FIELD TIDE NOTE

SP-PMC-7-DA-75

SERGIUS NARROWS

Project instructions for SP-PMC-7-DA-75 called for installation of one tide gage at the previous survey's location near Shoal 2, a triangulation station in the Sergius Narrows Channel. As was immediately apparent upon arrival, one gage would not suffice to supply reducers for both the Narrows and the area of principal investigation, East and West Francis Rocks. The ship installed a second gage on Point Sinbad. The attached plot of hourly heights confirms suspected differences of up to two feet at the two locations. As levels could not be carried directly to the Sinbad tide gage, and the project was too short to determine MLLW by series observation, an alternative MLLW determination was made as described in the leveling section.

Boat sheet reductions of soundings for Sergius Narrows were based on Sitka predicted tides. However, since bench mark data was available for Sergius Narrows, real tides from our two tide gage installations were used for the Smooth Field Sheet. The tide correctors were obtained by scaling highs and lows from the marigram and then computing reducers with program AM501 with iteration limits set at 0.2 feet. All times of recorded tides are based on Greenwich Mean Time. Two Bristol Bubbler tide gages were installed in the project area. Location and operational periods were as follows:

SITE	LOCATION		*	<u>P</u>]	ERIOD			
SERGIUS NARROWS	33.5 57/24/ 35.8 N	16	Oct	75	thru	10	Oct	75
	135/37/ 22.5 W 34:0 22.0							
POINT SINBAD	57/24/ 21. 0 N 135/39/ 02. 0 W	16	Oct	75	thru	19	Oct	75

SERGIUS NARROWS Gage s/n 73A235 and staff were installed and began operating 16 Oct 75. Continuous good records were obtained from this gage. The anchor slipped once during the installation and was reset, resulting in the following staff/ gage comparisons:

1700Z 16Oct75 thru 2147Z 16Oct750.0 on staff = 21.1 on the gage2148Z 16Oct75 thru 2322Z 16Oct750.0 on staff = 24.4 on the gage2323Z 16Oct75 thru 19Oct750.0 on staff = 18.2 on the gage

Published bench mark data and our leveling gave us the following: MLLW = 14.1 ft on gage (before anchor slipped); MLLW = 17.4 on gage (during short period before reset); and MLLW = 11.1 on gage (after anchor was reset).

POINT SINBAD Gage s/n 68A9333 was installed and began operating 16 Oct 75. Continuous good records were obtained from this gage. There was no staff installed at this station; however, waterline leveling established the following for the three benchmarks at the station:

BM l (Triangulation mark BOONE 2, 1950 = 18.8ft on gage BM 2 (RM #2) = 20.0ft on gage BM 3 (RM #1) = 21.1ft on gage

LEVELING

Sergius Narrows This station was leveled to three existing benchmarks. No changes in published benchmark elevation differences were found. The staff was bolted to solid rock, hence no staff movement was possible.

<u>Point Sinbad</u> This station was leveled to three benchmarks (a triangulation station disk and its two reference marks) on Point Sinbad. There was no staff installed here so a hand level and a Philadelphia rod were used to make gage-benchmark waterline comparisons. MLLW was also determined at this station from using the published Sergius Narrows datum and the following method:

In calculating MLLW on the Sinbad Tide Gage, we postulated that at slack water there was no elevation difference of the water surface level between the Sinbad and Sergius gages. This means that at any time "T" during apparent slack water, the difference between MLLW and observed water level at both gages is a constant.

So at each slack water time:

- 1. take Sergius gage reading (a)
- 2. subtract Sergius marigram/MLLW difference (b)
- 3. result is slack water level corrected to MLLW or (d)
- 4. take Sinbad gage reading (c)
- 5. subtract slack water level (d) from (c)

The result should be the MLLW correction for the Sinbad Gage

	Point Sinbad Tide Gage		Sergius narrous E
	Ĵd	-SLACK WATER LEVEL	Lage
مو ۲		So { a-b=d C-d= Sinbad Gage MLLW correction	

marigram. The mean of the eight MLLW determinations shown was 6.7 feet. Therefore 6.7ft = MLLW on the marigram for the Point Sinbad Tide Station. From this we were able to apply real tide correctors to the Field Smooth Sheet. Comparisons were made at high slack water. Predicted and observed tide curves were plotted for both gages. Equal water levels were observed on both real tide curves at times of predicted slack, lending credence to the initial assumption of no elevation difference during slack water.

ZONING

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Point Sinbad Tide Station is recommended for obtaining final tide reducers west of a line between Sergius Point and Rapids Island. Sergius Narrows Tide Station records should be used for all tide reducers east of the above mentioned line. The accompanying chartlet illustrates where the tidal zoning breaks occur. It is also indicated on the SP-PMC-7-DA-75 Smooth Field Sheet submitted by the DAVIDSON.



Time (GMT) DAY	Staff Readings (a) Sergius, (c) It. Sin	bad $(b=11.1)$. C-D= MLLi correcto;
2345z/ Oct.16	Sergius(a) = 17.2 Pt. Sinbad(c)=12.8	17.2-11.1=6.1	12.8-6.1= 6.7
0554 <i>2/</i> 0=t17	(q) = 20.9 (c) = 16.5	20.9-11.1=9.8	16.5-9.8 = 6.7
12. j z/ Oct 17.	(a) = 16.5 (c) = 12.1	16.5-11.1=5.4 1	2.1 - 5.4 = 6.7
1812 Z/ Oct 17	(a) = 21.6 (c) = 17.2	21.6-11.1=10.5	17.2-10,5= 6.7
00252/ Oct.18	(a) = /6.3 (c) = /1.8	16.3 - 11.1 = 5.2	11.8-5.2 = 6.6
0634 2/ Oct18	(a) = 21.0 (c) = 16.6	21.0-11,1=9,9	166-9.9= 6.7
245 2 / Oct.18	(a) = 16.6 (c) = 12.2	16.6 -11.1=5.5	12.2 - 5.5 = 6.7
1848 Z/ Oct. 18	(a) = 22.5 (c) = 18.2	22.5-//.1=11.4	18,2-11.4= 6.8

The mean of the eight MLLW correctors shown above is 6.7. O marigram equals 6.7 MLLW. Tide reducers, for plotting purposes, were computed by program

AM5/0%. The highs and lows were picked off observed tides and

correctors computed. The reducers, therefore, are a sinusoidal

approximation to the observed tide curve.

Tide reducers and velocity correctors were applied to the

soundings on the Field Smooth Sheets DA-5-1A-75 and DA-5-1B-75.