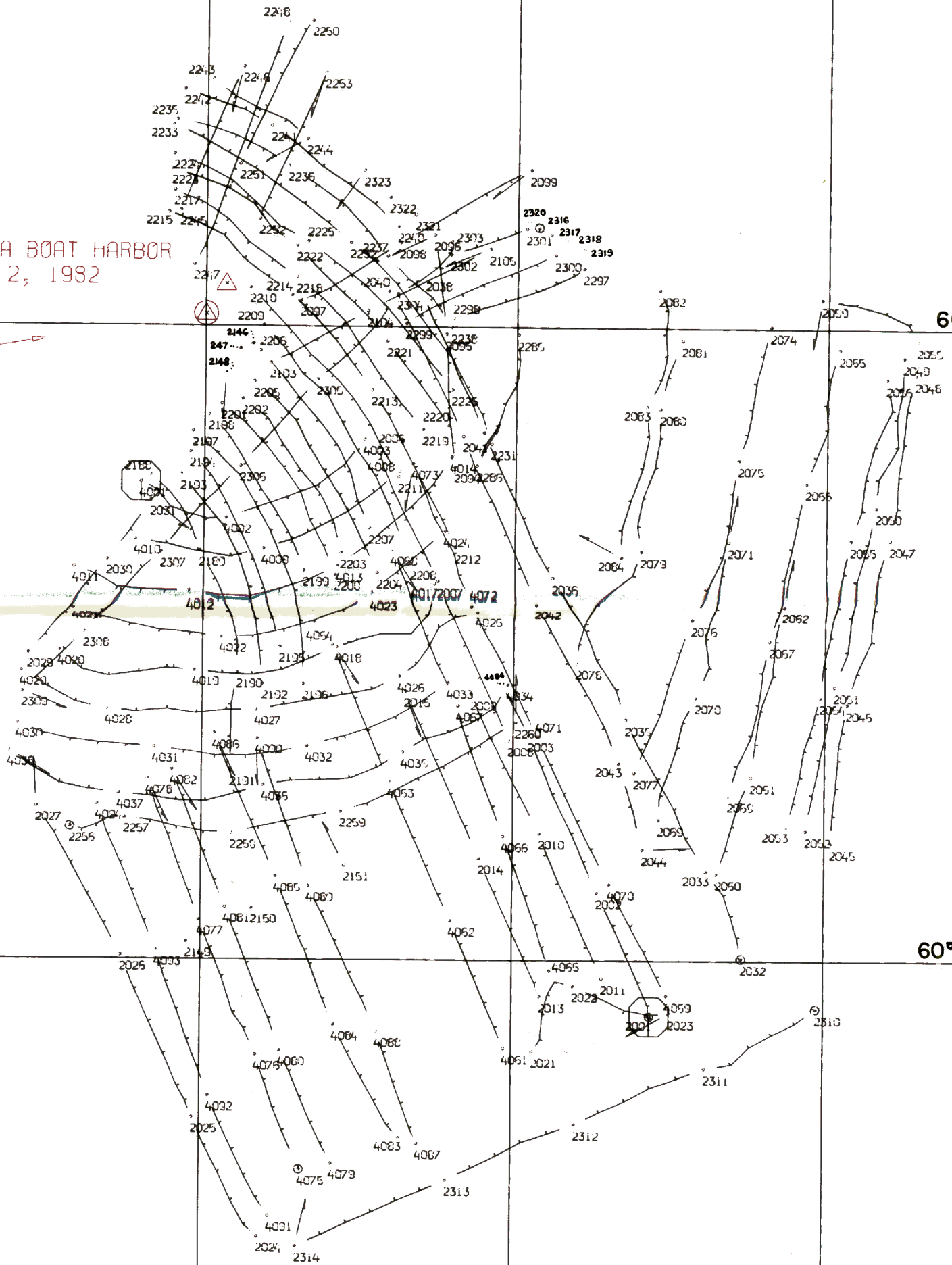
60° 32' 40"

145° 46' 10"

145° 46' 00"

145° 45' 50"

145° 45' 40"



**FE-252  
POSITION OVERLAY A**

145° 46' 10"

145° 46' 00"

145° 45' 50"

145° 45' 40"

60° 33' 00"

60° 33' 00"

20 CORDOVA RCA TOWER, 1979

*sdgs  
O-added to  
smooth sheet  
from excess*

22 CORDOVA BOAT HARBOR  
LIGHT 2, 1982

60° 32' 50"

60° 32' 50"

23 USCE

27 USCE 20, 1983

60° 32' 40"

60° 32' 40"

**FE - 252  
EXCESS SOUNDING OVERLAY**

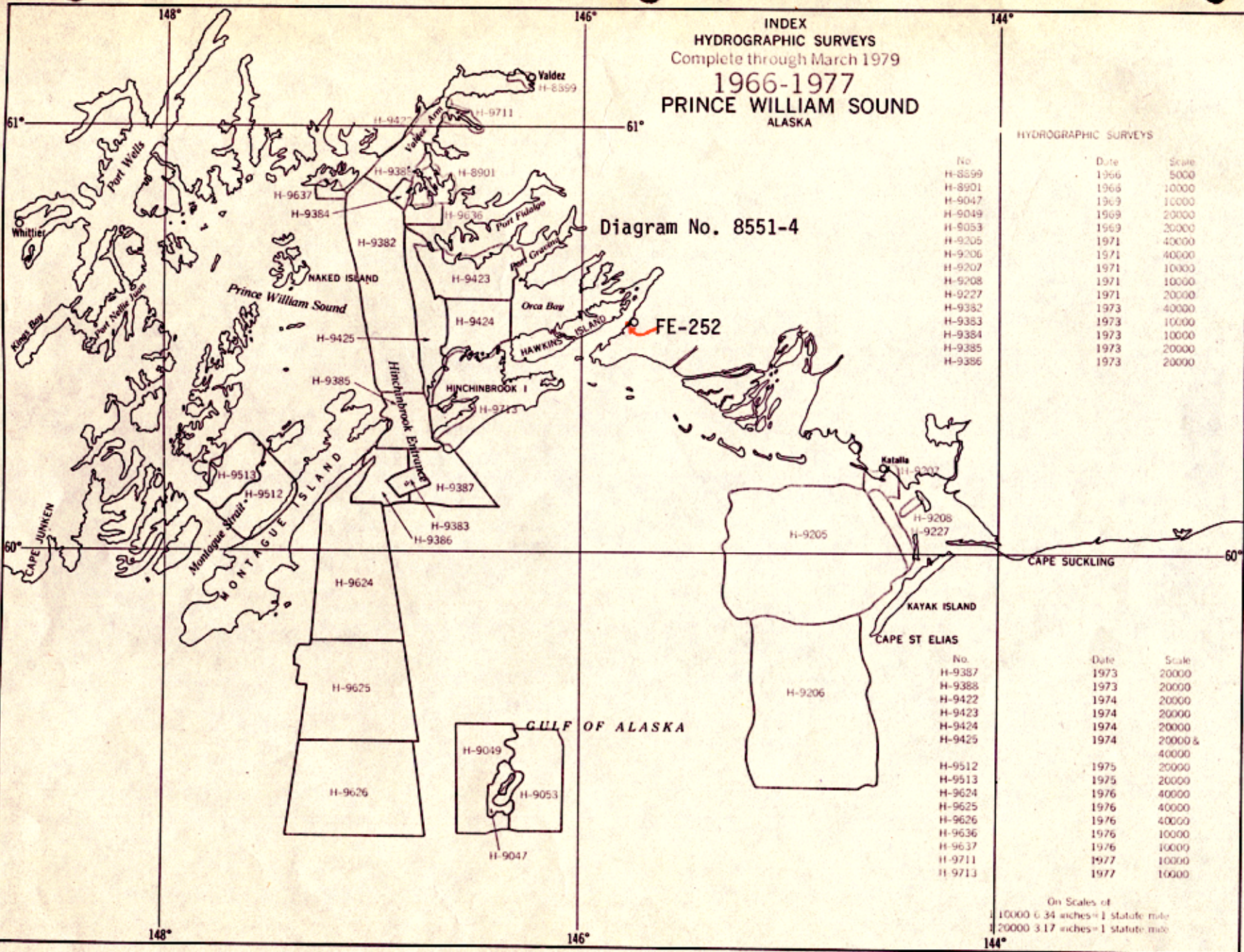
145° 46' 10"

145° 46' 00"

145° 45' 50"

145° 45' 40"





HYDROGRAPHIC SURVEYS

No.	Date	Scale
H-8599	1966	5000
H-8901	1966	10000
H-9047	1969	10000
H-9049	1969	20000
H-9053	1969	20000
H-9205	1971	40000
H-9206	1971	40000
H-9207	1971	10000
H-9208	1971	10000
H-9227	1971	20000
H-9382	1973	40000
H-9383	1973	10000
H-9384	1973	10000
H-9385	1973	20000
H-9386	1973	20000

No.	Date	Scale
H-9387	1973	20000
H-9388	1973	20000
H-9422	1974	20000
H-9423	1974	20000
H-9424	1974	20000
H-9425	1974	20000 & 40000
H-9512	1975	20000
H-9513	1975	20000
H-9624	1976	40000
H-9625	1976	40000
H-9626	1976	40000
H-9636	1976	10000
H-9637	1976	10000
H-9711	1977	10000
H-9713	1977	10000

On Scales of  
 10000 6.34 inches = 1 statute mile  
 20000 3.17 inches = 1 statute mile

DEPARTMENT OF COMMERCE  
 National Oceanic and Atmospheric Administration  
 National Ocean Survey  
 Washington, D.C.  
 Hydrographic Index No. 113E



