

March 14, 1983

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Pacific Marine Center:

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): 945-4050, Cordova, AK

Period: July 11 - September 2, 1982

HYDROGRAPHIC SHEET: H-10029

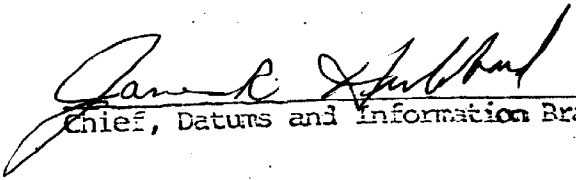
OPR: P132

Locality: ORCA Inlet, Alaska

Plane of reference (mean lower low water): 5.95 feet

Height of Mean High Water above Plane of Reference is 11.6 feet

REMARKS: Recommended Zoning
- Zone Direct


Chief, Data and Information Branch

FIELD TIDE NOTE
OPR-P132-DA-82
H-10029
H-10038
ORCA INLET, ALASKA

Field reduction of soundings for H-10029 and H-10038 is based on daily predicted tides for Cordova, Alaska (Reference Station 945-4050).

Program AM500, "Predicted Tides Generator" (11/10/72 version) was used to produce ASCII and BINARY Predicted Tide Tapes. Soundings on the final field sheet are corrected for predicted tides at 0.2 foot intervals.

The Cordova (primary) tide reference station (945-4050) was the control tide gage. It is located on the SE corner of the Ocean (Ferry) Dock approximately 0.8 miles north of Cordova. Two gages, Leupold-Stevens (L&S) analog to digital recording gage and a Metercraft gas purged (bubbler-type) backup gage operated continuously.

The Cordova tide station is maintained by a contract observer. Pacific Tide Party (PTP) personnel contacted the observer and inspected the station on 8 July 82. During the inspection they adjusted the memory spring on the L&S gage (see PTP Tide Station Report, Cordova, 8-6-82.) PTP and DAVIDSON divers cleaned and inspected the staff and floatwell.

Leveling

The staff was leveled by DAVIDSON personnel to three benchmarks, including the primary benchmark, to third-order class 1 accuracy on 2 July 82 (JD 182) prior to the start of hydrography. The staff was re-leveled by DAVIDSON and PTP personnel to second-order class 1 accuracy on JD's 194-195. The staff was leveled on JD 251 after completing hydrographic survey operations. There was no evidence of staff movement. Elevations of all benchmarks leveled to agreed within 0.005 m. of historic values.

Zoning

Recorded water levels from the Cordova reference station are representative throughout the survey area and should be applied directly.

Supplemental Tide Data

Two additional bubbler-type tide stations were established in

anticipation of hydrography which was not performed. Boswell Rock was an alternate site for tide support for offshore work, and Shag Rock was to support operations in Orca Inlet, south of Cordova. Data from these stations are provided for informational and historic purposes only, and have no application to H-10029 or H-10038 soundings.

<u>Station</u>	<u>Location</u>	<u>Period of Operation</u>	<u>Gage S/N</u>
Boswell Rock (945-4149)	60/24/48N 146/06/12W	15 July - 2 Sept 82 (JD 196 - JD 245)	64A11030
Gage Installed:	29 June 82 (JD 180)		
Gage removed:	3 Sept 82 (JD 246)		
Shag Rock (945-4125)	60/27/54N 145/59/18W	15 July - 2 Sept 82 (JD 196 - JD 245)	67A10292
Gage Installed:	1 July 82 (JD 182)		
Gage removed:	3 Sept 82 (JD 246)		

Gages were operated on GMT and inspected every two to three days by DAVIDSON personnel. When abstracting hourly heights of tide, time errors were distributed linearly throughout the period between observations.

Both gages exhibited an unusual flattening of the tide curve at the low portion of the tidal cycle. Since the orifices were not set in tide pools and the gages otherwise appeared to work properly, the flattening is probably real, and a function of the geometry of the tidal basin.

Boswell Rock (945-4149)

Egg Island and Point Bentinck were identified by the Project Instructions as two sites for a tide station to control offshore hydrography. Neither site was suited for an installation, since each is adjacent to channels where strong currents occur, are bordered by broad flat sandy beaches, and are heavily fished up to the shoreline by gill-netters.

Verbal permission to use Boswell Rock as an alternate was issued through PMC, and benchmarks were stamped with the station number (945-4149) prescribed for Point Bentinck. CHANGE NO. 2, issued after the station was installed, formally authorized the use of Boswell Rock as an alternate site, and assigned the Egg Island station number. The discrepancy was reported and authorization to use 945-4149 was granted via the 121521Z August 1982 CPM radio message. An ammendment to CHANGE NO. 2 was not issued.

Boswell Rock is located approximately 6.8 n.mi. WSW of Point Whitshed, 4.5 n.mi. SW of Mummy Island Light, and 1.5n.mi. NW of Point Bentinck, on the west side of the entrance to Boswell Bay. The station was installed on the SE tip of the island. The staff was mounted on a large and stable round top boulder and guyed in place with wire secured to eyebolts. The orifice

was placed in the channel south of Boswell Rock. The gage was set well up on Boswell Rock and was protected from the elements by a rock wall and boulders on three sides. The gage provided continuous data and kept accurate time.

The Boswell Rock staff was leveled to five newly established benchmarks to third-order class 1 accuracy requirements on JD 182 prior to the start of survey operations. It was leveled again on JD 245 at the end of survey operations. The JD 245 difference in elevation between benchmarks 4149-C and 4149-D did not agree with the JD 182 value. The leg was re-observed on JD 250, and those results confirmed the JD 245 elevation difference. Since there is no indication of mark disturbance it is presumed that compensating errors occurred during the JD 182 observations. An observation across approximately 120 m of open water was required to tie 4149-C to 4149-D and probably contributed to the discrepancy.

Based on 25 staff-gage comparisons a marigram reading of 4.4 feet corresponds to 0.0 feet on the tide staff. An erroneous computation for the staff-to-gage comparison on 15 July 82 (2120A) was not included in the staff-gage comparison.

Shag Rock (945-4125)

Shag Rock is located approximately 2.9 n.mi. WNW of Point Whited, 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 ledge near the highest point of the rock, partially protected from the elements. The tide staff was mounted against the W 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 gage continuously provided good data except for one period when it was over-dampened. Dampening was relieved and the gage was restored to proper operating condition. The gage kept excellent time.

The Shag Rock staff was leveled before and after survey operations, on JD's 182 and 245. Elevations determined for the benchmarks from the opening and closing level runs agreed within 0.001 m. of each other and historic data. Maintenance was performed on Benchmark No. 1 1964 to replace cement which had weathered away from the disk. The disk was not loose.

Based on 25 observations, a marigram reading of 4.7 feet corresponds to 0.0 feet on the tide staff. Over dampening caused an erroneous staff-to-gage comparison on 2 August 1982 (1945Z). The observation was not included in the analyses. Divers removing the Shag Rock orifice anchor and tubing found approximately one-half of one foot of loose sand covering them. The

final staff-to-gage comparison (taken the day before orifice removal) was higher than previously recorded values, but no other indications of a blocked orifice were evident. Future installations at the site must take into account the shifting nature of the sandy bottom when installing the orifice. The orifice should be mounted on a stake driven into the bottom and inspected by divers at 2 to 4 week intervals.

Respectfully submitted,

for *Donald A. Haw*
Eric G. Hawk
Ens. NOAA

Approved and forwarded,

James M. Wintermyre
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Commanding Officer
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