# DETERMINING

# DEPTH of WATER, CURRENT SPEED and DIRECTION OF TIDES at a give location and time



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# **READING TIDE TABLES** Determining Tide at a given location and time:

## STEP 1

Document Know information including CHARTED DEPTH (CD), DATE, TIME, PLANNED LOCATION ( SUBSTATION )

EXAMPLE: Find the water depth at DENNIS PORT on OCT 28, 1983 at 0914 EST Date: OCT 28, 1983 Time: 0914 EST SubStation: Dennis Port (Planned location) CHARTED DEPTH (CD) 14 Ft

## STEP 2

Locate Tide differences by finding closest location (substation) number in INDEX for TABLE 2

#### EXAMPLE: SubStation: Dennis Port index number : 1027

Delray Beach, Fla	2937
Democrat Point, N. Y	1421
	1767
Dennis Port, Mass	1027
Denton, Md	2031
Despair Bay, Newfoundland 24	
Devils Island, N. J	

Document Differences noted in TABLE 2 for time/date of planned location HIGH TIDE DIFFERENTIAL TIME and HIGH TIDE DIFFERENTIAL IN FT (including + - or \*) LOW TIDE DIFFERENTIAL TIME and LOW TIDE DIFFERENTIAL IN FT (including + - or \*)

EXAMPLE: High Water time differential: +1 01 (1 hour and 1 min) High Water height differential: \*.36 (\* means to multiple) .36 ft Low Water time differential: +0 36 (36 minutes) Low Water height differential: \*.36 (\* means to multiple) .36 ft

					$\mathbf{i}$				
1027	Stage Harbor Wychmere Harbor Dennis Port South Yarmouth, Bass River Hyannis Port	41 40 41 39 41 40	69 58 70 04 70 07 70 11 70 18 70 26	+0 50 +1 01 +1 46 +1 01 +1 15	+0 23 +0 36 +1 44 +0 45	*0.41 *0.39 *0.36 *0.29 *0.33 *0.26	*0.41 *0.39 *0.36 *0.29 *0.33 *0.26	3.9 3.7 3.4 2.8 3.1 2.5	4.7 4.3 4.1 3.4 3.7 3.0

#### STEP 4

Go to top of TABLE 2 PAGE Selected for planned location (substation) and Find REFERENCE STATION at top. Go to REFERENCE STATION in table 1

EXAMPLE: Reference Station: BOSTON (top of page)

							<b>\</b> .						
	Boston Narbor Time meridian, 75°W				2	34	on	BOST	ON, p.36	R	CF	R	DRT
949 951	BOSTON Dover St. Bridge, Fort Point Channel Charles River	42 21 42 21	71 0 71 0		+0	04	Daily +0		dictions +0.1	0.0	9.5 9.6	11.0	4.7 4.8
953 955 957 959 965 965	Charlestown Bridge Charlest River Dam. Charlestown. Chelsea St. Bridge, Chelsea River	42 22 42 22 42 22 42 23	71 0 71 0 71 0 71 0	4 3	+0 +0 +	05	+0 +0 -0	04	0.0	0.0	9.5 9.5 9.5	11.0 11.0 11.0	4.7 4.7 4.7
965 967 969	Neon Head Rainsford Island, Nantasket Roads	42 17 42 19 42 19 42 19	71 0 70 5 70 5	29		04	+0 +0 +0	01	+0.1 0.0 -0.1 -0.4	0.0	9.6 9.5 9.4 9.1	11.1 11.0 10.9 10.6	4.8 4.7 4.7 4.5

FIND REFERENCE STATION, DATE, TIME Note and Document CLOSEST HIGHT and LOW TIDES to planned original time (original time should be between the two tides) DOCUMENT the two tide informamation HIGH TIDE TIME and HEIGHT LOW TIDE TIME and HEIGHT

### EXAMPLE:

Reference Station: BOSTON DATE: OCT 28, 1983 ETA: 0914 Find the tides **before** and **after:** Bracket 0914 between two tides:

HIGH TIDE time: 0337 HIGH TIDE height: + 8.7 ft LOW TIDE time: 0939 LOW TIDE height + 1 ft

	1			
2.5 0.5 2.7 0.2		1554	8.7 1.0 9.9 -0.1	0.3

						805T08, R			
					Times and		High and Low Waters	DE CE	REER
			TOBER			LOU	MBER	Time Meicht	Tie
ine	He	ight	Time Day	Height	S Time Day	Height	Time Height Day	Time Neight Day	Day
	ft			ft #	ha	ft =	ha ft a	an ft a	16 014
557 203 817	8.6 1.0 9.9	2.0	16 0048 5a 0704 1307 1920	1.1 0. 5.0 2. 1.7 0. 8.7 2.	Tu 0744 1357	-0.4 -0.1 9.7 3.0 -0.1 0.0 10.1 3.1	16 0144 0.8 0.2 ¥ 0757 8.8 2.7 1410 0.8 0.2 2018 8.8 2.7	1 0202 -0.3 -0.1 Th 0821 10.3 3.1 1439 -0.7 -0.2 2050 9.6 2.9	F 075
701	-0.1 8.9 0.6 10.2	0.0	17 0141 # 0755 1358 2012	0.9 0.1 8.3 2.1 1.3 0.1 8.9 2.1	¥ 0840 1453	-0.7 -0.2 10.3 3.1 -0.7 -0.2 10.3 3.1	17 0227 0.6 0.2 Th 0840 9.3 2.8 1455 0.3 0.1 2103 9.0 2.7	2 0255 -0.4 -0.1 F 0911 10.6 3.2 1532 -1.0 -0.3 2143 9.6 2.9	17 023 Sa 084 150 2114
302	-0.4 9.4 0.0 10.6	-0.1	18 0227 Tu 0842 1447 2058	0.7 0.1 8.7 2.1 0.9 0.1 9.2 2.4	3 0316 Th 0932 1546 2159	-0.9 -0.3 10.8 3.3 -1.2 -0.4 10.4 3.2	18 0309 0.4 0.1 F 0922 9.7 3.0 1538 -0.2 -0.1 2146 9.2 2.8	3 0344 -0.3 -0.1 Sa 0359 10.8 3.3 1620 -1.2 -0.4 2233 9.5 2.9	18 0314 54 0928 1553 2201
159	-0.9 10.0 -0.6 10.9	3.0	19 0309 ¥ 0922 1530 2140	0.4 0.1 9.1 2.4 0.5 0.1 9.4 2.5	F 1020	-0.9 -0.3 11.1 3.4 -1.5 -0.5 10.4 3.2	19 0351 0.2 0.1 5a 1052 10.1 3.1 1621 -0.6 -0.2 2231 9.3 2.8	4 0430 -0.2 -0.1 Se 1045 10.8 3.3 1707 -1.3 -0.4 2321 9.4 2.5	19 0401 # 1015 1635 2245
51	-1.2		20 0351 Th 1001 1610 2220	0.2 0.1 9.5 2.9 0.0 0.0 9.5 2.9	Sa 1106 1724	-0.8 -0.2 11.2 3.4 -1.6 -0.5 10.2 3.1	20 0433 0.0 0.0 5= 1041 10.5 3.2 1703 -1.0 -0.3 2312 9.4 2.9	5 0513 0.0 0.0 # 1129 10.7 3.3 1750 -1.1 -0.3	20 0448 Tu 1101 1726 2338
	1.4	-0.4 3.4 -0.5 3.4	21 0428 F 1037 1650 2301	0.0 0.0 9.9 1.0 -0.3 -0.1 9.6 2.9	6 0537 Su 1152 1810	-0.6 -0.2 11.1 3.4 -1.5 -0.5	21 0514 0.0 0.0 # 1124 10.7 3.3 1767 -1.2 -0.4 2359 9.5 2.9	6 0004 9.2 2.8 Tr 0558 0.2 0.1 1213 10.5 3.2 1834 -0.9 -0.3	21 0536 ¥ 1148 1815
12 -	1.4	-0.4	22 0505 54 1115 1729 2340	0.0 0.0 10.1 3.1 -0.6 -0.2 9.6 2.9	H 0623 1236	9.9 3.0 -0.2 -0.1 10.8 3.3 -1.1 -0.3	22 0558 0.0 0.0 Tu 1208 10.8 3.3 1831 -1.3 -0.4	7 0050 9.0 2.7 W 0641 0.5 0.2 1255 10.1 3.1 1916 -0.6 -0.2	22 0026 Th 0624 1239 1903
	1.2		23 0544 5s 1153 1811	0.0 0.0	8 0111 Tu 0706 1322 1942	9.4 2.9 0.2 0.1 10.4 3.2 -0.7 -0.2	23 0045 9.4 2.9 W 0643 0.0 0.0 1255 10.8 3.3 1920 -1.2 -0.4	8 0132 8.7 2.7 Th 0727 0.8 0.2 1340 9.8 3.0 2001 -0.2 -0.1	23 0116 F 0716 1332 1955
	0.5	3.2	24 0020 # 0623 1233 1853	9.6 2.9 0.1 0.0 10.4 3.2 -0.8 -0.2	9 0159 ¥ 0752 1409 2029	9.0 2.7 0.7 0.2 9.9 3.0 -0.2 -0.1	24 0132 9.3 2.8 Th 0732 0.2 0.1 1345 10.6 3.2 2012 -1.0 -0.3	9 0217 8.5 2.6 F 0812 1.1 0.3 1426 9.4 2.9 2046 0.1 0.0	24 0211 5a 0812 1425 2048
5 -6	1.2 -	3.0 0.1 3.2 0.2	Tu 0705 1316 1 1938 -	-0.7 -0.2	10 0246 Th 0843 1457 2120	8.5 2.6 1.2 0.4 9.4 2.9 0.3 0.1	25 0226 9.2 2.8 F 0827 0.4 0.1 1441 10.4 3.2 2105 -0.8 -0.2	10 0304 8.3 2.5 54 0900 1.3 0.4 1513 9.0 2.7 2134 0.4 0.1	25 0307 3u 0909 1521 2145
	.4	2.9	26 0151 ¥ 0751 1403 1 2028 -	9.2 2.8 0.5 0.2 0.3 3.1 0.5 -0.2	11 0338 F 0934 1550 2214	8.2 2.5 1.6 0.5 8.9 2.7 0.7 0.2	26 0323 9.1 2.8 54 0923 0.6 0.2 1535 10.1 3.1 2204 -0.5 -0.2	11 0352 8.2 2.5 5w 0953 1.5 0.5 1603 8.7 2.7 2224 0.7 0.2	26 0401 M 1011 1621 2241
1 9	15	2.7	Th 0842 1455 1	8.9 2.7 0.7 0.2 0.1 3.1 0.3 -0.1	12 0432 Sa 1030 1643 Z306	8.0 2.4 1.8 0.5 8.6 2.6 1.0 0.3	27 0422 9.1 2.8 54 1027 0.6 0.2 1642 9.8 3.0 2305 -0.4 -0.1	12 0442 8.2 2.5 N 1046 1.6 0.5 1656 8.4 2.6 2315 0.8 0.2	27 050 Tu 1111 172 234
- 9	.0 :	.5	F 0939 1554	8.7 2.7 1.0 0.3 9.9 3.0 0.1 0.0	13 0525 Se 1128 1741	8.0 2.4 1.8 0.5 8.5 2.6	28 0524 9.2 2.8 H 1133 0.5 0.2 1746 9.6 2.9	13 0532 8.3 2.5 Tu 1141 1.5 0.5 1748 8.3 2.5	28 060 W 1220 1831
1.		.4	Sa 1042	8.7 2.7 1.0 0.3 9.7 3.0 0.1 0.0	14 0002 # 0620 1225 1837	1.0 0.3 8.1 2.5 1.6 0.5 8.4 2.6	29 0006 -0.3 -0.1 Tu 0626 9.5 2.9 1238 0.2 0.1 1849 9.5 2.9	14 0006 0.9 0.3 W 0621 8.5 2.6 1235 1.2 0.4 1843 8.3 2.5	29 004 Th 070 132 193

# STEP 6

DETERMINE ADJUSTED TIDE TIMES for planned Location (nearest substation)

ADD Time differential to HIGH and LOW TIDES

DETERMINE CORRECTED TIDE HEIGHTS for planned location & time (using + - or (\* multiply)) add, subtract or multiply the HIGH and LOW TIDES for the REFERENCE STATION with the Planned location DIFFERENTIALS

ADD THESE TO CD (Charted Depth) to find corrected HIGH and LOW TIDE HEIGHT

EXAMPLE: HIGH TIDE time: 0337 + 1 hr 1min = 0438 HIGH TIDE height: 8.7 ft x .36 = 3.13 Ft LOW TIDE time: 0939 + 36 min = 1015 LOW TIDE height 1 ft x .36 = .36 Ft

(charted depth) CD = 14 Ft (from navigation chart)

CD 14 + ADJ High Tide 3.13 Ft = 17.13 ft HIGH TIDE CD 14 + ADJ Low Tide 0.36 Ft = 14.23 Ft LOW TIDE

DETERMINE DIFFERENTIALS for TIDE RANGE and TIDE DURATION (TIME) HIGH TIDE HEIGHT - LOW TIDE HEIGHT = TIDE RANGE HIGH TIDE TIME - LOW TIDE TIME = TIDE DURATION

# EXAMPLE:

DURATION OF TIDE: Tide Time Differential 1015 - 0438 = 5 hours 37 min TIde Height Differential 17.13 Ft - 14.23 Ft = 2.9 Ft

### **STEP 8** FIND Differential between our ETA and the nearest TIDE

EXAMPLE: Original ETA: 0914 Closest Tide: 1015 (LOW Tide) DIFFERENTIAL BETWEEN OUR ETA ARRIVAL and CLOSEST TIDE: 1 hour

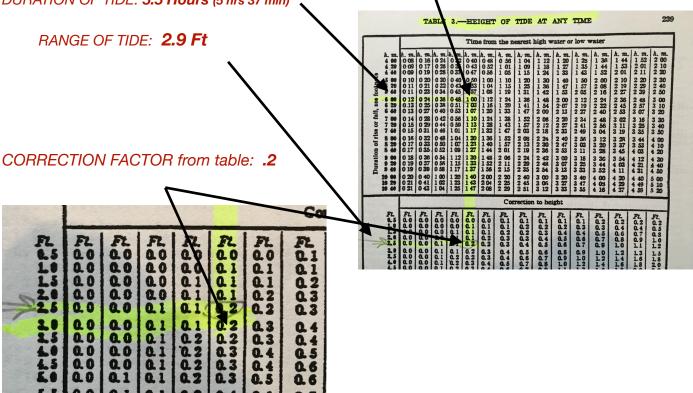
**USING TABLE 3** Find TNT - Time to Nearest Tide (**TIME DIFFERENCE**) follow that COLUMN down until you find RANGE OF TIDES that cloest match our TIDE RANGE. Using **TIDE DURATION** in table 3, follow row until you find the closest matched duration.

Note that cross referenced CORRECTION IN HEIGHT IF nearest tide is HIGH TIDE **subtract** the **CORRECTION IN HEIGHT to HIGH TIDE** IF nearest tide is LOW TIDE **add** the **CORRECTION IN HEIGHT to LOW TIDE** 

USING THE CLOSEST TIDE TO OUR PLANNED TIME you now have the Tide Height at the planned location and planned time.

**Some extrapoliation is required here:** EXAMPLE:

DIFFERENTIAL BETWEEN OUR ARRIVAL and CLOSEST TIDE: **1 hour** DURATION OF TIDE: **5.5 Hours (5 hrs 37 min)** 



LOW TIDE 14.23 + .2 = 14.42 Ft Answer: 14.42 Ft at 0914 on COT 28, 1983 at DENNIS PORT

# DETERMINING CURRENT AT A GIVEN LOCATION AND TIME

### STEP 1

Document Know information including DATE, TIME, PLANNED LOCATION (SUBSTATION), PLANNED ARRIVAL TIME (ETA) THEN FIND THE INDEX NUMBER for the SubStation (planned lcoation)

### EXAMPLE:

 Badgers Island.
 531,541

 Bahia de San Juan.
 9271,9281

 Bahia Honda Harbor.
 7941

 Bakers Haulover Cut.
 7851

 Bald Eagle Point.
 5616

 Bald Head, Cape Fear River.
 216

 Baltimore Harbor Approach \* (70).
 4696

 Barataria Pass.
 8921

 Barren Island.
 3301

 Barrytown.
 3671-681

 Bath, Kennebec River.
 226

 Barnegat Inlet.
 4066

 Barren Island.
 3301

 Barrytown.
 3671-681

 Bath, Kennebec River.
 241

 Bay of Fundy entrance \* (4).
 81

 Bay of Fundy entrance \* (4).
 81

 Bay Point Island.
 3406

Find the current at BARNSTABLE HARBOR -SubStation: (Planned location) :1251 Date: APRIL 3, 1983 at 13:43 EST Time: 0914 EST

## STEP 2

Goto TABLE 2 - find the INDEX number (planned location) and document the following:

		TABLE	2 CURRI	ENT DIFFEF	ENCES AND OTHER CONSTANTS, 1	983
TIME DIFERENCES (hours and minutes)	which the other has being the total state of the last	METER	POST	TION	TIME DIFFERENCES	Is
MINIMUM (SLACK WATER) BEFORE FLOOD	NO. PLACE	DEPTH	Lat.	Long.	Min. Min. before Flood before Ebb Flood Ebb	Flo
FLOOD ( max FLOOD )	CAPE COD BAY	ft	• ' N	° '	h. m. h. m. h. m. h. m. on BOSTON HARBOR, p.16	
EBB (Max EBB)	1231 Race Point, 7 miles north of 1236 Race Point, 1 mile northwest of 1241 Provincetown Marbor. 1246 Weilfleet Harbor.		42 11 42 05 42 03 41 54	70 16 70 15 70 03	-0 01 -0 01 -0 01 -0 01 -0 06 -0 06 -0 06 -0 06 +0 64 +0 04 +0 04 +0 09 +0 09 +0 09	0.
SPEED RATIO (multiply)	1266 Sandwich Harbor. Cape Cod Canal (see Index) 1261 Sagamore Beach.		41 43.6 41 46 41 48	70 16.4 70 29 70 31	+0 19 +0 58 +0 22 +0 29 Current weak and variable Current weak and variable	<b>i.</b> -
FLOOD EBB	1266 Ellisville Herbor, I mile east of 1271 Menomet Point. 1276 Gurnet Point, I mile east of. 1281 Plymouth Marbor		41 51 41 56 42 00 41 58	70 30 70 32 70 35 70 39	+0 14 +0 14 +0 14 +0 14 +0 04 +0 04 +0 04 +0 04 -0 06 -0 06 -0 06 -0 06 +0 04 +0 04 +0 04 +0 04	11.
EDD	1286 Farnham Rock, 1 mile east of		42 06		-0 21 -0 21 -0 21 -0 21 on POLLOCK RIP CHANNEL, p.2	
	1291  Hauset Beach Light, 5 miles northeast of    1296  Georges Bank and vicinity.    1301  Davis Bank.    1306  Honomay Point, 23 miles east of.    1311  Hantucket Shoals.    1316  Hontucket Slands.    1316  Hentucket Shoals.		41 56 41 36 40 37	69 64 69 30 69 37	See table 5. See table 5. See table 5. See table 5. See table 5.	
	1316 Nantucket Island, 28 miles east of 1321 Old Man Shoal, Nantucket Shoals 1326 Hiacomat Pond, 3.0 miles SSE of 1331 Tuckernuck Island, 4.2 miles SSH of 1336 Martha's Vinoyard, 1.4 miles S of Cl		41 20 41 13.6 41 11.4 41 13.57 41 19.50	69 21 69 59.0 70 05.8 70 16.90 70 39.90	See table 5. +1 23 +1 03 +1 17 +1 14 +2 19 +2 03 +2 22 +2 16 +4 08 +3 13 +2 17 +3 56	0.
EXAMPLE:						
MINIMUM (SLACK WATER) BEFORE FLOOD	+19 minutes					
FLOOD ( max FLOOD )	+ 58 minutes					
MINIMUM BEFORE EBB	+ 22 minutes					
EBB (Max EBB)	+ 29 minutes					
SPEED RATIO - (multiple) FLOOD max	X 1.1					
SPEED RATIO - (multiple) EBB max	X1.0					

Document the following from TABLE 2

# SPEED RATIO (multiplier) and DIRECTIONS (directions are in DEGREES)

MINIMUM BEFÒRE FLOOD FLOOD (max FLOOD) MINIMUM BEFORE EBB EBB (Max EBB)

		TABLE	2 CURR	ENT DIFFER	ENCES A	ND OTHER	CONSTA	NTS, 19	83								
1 Sale	the same in the first star and of fiding a	METER	POSI	TION	1	TIME DI	FERENCE	5	SPEED		AVE	RAGE S	PEEDS	AND D	IRECT	IONS	
NO.	PLACE	DEPTH	Section and a	Long.	Min. before Flood	Flood	Min. before Ebb	Ebb	Flood Ebb	Mini bef Flo	ore	Haxt		Mini bef Eb	ore	Maxi	
1246 1251 1256 1251 1256 1261 1276 1271 1276 1281	CAPE COD BAY Time meridian, 75°W Race Point, 7 miles north of Race Point, 1 mile northwest of Provincetown Harbor. Barstable Harbor. Sandwich Harbor. Cape Cod Canal (see Index). Sagamore Beach. Ellisville Harbor, 1 mile east of Manomet Point Gurnet Point, 1 mile east of Farnham Rock, 1 mile east of		• • • N 42 11 42 05 42 03 41 43 6 41 43 6 41 43 6 41 46  41 48 41 51 41 56 42 00 41 58 42 05	70 16 70 16 70 10 70 10 70 03 70 16.4 70 29 70 31 70 30 70 30 70 32 70 35 70 35	-0 01 -0 06 +0 04 +0 09 +0 19 Currer	-0 01 -0 06 +0 04 +0 09 +0 58 it weak	+0 22 and var	-0 01 -0 06 +0 04 +0 09 +0 29 table	1.4 1.2 0.9 0.8 0.5 0.3 0.6 0.4 1.1 1.2 0.3 0.2 1.0 0.1 1.3 0.8 0.5 0.3 1.0 0.8	knots 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	deg.	knots 1.5 1.0 0.6 0.7 1.2 0.3 1.1 0.3 1.1 0.5 1.1	deg. 290 226 315 020 192  200 200 250 245 180	knots 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	deg.	1.5 0.9 0.4 0.5 1.4 0.3 0.9 1.0 0.4	deg. 061 135 200 004  020 010 010
EXAM																	
	D RATIO for Substation				/												
FLOOL	•			/													
EBB	X 1.2		/														
DIREC	TION OF CURRENT																
FLOOL	<u> </u>		-														
EBB	004 degrees																

### STEP 4

Find the REFERENCE STATION at the top of the page and go to TABLE 1

 $\mathbf{\tilde{}}$ 

	submark to be adding the state of the first	METER	POSITION TIME DIFFERENCES					SPEED RATIOS		AVERAGE SPEEDS AND DIRECTIONS								
NO.	PLACE	DEPTH	Late	Long.	Min. before Flood	Flood	Min. before Ebb	Ebb		Flood Ebb		mum ore od	Maxin		Mini bef Eb	ore	Maximum Ebb	
	CAPE COD BAY Time meridian, 75°W	ft	N N	° H			h. m. ARBOR, I				knots	deg.	knots	deg.	knots	deg.	knots	deg.
1231 1236 1241 1246 1251 1266	Race Point, 7 miles north of Race Point, 1 mile northwest of Provincetown Harbor Weilfleet Harbor Barnstable Harbor Sendwich Harbor		42 11 42 05 42 03 41 54 41 43.6 41 46	70 16 70 15 70 10 70 03 70 16.4 70 29	+0 09 +0 19	-0 01 -0 06 +0 04 +0 09 +0 58 weak	+0 09	-0 01 -0 06 +0 04 +0 09 +0 29 table	0.9 0.5 0.6	1.2 0.8 0.3 0.4 1.2			1.5 1.0 0.6 0.7 1.2	290 226 315 020 192	0.0 0.0 0.0 0.0 0.0 0.0		1.5 0.9 0.4 0.5 1.4	061 135 200 004
1261 1266 1271 1276 1281 1286	Cape Con Canal (see Index). Sagamore Beach. Ellisville Harbor, 1 mile east of Manomet Point. Gurnet Point, 1 mile east of Plymouth Harbor.		41 48 41 51 41 56 42 00 41 58 42 06	70 31 70 30 70 32 70 35 70 39 70 35	+0 14 +0 04 -0 06 +0 04	+0 14 +0 04	+0 04	table +0 14 +0 04 -0 06 +0 04 -0 21	1.0 1.3 0.5	0.2 0.7 0.8 0.3 0.8	0.0 0.0 0.0 0.0 0.0		1.1	200 155 250 245 180	0.0		0.3 0.9 1.0 0.4 0.9	020 010 010 010

EXAMPLE: REFERENCE STATION for Barnstable Harbor is BOSTON

**Using table 1** FIND THE TWO TIDES THAT OCCUR **BEFORE** and **AFTER** OUR **ETA** DOCUMENT the following:

SLACK WATER (Minimum) T MAXIMUM CURRENT TIME SLACK WATER (Minimum) T MAXIMUM CURRENT TIME VELOCITY (Kts) (note E = I (SLACK WATER = minimum) EXAMPLE:	: (Flood) FIME : (Ebb) Ebb F=Flood)		Slack Water Time	Dir. 2 Maxi Curr	54° True	E-ED	b, Dir. Slack Water Time	. 111° Maxi Curr	APR I
SLACK WATER TIME MAX CURRENT TIME	09:22 12:37	16 ₩	0617 1157 1831	0313 0853 1506 2101	1.2E 1.3F 1.2E 1.4F	1 F	0102 0740 1328 1958	0514 1051 1739 2309	1.5E 1.3F 1.3E 1.3F
ETA SLACK WATER TIME	13:43 15:10	17 Th	0028 0658 1237 1911	0324 9918 1531 2134	1.3E 1.3F 1.2E 1.5F	2 Sa	0149 0830 1418 2048	0608 1142 1836 2359	1.4E 1.2F 1.2E 1.2F
MAX SURRENT TIME	19:35	18 F	0059 0740 1319 1955	0352 0957 1604 2216	1.3E 1.4E 1.2E 1.5F	SE	0237 0922 1510 2140	0706 1237 1935	1.3E 1.1F 1.1E
SPEED FLOOD max SPEED EBB max	1.1 F 1.1 E								

### **STEP 6**

ADD the TIME DIFFERENCE for the selected SUBSTATION  $\,$  ( our planned location) to TIME AT REFERENCE STATION  $\,$ 

MULTIPLY the SPEED RATION from the SUBSTATION to the SPEED AT REFERENCE STATION

NOTE: YOU MUST add or SUBTRACK Times as listed (- or + ) and MULTIPLE RATIOS for SPEED

# EXAMPLE:

STATION	Min before Flood	Max Flood	Min before Ebb	Max Ebb	Speed Flood	Speed Ebb
BOSTON (Reference)	9:22	12:37	15:10	19:35	1.1	1.1
Barnstable Harbor (dest)	19	58	22	29	1.1	1.2
	9:41	13:35	15:32	20:04	1.2	1.3
	time	time	time	time	Kts	Kts

Bracket OUR time between the two times that are closest NOTE: For direction of CURRENT: IF START at Flood use **FLOOD** direction, if START at ebb use **EBB** direction

EXAMPLE:

MAX FLOOD 13:35 selected Original ETA: 13:43 MIN BEFORE FLOOD 15:32 selected

DIRECTION OF CURRENT from Table 2FLOOD192 degreesEBB004 degrees

Therefore: Direction will be 192 degrees upon arrival.

### STEP 8

Go to TABLE 3 VELOCITY OF CURRENT AT ANY TIME

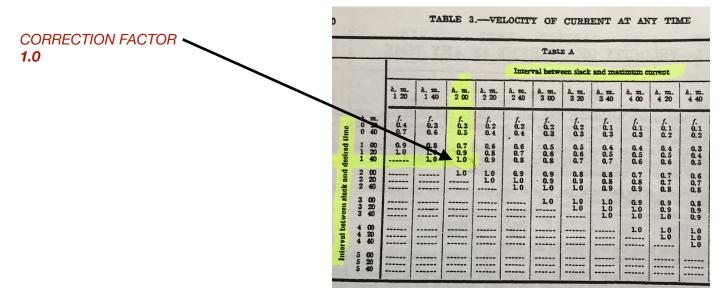
Determine DIfferential time between SLACK and MAX Determine Differential time between SLACK and OUR ETA

Using closest available numbers (EXTRAPOLIATION IS REQUIRED HERE)

CROSS REFERENCE to find correction factor multply the CORRECTION FACTOR and the SELECTED MAX CURRENT SPEED

## EXAMPLE:

DIFF between Slack and MAX: DIFF between Slack and our ETA: Slack 15:32 Maximun Flood 13:35 = 1 hr 57 min Slack 15:32 Our ETA: 13:43 = 1. hr 49 min



MULTIPLE CORRECTION FACTOR (step 8) X MAX FLOOD VELOCITY (from step 6) to get SPEED of CURRENT at our ETA

EXAMPLE:

Our original ETA: 13:43

Correction factor 1.0 X Maximum Flood Speed 1.2 Kts = 1.2 kts

(Use direction of current from step 7) Flood current direction 192 degrees

**Therefore:** 

At our arrival to Barnstable Harbor on April 3, 1983 at 13:43 EST the direction of the current will be 192 degrees at a speed of 1.2 Kts.