DATE: May 2, 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): 944-5088 Lofall, WA
944-5133 Bangor, WA

Period: February 26-March 23, 1983

HYDROGRAPHIC SHEET: H-10072

OPR: N165

Locality: Hood Canal, Washington

Plane of reference (mean lower low water): 944-5088 = 0.48 ft.
944-5133 = 2.59 ft.

Height of Mean High Water above Plane of Reference is 944-5088 = 9.8 ft.
944-5133 = 10.2 ft.

REMARKS: Recommended Zoning:

1. North of latitude 47°47.0' zone direct on 944-5088.

2. South of 47°47.0' zone direct on 944-5133.

James C Hubbard

Chief, Tidal Datums Section, Tides & Water Levels Branch

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FIELD TIDE NOTE
OPR-N165 -DA-83
Hood Canal, Washington

Predicted tides for Seattle (Reference Station 944-7130), Washington were used to reduce survey OPR-N165-DA-83 soundings to Mean Lower Low Water Datum. Sounding data was collected using the shipboard Bathymetric Swath Survey System (BS3) and conventional survey launch Hydroplot.

Binary and ASCII predicted tide tapes were generated on the DAVIDSON's PDP8/e computer using Program AM500, Predicted Tides Generator (11/10/72 version) for use during Hydroplot survey operations and postprocessing. BS3 data was reduced with predicted tide data for Seattle, Washington from magnetic tapes generated by the Marine Predictions Branch, N/OMS 132.

Hood Canal was divided into two tidal zones for sounding data reduction. The zone, north of a line between latitude 47°46.0'N, longitude 122°43.0'W and latitude 47°46.5'N, longitude 122°45.0'W, had corrections of -8 minutes for high water, -5 minutes for low water, and a height correction factor of 0.91. Corrections of -7 minutes for high water, 0 minutes for low water, and a height correction factor of 0.95 were applied south of the line.

Fischer and Porter Analog to Digital Recorder (ADR) gages were installed at Bangor (47°44'55"N, 122°43'28"W) and Lofall (47°48'52"N, 122°43'28"W) on the eastern side of Hood Canal in support of survey operations. The Bangor tide station (944-5133) was located on the northeastern tip of the Marginal Wharf (charted as Bangor Wharf on NOAA Chart 18458, 10th Ed., Aug. 15/81), Naval Submarine Base, Bangor, Washington. Gage serial number S/N 2R6406A583N7 operated from 24 February to 7 March 1983. Gage S/N 7403A3402M5 operated from 7 March 1983 until the end of survey operations. The Lofall tide station (944-5088) was established on remnant pilings of old pier immediately south of the Lofall Ferry Dock. Gage S/N 6903A5568M13 operated from 23 February to 25 March 1983. Gage S/N 7601A1469M19 operated from 25 February until survey operations were completed.

Numerous problems were experienced with the Lofall and Bangor gages. The first gage installed at Lofall jammed twice in two days of operation, ostensibly due to a warped punch bar. The replacement gage worked satisfactorily. As a precautionary measure on 7 March a new punch bar was installed in the replacement gage as per Pacific Tides Party (PTP) verbal instructions of 4 March 1983. The replacement gage failed on 23 March as a result of vibration loosening the nut which held the floatwire spool locked against the drive shaft. Fortunately, hydrographic operations had concluded the previous day. The gage installed at Bangor Marginal Wharf appeared to work satisfactorily until a routine observation opportunely coincided with a gage mispunch, revealing the gage code disks were misindexed. The gage was replaced on 7 March as per PTP verbal instructions of 4 May, and no further problems were experienced with it.

Tide gages were set and records annotated in Universal Coordinated Time (UTC) although the GMT (Greenwich Mean Time) notation was used interchangeably with UTC. Local (watch) time was converted to UTC by applying a +8 zone description.

Third-order levels were run between each gage staff and four or more nearby bench marks at the times of tide station installation and removal. A Zeiss Ni2 Level, a Lietz Sokkisha B-1 Level, and a Keuffel and Esser Metagrad Philadelphia Rod were used. The levels were peg tested prior to use; level error (C) was found to be within acceptable limits of ±0.00005.

The elevation differences determined during opening and closing level runs between bench marks at each tide station agreed favorably with historic elevation data. Opening and closing bench mark elevations above zero of the tide staffs agreed within 0.002 m at both tide stations. There was no evidence of staff or gage movement.

Based on the mean of 19 staff-to-gage comparisons made between 25 February and 22 March a punched tape reading of 55.65 (Standard Deviation, SD = ±0.06) feet at the Lofall tide station corresponds to 0.0 feet on the staff. Based on 7 comparisons between 27 February and 7 March at Bangor tide station, a reading of 10.14 (SD = ±0.02) feet corresponds to 0.0 feet of the staff. The Bangor gage was replaced on 7 March. Thirteen comparisons from March 7 - 23 revealed a staff-to-gage difference of 9.96 (SD = ±0.04) feet.

Data was collected in digital format on the ADR gages, rendering it impractical to make comparisons of times of high and low tides between the Lofall and Bangor tide stations. However, observed heights and times of tidal extrema appeared to agree with predicted values. No unusual tides or currents were noted, though strong currents flowing approximately parallel to the shoreline were observed several hundred meters offshore from Horizontal Control Stations SOUTH 3 1961 (47°49'41.181"N, 121°41'37.198"N), SEI 2 1934 (47°48'43.222"N, 122°39'52.267"W) and THREE SPITS 2 1934 (42°44'11.105"N, 122°44'19.846"W).

Respectfully submitted,

Eric G. Hawk

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ENS, NOAA

Approved and forwarded,

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