Solutions to Navigation Practice

1a) Fl 6sec 64ft 15M HORN-- Flashing white light, 6 second period, 64 feet high, 15 mile light visibility with a horn.
1b) Gp Occ (1+2) 15sec 65ft 16M Racon-- Group occulting white light, 1 dark followed by 2 darks, 15 second period, 65 feet high with a radar responder.
1c) KGR- Rectangular green dayboard bearing a central red stripe.
1d) GR "A" Fl (2+1) G 6s-- Green over red channel junction buoy, group flashing green light, 1 flash followed by 2 flashes, 6 second period. For preferred channel, leave this buoy to port side when enter from sea.

2a) Drying heights and contours above chart datum; I-15 of Chart #1.
2b) Rock which covers and uncovers during tidal swings; number designates height in feet above chart datum when uncovered; refer to K11 of Chart #1.
2c) Dangerous wreck, depth unknown; refer to K28 of Chart #1.
2d. Oil or gas installation buoy, or catenary anchor leg mooring, or single buoy mooring; refer to L16 of Chart #1.
2e) Established (mandatory) direction of traffic flow; refer to M10 of Chart #1.
2f) Rip rap surrounding a light; refer to Pa of Chart #1.
2g) Mean lower low water; refer to H12 of Chart #1.
2h) Position doubtful; refer to B8 of Chart #1.

3a) Water depths
3b) Distances
3c) Bearings

4a) Description of the entire Nav Aid system in US waters.
4b) Locations of Nav Aids
4c) Light Characteristics and descriptions of specific Nav Aids
4d) Geographic range table

5a) USCG Light List for US waters
5b) NGA List of Lights for non-US waters
5c) Chart #1
5d) Ocean Pilot Charts

6) NOAA Website

7) Starboard

8a) USCG Notices to Mariners.
8b) NGA Website.

9a) Safe Water mark.

9b) Isolated Dangers mark.
9c) Unlighted green can; leave to portside entering from sea.
9d) Lighted yellow special mark.
9e) Black & white dayboard.

Part II- Questions 10 to 15 contain 32 answers valued at 2 points each. Max points = 64.

First, it is necessary to update the magnetic Variations on 1210Tr from the date of the chart. There are three compass roses on this chart and they all have a slightly different Variation, which range from 15º00'W in the SW corner of the chart to 15º30'W in the NE corner. All show an annual increase of 3'W, which needs to be applied for the elapsed 19 years from 1985 to 2004. Correct as follows:

15º00'W	**in 1985**	**15º30'W**	**in 1985**
57'W	**19 x 3'**	**57'W**	**19 x 3'**
15º57'W	**in 2004**	**16º27'W**	**in 2004**

Round these off to a whole degree, which in both cases produce 16ºW; therefore we can use 16ºW Variation for the entire chart in the year 2004.

10) First plot your DR. Since the magnetic compass rose is out of date as discussed above, convert the course from ºpsc to ºT using 16ºW Variation as discussed above and the Deviation table earlier given:

	T	V	M	D	C
Course	231	16W	247	1E	246

Plot the DR from 0900 starting at buoy R"26" Fl R 4 sec Bell and draw in a course line at 231ºT. Speed is given as 4.9 knots; spread your dividers to this distance using the latitude scale on the right or lefthand sides of the chart and mark the distance from 0900 to 1000, from 1000 to 1100 and from 1100 to 1130; mark these points with a half circle and a dot and write in the times. See attached plot 13-10a.

A three bearing fix was shot at 1130. One was a visual range based on the E end of Nashawena Island when it aligned perfectly with the W end of Pasque Island; draw in this line on the chart.

The other two bearings were shot across the ship's compass and need to be converted from ºpsc to ºT as follows:

	T	V	M	D	C
Cuttyhunk	301	16W	317	1E	316
Gay Head	138	16W	154	1E	153

Plot these two additional bearings and you'll find that they cross very close to a single point as shown is the attached plot; this is your 1130 Fix; mark it with a circle and a dot and write in the time of 1130. See attached plot 13-10b.

The 1130 Fix is not at the 1130 DR position. The difference is attributed to current assumed to be acting on the boat over the previous 2-1/2 hours. <u>You were pushed from the DR to the Fix by the current</u>. Draw in this line and measure its direction by transferring it with parallel rules to the compass rose; it should be 280ºT, which is assumed to be the current Set.

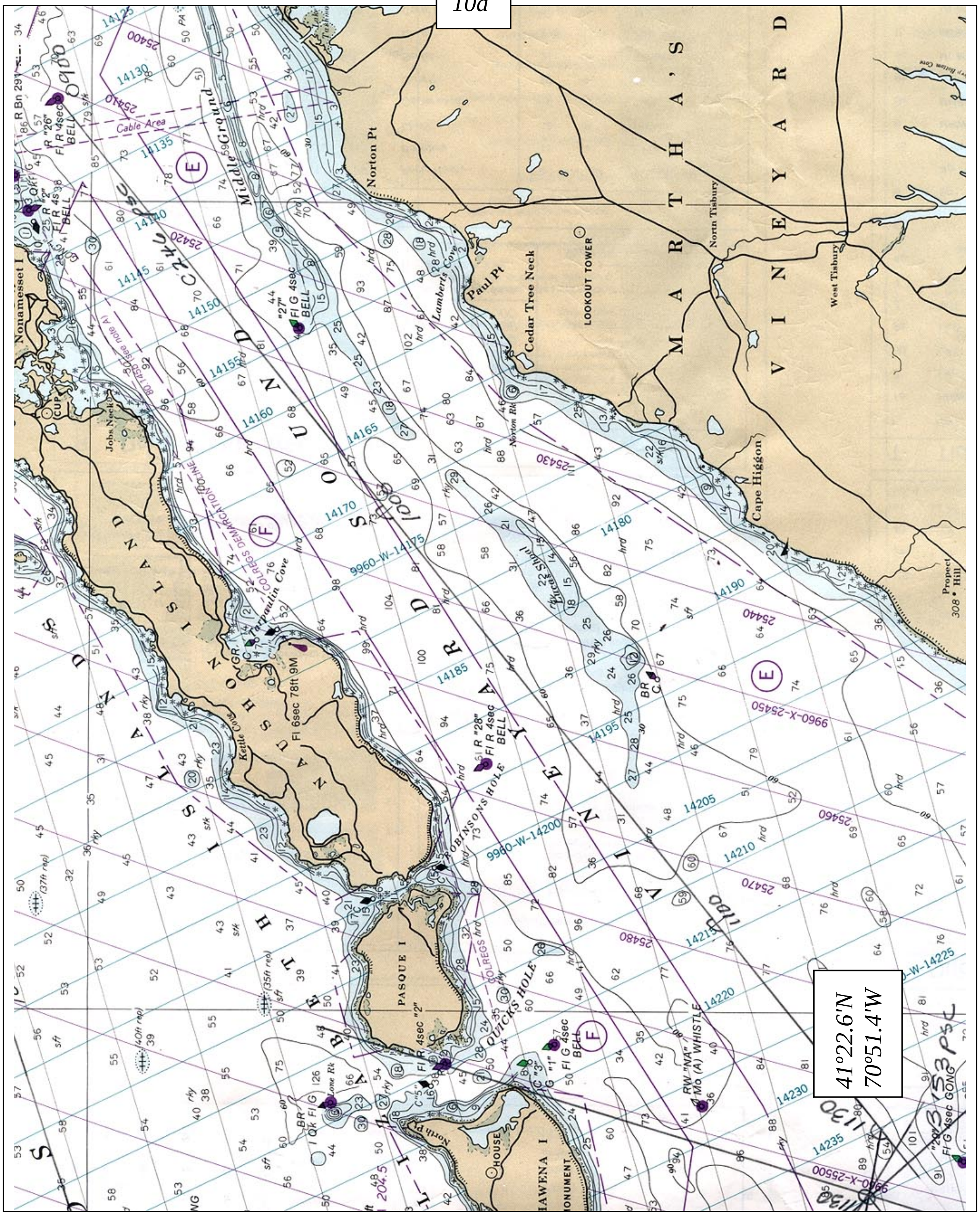
Measure the distance from the DR to the Fix and it should be 0.64 NM; this is <u>not</u> the current Drift velocity, it's the distance that the current pushed us during a 2-1/2 hour period. So, Drift velocity is:

Drift = 0.64 NM ÷ 2.5 hours = 0.26 knots

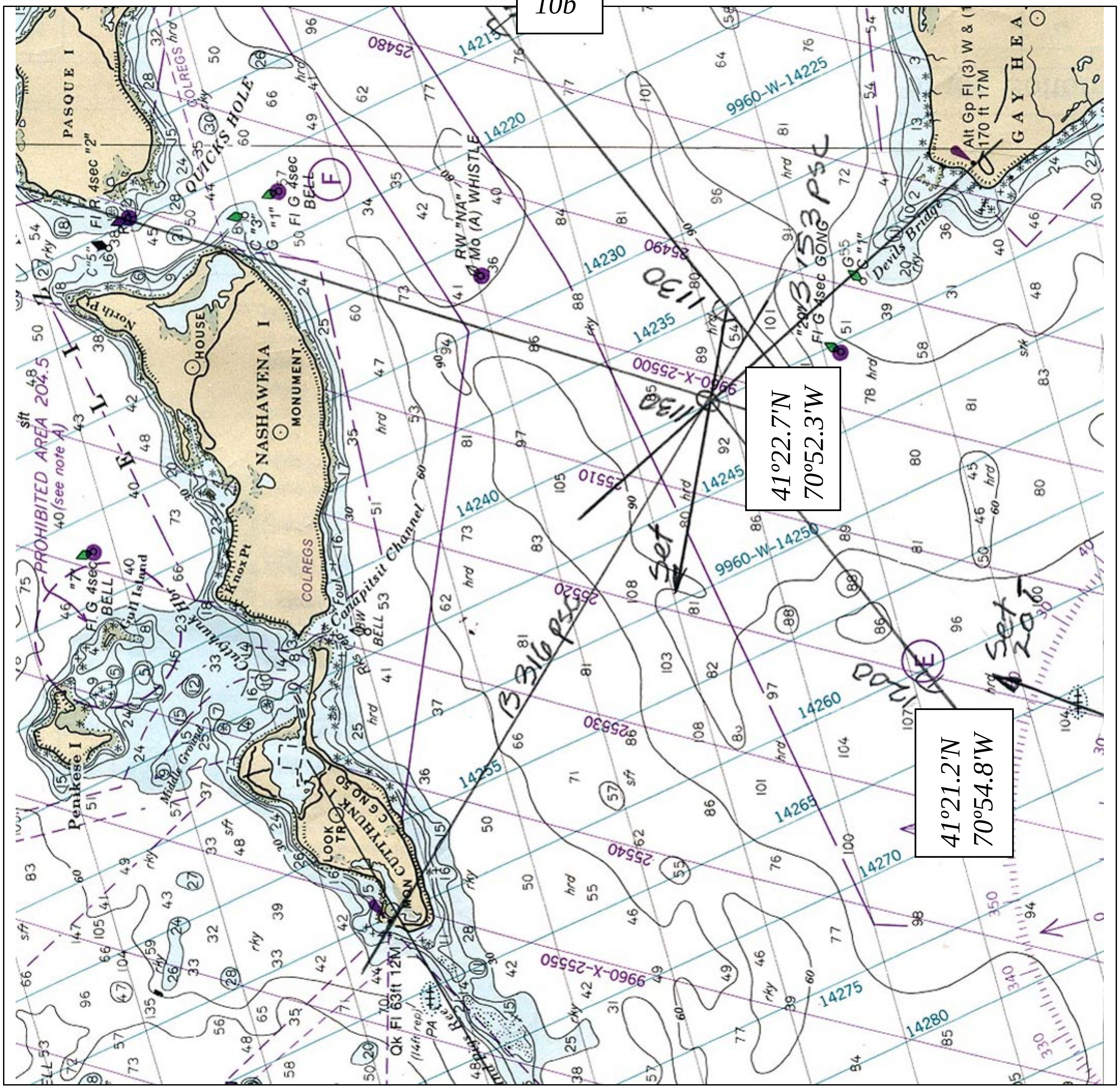
From the Fix continue plotting the DR from 1130 to 1200 and mark this point with a half circle and a dot.

Determine the latitudes and longitudes of the 1130 DR, the 1130 fix and the 1200 DR.

10a


41°22.6'N
70°51.4'W
MARTHA'S VINEYARD
VINEYARD SOUND
NAUSHON ISLAND
Norton Pt
Paul Pt
Cedar Tree Neck
LOOKOUT TOWER
Cape Higgon
North Tisbury
West Tisbury
Lamberts Cove
Middle Ground
Nonamesset I
Jobs Neck
Tarpaulin Cove
Kettle Cove
ROBINSONS HOLE
QUICKS HOLE
PASQUE I
Cable Area
COLREGS DEMARCATION LINE
Lone Rk

10b

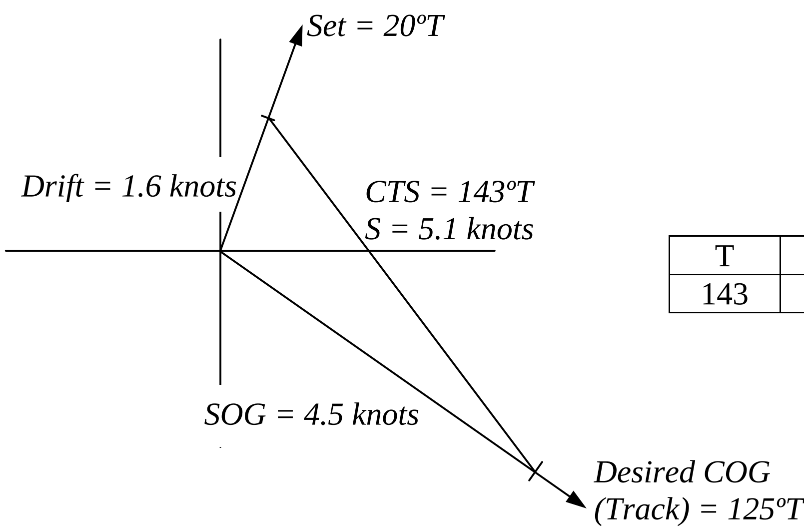

41°22.7'N
70°52.3'W
41°21.2'N
70°54.8'W
PASQUE I
QUICKS HOLE
NASHAWENA I
MONUMENT
HOUSE
Penikese I
Gull Island
Canapitsit Channel
CUTTYHUNK
PROHIBITED AREA 204.5
COLREGS
Devils Bridge
GAY HEAD

11) Plot the desired COG (Track) from buoy <u>BW "VS" Whistle</u> to buoy <u>R"2" Fl R 4 sec Whistle</u>; it should be 125ºT. You need to determine the course to steer needed to compensate for the current flow and stay on your desired course. This is a Type C current problem as discussed in Chapter 7 of the text; here's what you know:

C	**?**
S	**5.1 knots**
Set	**20ºT**
Drift	**1.6 knots**
COG	**125ºT**
SOG	**?**

Plot the COG of 125ºT. Plot the Set of 20ºT. Measure the Drift velocity of 1.6 knots along the Set vector and place a mark there.

Now, adjust your dividers to the boat speed S of 5.1 knots; place one end of the dividers at the end of the current vector and swing the other end of the dividers to find where it touches the COG vector; put a mark at this point.



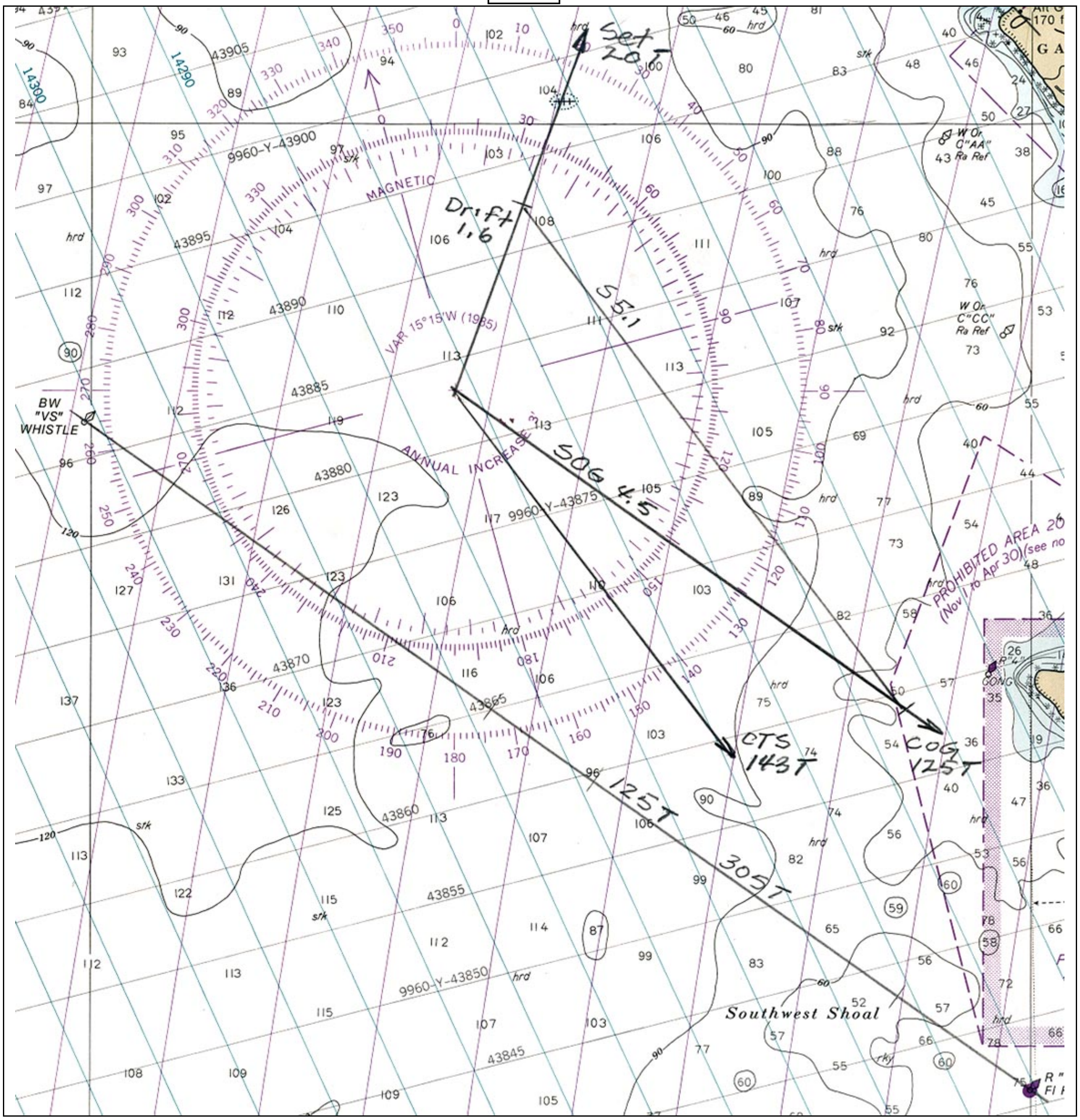
T	V	M	D	C
143	16W	159	2W	161

Speed over ground is determined by measuring the length on the "over ground" side of the triangle, which should be 4.5 knots. Use this speed to determine the ETA at buoy <u>R"2" Fl R 4 sec Whistle</u> as follows:

Transit time = Distance ÷ SOG
= 9.3 NM ÷ 4.5 knots
= 2.066 hours
= 2 hours & 04 minutes.

ETA = Departure time + Transit Time
= 1300 + 0204
= 1504

11

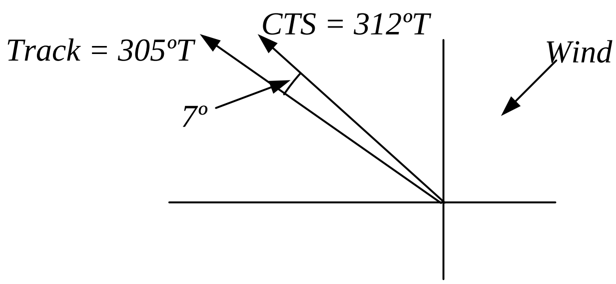

Set 20T
Drift 1.6
55.1
SOG 4.5
CTS 143T
COG 125T
125T
305T
BW "VS" WHISTLE
MAGNETIC
VAR 15°15'W (1985)
ANNUAL INCREASE
Southwest Shoal
PROHIBITED AREA
9960-Y-43900
9960-Y-43875
9960-Y-43850

**12)	The desired COG (Track) for this question is the reciprocal of that for question #11, or**

Track = 125ºT + 180º = 305ºT

	T	V	M	D	C
Track	305	16W	321	1W	322

To counteract the NE wind and stay on track you need to steer toward the wind by the amount of the leeway or 7º, thus:



	T	V	M	D	C
CTS	312	16W	328	1W	329

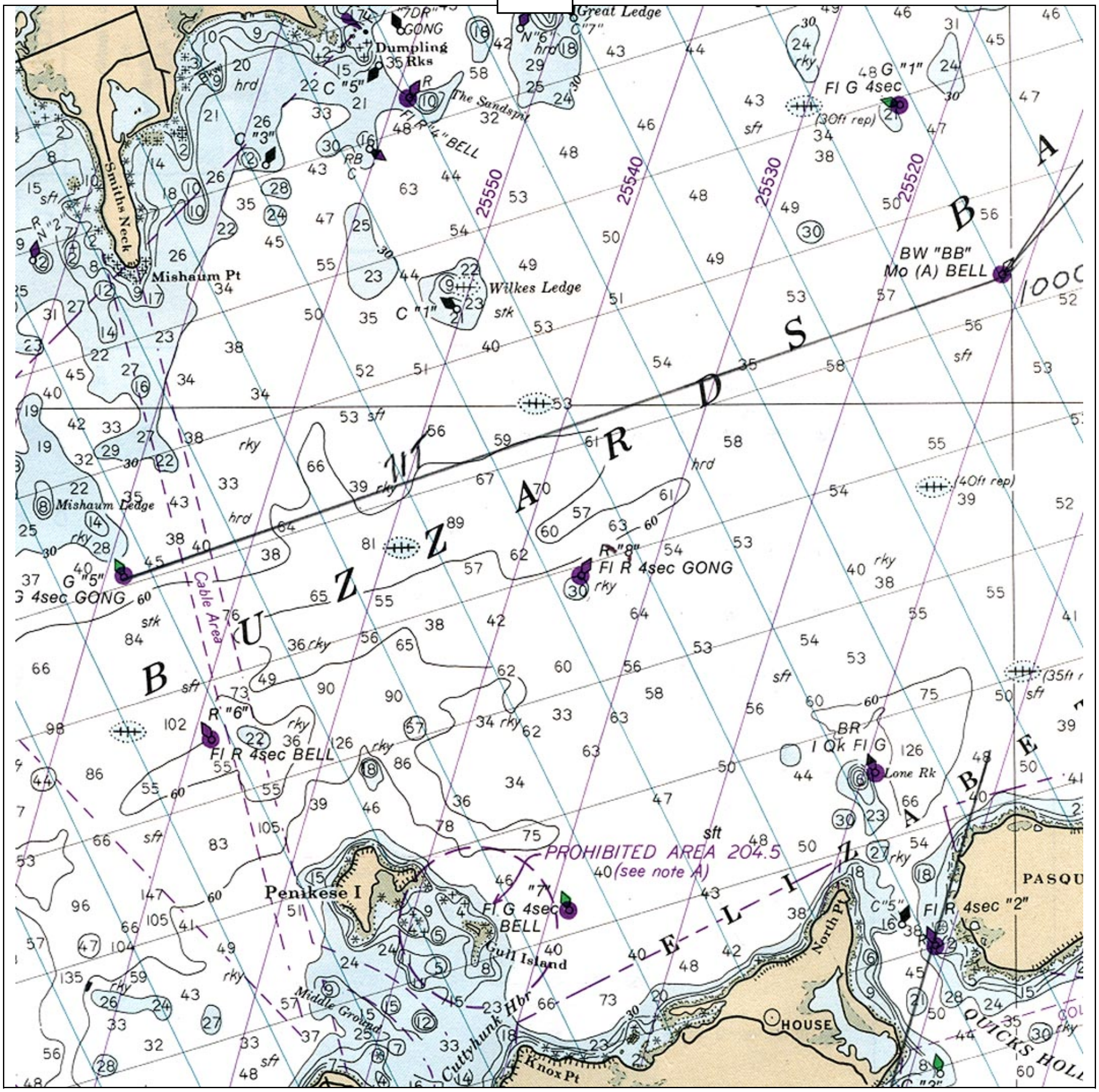
**13-13)	Draw a danger bearing line from the <u>G "5" Fl G 4 sec Gong</u> buoy to the <u>BW "BB" Mo(A) Bell</u> buoy and notice that the wreck lies just N of this line. This bearing line is 71ºT, which we need to convert to psc to allow monitoring on the ship's compass.**

	T	V	M	D	C
Bearing	71	16W	87	4W	91

We want to stay S of this line to remain away from the wreck. This danger bearing line is <u>NOT</u> a course line; we may choose to sail on a course below it and remain further away from the wreck. While doing this, we monitor the compass bearing to the <u>BW "BB" Mo(A) Bell</u> buoy; as long as this bearing remains <u>LESS</u> than 91ºpsc; we'll be away from the wreck.

Bearings of more than 91ºpsc would put us N of the danger bearing line.

13



BUZZARDS BAY
ELIZABETH
Great Ledge
Dumpling Rks
The Sandspit
Smiths Neck
Mishaum Pt
Wilkes Ledge
Mishaum Ledge
BW "BB" Mo (A) BELL
G "5" Fl G 4sec GONG
R "8" Fl R 4sec GONG
R "6" Fl R 4sec BELL
Cable Area
PROHIBITED AREA 204.5
(see note A)
Penikese I
Gull Island
Middle Ground
Cuttyhunk Hbr
Knox Pt
North Pt
Lone Rk
I Qk Fl G
"7" Fl G 4sec BELL
Fl G 4sec
Fl R 4sec "2"
HOUSE
QUICKS HOLL
PASQU
25550
25540
25530
25520

14) This is a running fix question. First draw in the desired COG (Track) from the <u>BW "BB" Mo(A) Bell</u> buoy to the <u>Fl 10 sec 74ft 16M HORN R Bn 308</u> beacon at Cleveland Ledge Channel; it should be 42ºT; convert to ºpsc as follows:

	T	V	M	D	C
Track	42	16W	58	4W	62

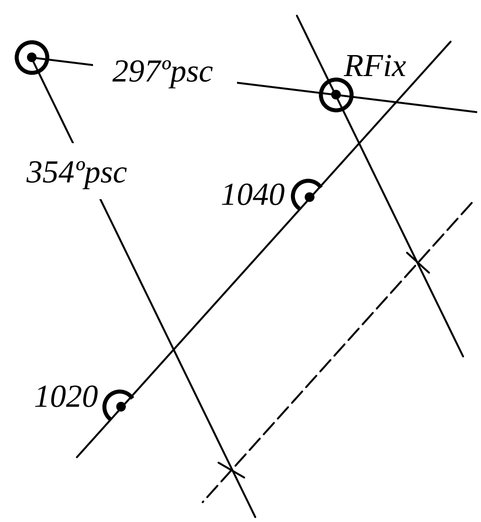
Initially, you'll steer the 62ºpsc lacking any information about current or leeway.

Since bearings were shot on the tower at 1020 and 1040, you'll need to locate your DR positions for these times. Calculate the distance traveled from 1000 to 1020 at a boat speed of 6.2 knots. This is 1/3 hour, so distance is 1/3 hour x 6.2 knots = 2.1 NM. Measure this distance and mark the point with a dot and half circle on the course line. Do the same for 1040.

Convert these bearings from ºpsc to ºT as follows and draw them in on the chart.

	T	V	M	D	C
1020 Bearing	334	16W	350	4W	354
1040 Bearing	277	16W	293	4W	297

Advance the 1020 bearing line in the direction and distance of the DR between 1020 and 1040. This is done by drawing a line parallel to the course line between 1020 and 1040 and marking off the distance covered by the DR in that time starting from where this line intersects the 1020 bearing line.

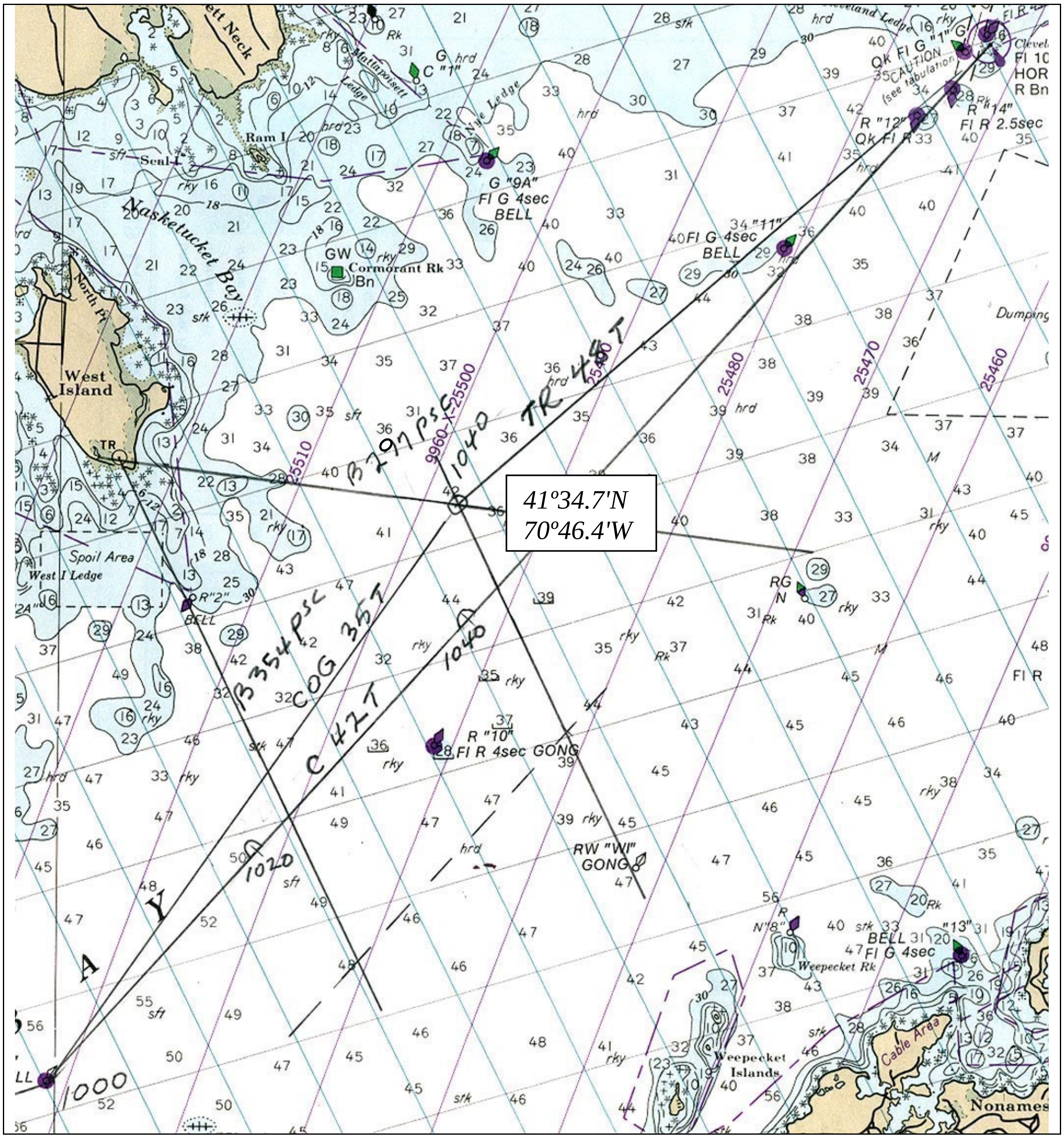


As shown in the next plot, the actual COG achieved is 35ºT from the starting buoy to the RFix, and the wind leeway is therefore 42ºT - 35ºT = 7º to port.

The desired course (Track) from the RFix to the destination buoy is 48ºT and you'll need to steer toward the wind (to the right) by 7º in order to stay on track. So, CTS = 48ºT + 7º = 55ºT and this converts to 75ºpsc.

	T	V	M	D	C
Actual COG	35	16W	51	4W	55
New Track	48	16W	64	4W	68
New CTS	55	16W	71	4W	75

14



15) This question verifies the accuracy of the Deviation table while on one boat heading of 344ºpsc. Using a pelorus you shot the range between the two towers on Cuttyhunk and found it to be 98º relative off of your starboard bow. Therefore, the bearing along the range between the towers, based on the compass is:

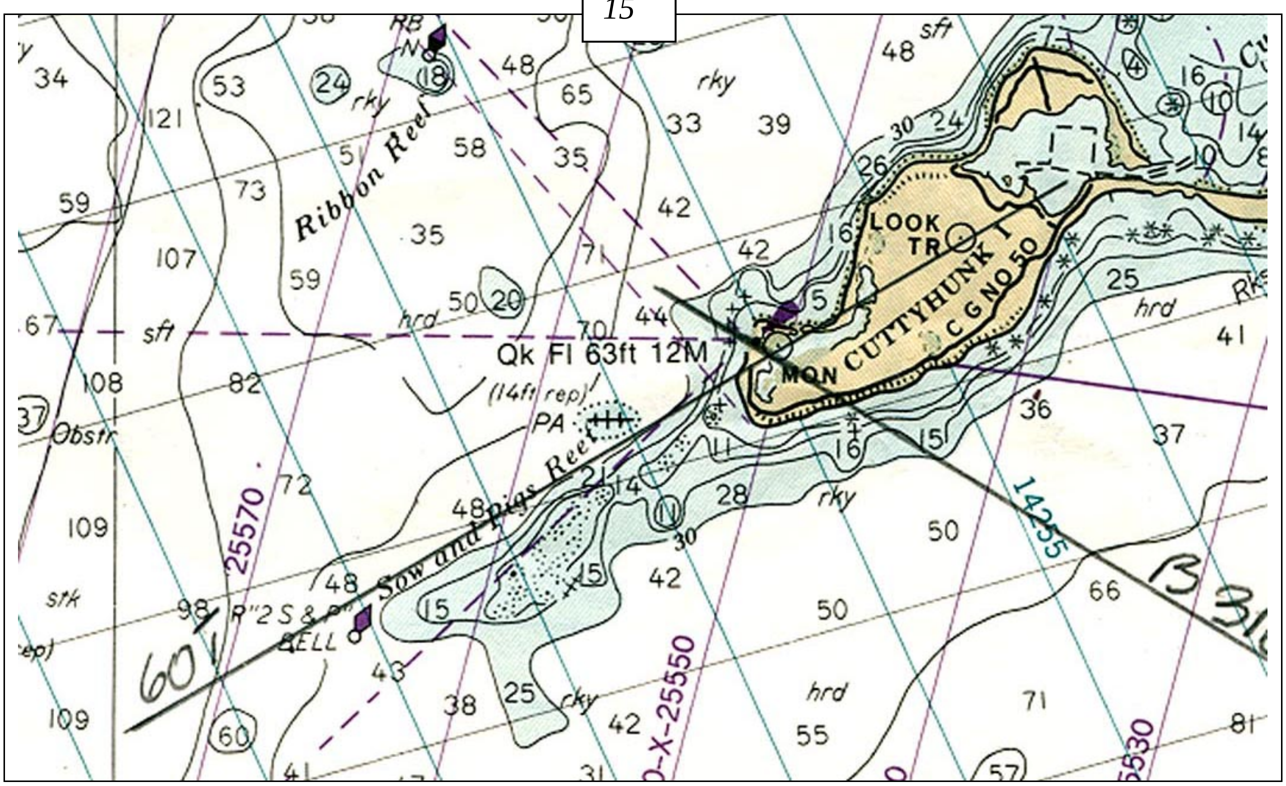
Bearing of range
= 344ºpsc + 98º
= 442ºpsc - 360º
= 82ºpsc

The chart shows this range to be 60ºT, and we enter this information in the table as follows:

	T	V	M	D	C
Range	60	16W	76	6W	82

From this observation we compute the compass deviation to be 6ºW for a boat heading of 344ºpsc, but the Deviation table gives 1ºW for this heading. So, either the Deviation table is in error or our shot was in error.

15



16) What is the time and height of the lowest tide at Newport, RI on January 29, 1997? This is a direct lookup in the tide table of *Appendix G-15*.

Newport, R.I., 1997

Times and Heights of High and Low Waters

January

Day	Time (h m)	Height (ft)	Height (cm)
1 W ◑	0037	2.9	88
	0537	0.5	15
	1255	2.8	85
	1802	0.3	9
2 Th	0130	3.0	91
	0634	0.6	18
	1350	2.8	85
	1855	0.3	9
3 F	0225	3.1	94
	0738	0.6	18
	1446	2.8	85
	1954	0.2	6
4 Sa	0320	3.3	101
	0846	0.4	12
	1542	2.9	88
	2056	0.1	3
5 Su	0412	3.6	110
	0951	0.2	6
	1635	3.2	98
	2157	−0.2	−6
6 M	0503	4.0	122
	1051	−0.1	−3
	1727	3.4	104
	2254	−0.4	−12
7 Tu	0553	4.3	131
	1146	−0.4	−12
	1817	3.7	113
	2349	−0.7	−21
8 W ●	0642	4.6	140
	1237	−0.7	−21
	1907	3.9	119
9 Th	0042	−0.9	−27
	0731	4.7	143
	1326	−0.9	−27
	1956	4.1	125
10 F	0134	−1.0	−30
	0821	4.7	143
	1414	−0.9	−27
	2047	4.2	128
11 Sa	0226	−1.0	−30
	0911	4.6	140
	1503	−0.9	−27
	2138	4.2	128
12 Su	0319	−0.8	−24
	1003	4.4	134
	1552	−0.8	−24
	2232	4.1	125
13 M	0413	−0.6	−18
	1057	4.1	125
	1643	−0.6	−18
	2327	4.0	122
14 Tu	0511	−0.3	−9
	1153	3.8	116
	1737	−0.3	−9
15 W ◐	0026	3.8	116
	0616	0.0	0
	1252	3.5	107
	1836	−0.1	−3
16 Th	0126	3.7	113
	0733	0.2	6
	1352	3.2	98
	1943	0.1	3
17 F	0227	3.7	113
	0859	0.3	9
	1453	3.1	94
	2055	0.2	6
18 Sa	0326	3.7	113
	1015	0.3	9
	1550	3.1	94
	2203	0.1	3
19 Su	0421	3.7	113
	1112	0.2	6
	1644	3.1	94
	2257	0.1	3
20 M	0512	3.8	116
	1158	0.1	3
	1733	3.2	98
	2342	0.0	0
21 Tu	0558	3.9	119
	1234	0.0	0
	1818	3.3	101
22 W	0019	−0.1	−3
	0642	3.9	119
	1303	0.0	0
	1901	3.4	104
23 Th ○	0052	−0.1	−3
	0723	3.9	119
	1329	−0.1	−3
	1942	3.5	107
24 F	0124	−0.2	−6
	0803	3.9	119
	1355	−0.1	−3
	2023	3.5	107
25 Sa	0155	−0.2	−6
	0843	3.8	116
	1422	−0.1	−3
	2103	3.4	104
26 Su	0228	−0.1	−3
	0922	3.6	110
	1452	−0.1	−3
	2143	3.4	104
27 M	0302	0.0	0
	1001	3.4	104
	1524	−0.1	−3
	2224	3.2	98
28 Tu	0338	0.1	3
	1041	3.2	98
	1558	0.0	0
	2307	3.1	94
29 W	0418	0.2	6
	~~1124~~	~~3.0~~	~~91~~
	1637	0.1	3
	~~2350~~	~~3.1~~	~~94~~
30 Th	0503	0.3	9
	1212	2.8	85
	1721	0.1	3
31 F ◑	0045	3.0	91
	0556	0.4	12
	1307	2.7	82
	1813	0.2	6

February

Day	Time (h m)	Height (ft)	Height (cm)
1 Sa	0142	3.1	94
	0656	0.4	12
	1407	2.7	82
	1913	0.1	3
2 Su	0242	3.3	101
	0806	0.3	9
	1508	2.8	85
	2020	0.0	0
3 M	0341	3.6	110
	0918	0.1	3
	1607	3.1	94
	2128	−0.2	−6
4 Tu	0437	3.9	119
	1025	−0.1	−3
	1703	3.4	104
	2234	−0.4	−12
5 W	0531	4.2	128
	1125	−0.5	−15
	1756	3.8	116
	2335	−0.7	−21
6 Th	0622	4.5	137
	1218	−0.8	−24
	1847	4.1	125
7 F ●	0031	−1.0	−30
	0713	4.7	143
	1309	−1.0	−30
	1937	4.4	134
8 Sa	0124	−1.1	−34
	0803	4.7	143
	1357	−1.1	−34
	2027	4.5	137
9 Su	0216	−1.1	−34
	0852	4.6	140
	1444	−1.0	−30
	2117	4.5	137
10 M	0307	−1.0	−30
	0943	4.4	134
	1531	−0.9	−27
	2209	4.4	134
11 Tu	0359	−0.7	−21
	1034	4.1	125
	1618	−0.6	−18
	2302	4.1	125
12 W	0452	−0.4	−12
	1128	3.7	113
	1708	−0.3	−9
	2358	3.9	119
13 Th	0551	−0.1	−3
	1224	3.3	101
	1802	0.0	0
14 F ◐	0057	3.6	110
	0701	0.3	9
	1324	3.1	94
	1904	0.2	6
15 Sa	0158	3.5	107
	0830	0.4	12
	1425	2.9	88
	2023	0.4	12
16 Su	0258	3.4	104
	0955	0.5	15
	1525	2.9	88
	2145	0.4	12
17 M	0356	3.4	104
	1055	0.4	12
	1620	3.0	91
	2247	0.3	9
18 Tu	0448	3.5	107
	1139	0.3	9
	1709	3.1	94
	2331	0.2	6
19 W	0535	3.6	110
	1212	0.2	6
	1755	3.3	101
20 Th	0006	0.0	0
	0618	3.7	113
	1238	0.1	3
	1837	3.5	107
21 F	0036	−0.1	−3
	0659	3.7	113
	1301	0.0	0
	1917	3.6	110
22 Sa ○	0105	−0.2	−6
	0738	3.8	116
	1326	−0.1	−3
	1956	3.6	110
23 Su	0135	−0.2	−6
	0817	3.7	113
	1353	−0.2	−6
	2035	3.6	110
24 M	0207	−0.2	−6
	0855	3.6	110
	1422	−0.2	−6
	2113	3.6	110
25 Tu	0240	−0.2	−6
	0932	3.4	104
	1453	−0.2	−6
	2152	3.5	107
26 W	0315	−0.1	−3
	1011	3.2	98
	1528	−0.1	−3
	2232	3.4	104
27 Th	0353	0.0	0
	1052	3.0	91
	1606	−0.1	−3
	2316	3.3	101
28 F	0437	0.1	3
	1139	2.9	88
	1650	0.0	0

March

Day	Time (h m)	Height (ft)	Height (cm)
1 Sa	0007	3.2	98
	0527	0.2	6
	1234	2.8	85
	1742	0.1	3
2 Su ◑	0106	3.2	98
	0626	0.3	9
	1336	2.8	85
	1843	0.1	3
3 M	0210	3.3	101
	0735	0.2	6
	1441	2.9	88
	1953	0.1	3
4 Tu	0313	3.5	107
	0850	0.1	3
	1543	3.2	98
	2109	−0.1	−3
5 W	0413	3.8	116
	1002	−0.2	−6
	1641	3.6	110
	2220	−0.4	−12
6 Th	0509	4.1	125
	1104	−0.5	−15
	1735	4.0	122
	2324	−0.7	−21
7 F	0602	4.4	134
	1158	−0.8	−24
	1827	4.3	131
8 Sa ●	0020	−1.0	−30
	0653	4.6	140
	1248	−1.0	−30
	1917	4.6	140
9 Su	0113	−1.1	−34
	0743	4.6	140
	1335	−1.1	−34
	2006	4.7	143
10 M	0203	−1.2	−37
	0832	4.5	137
	1421	−1.0	−30
	2055	4.7	143
11 Tu	0252	−1.0	−30
	0921	4.3	131
	1506	−0.8	−24
	2144	4.5	137
12 W	0341	−0.7	−21
	1011	4.0	122
	1551	−0.6	−18
	2235	4.2	128
13 Th	0430	−0.4	−12
	1102	3.6	110
	1637	−0.2	−6
	2329	3.9	119
14 F	0522	0.0	0
	1157	3.3	101
	1726	0.1	3
15 Sa ◐	0025	3.6	110
	0622	0.3	9
	1255	3.0	91
	1823	0.4	12
16 Su	0125	3.3	101
	0741	0.6	18
	1355	2.8	85
	1938	0.6	18
17 M	0226	3.2	98
	0917	0.6	18
	1455	2.8	85
	2118	0.6	18
18 Tu	0325	3.1	94
	1022	0.6	18
	1551	2.9	88
	2227	0.5	15
19 W	0418	3.2	98
	1104	0.5	15
	1641	3.1	94
	2311	0.4	12
20 Th	0506	3.3	101
	1134	0.3	9
	1727	3.3	101
	2344	0.2	6
21 F	0549	3.5	107
	1159	0.2	6
	1809	3.6	110
22 Sa	0013	0.0	0
	0631	3.6	110
	1223	0.0	0
	1849	3.7	113
23 Su ○	0042	−0.1	−3
	0710	3.7	113
	1250	−0.1	−3
	1928	3.8	116
24 M	0112	−0.2	−6
	0749	3.7	113
	1320	−0.2	−6
	2006	3.9	119
25 Tu	0144	−0.3	−9
	0827	3.6	110
	1351	−0.2	−6
	2044	3.9	119
26 W	0218	−0.3	−9
	0906	3.5	107
	1424	−0.2	−6
	2123	3.8	116
27 Th	0254	−0.3	−9
	0946	3.3	101
	1501	−0.2	−6
	2203	3.7	113
28 F	0333	−0.2	−6
	1028	3.1	94
	1541	−0.1	−3
	2248	3.6	110
29 Sa	0417	−0.1	−3
	1116	3.0	91
	1627	0.0	0
	2340	3.5	107
30 Su	0508	0.0	0
	1212	2.9	88
	1720	0.1	3
31 M ◑	0039	3.4	104
	0606	0.1	3
	1315	2.9	88
	1823	0.2	6

Time meridian 75° W. 0000 is midnight. 1200 is noon.
Heights are referred to mean lower low water which is the chart datum of soundings.

17) What is the time and height of the lowest tide at Portland Head Light on February 18, 1997?

From Appendix page G-12 find Portland Head Light #869 and a Low Water height ratio of 0.97 and a time difference of -2 minutes compared with the reference station at Portland, Maine.

Portland, Maine on Appendix page G-14 for February 18, 1997 gives the lowest tide height as 0.3 feet at 1448.

Therefore, at Portland Head Light, Low Water would be:

Time = 1448 -0002 = 1446 hours/minutes

Height = 0.3 feet x 0.97 = 0.29 feet

18) Convert Eastern Standard Time to Eastern Daylight Time.

EDT = EST + 1 hour

19) What is the time of the maximum flood current at Boston Harbor, Deer Island Light on February 19, 1997? This is a straight lookup on *Appendix page I-8*.

13-20) What is the direction, velocity and time of the maximum ebb current at Wareham River off Barneys Point on January 23, 1997?

On *Appendix page I-7* find Wareham River, Barney's Point # 2141

- **Time difference is given as - 1 hour & 31 minutes under Ebb**
- **Speed Ratio is given as 0.4 under Ebb.**
- **In the right hand column under Max Ebb the direction is given as 185ºT.**
- **Reference Station is given as Pollock Rip Channel**

On *Appendix page I-9* find Pollock Rip Channel daily predictions

- **Max Ebb current is given at 1.8 knots at 1212**
- **At Wareham River, Barney's Point:**

  Time = 1212 - 0131 = 1041 EST

  Velocity = 1.8 knots x 0.4 = 0.72 knots

TABLE 2 – TIDAL DIFFERENCES AND OTHER CONSTANTS

No.	PLACE	POSITION Latitude	POSITION Longitude	DIFFERENCES Time High Water	DIFFERENCES Time Low Water	DIFFERENCES Height High Water	DIFFERENCES Height Low Water	RANGES Mean	RANGES Spring	Mean Tide Level
		North	West	h m	h m	ft	ft	ft	ft	ft
	MAINE, Casco Bay–cont. Time meridian, 75° W				on Portland, p.32					
833	Little Flying Point, Maquoit Bay	43° 50'	70° 03'	–0 01	–0 01	*0.99	*0.99	9.0	10.3	4.8
835	South Freeport	43° 49'	70° 06'	+0 12	+0 10	*0.99	*0.99	9.0	10.3	4.8
837	Chebeague Point, Great Chebeague Island.	43° 46'	70° 06'	–0 04	–0 09	*0.99	*0.99	9.0	10.4	4.8
839	Prince Point	43° 46'	70° 10'	0 00	0 00	*1.01	*1.00	9.2	10.6	4.9
841	Doyle Point	43° 45'	70° 08'	–0 02	–0 03	*1.00	*0.88	9.2	10.5	4.9
843	Falmouth Foreside	43° 44'	70° 12'	+0 01	0 00	*1.00	*1.03	9.1	10.5	4.9
845	Great Chebeague Island	43° 43'	70° 08'	+0 03	+0 03	*1.00	*1.00	9.1	10.5	4.9
847	Cliff Island, Luckse Sound	43° 42'	70° 07'	–0 02	–0 02	*1.00	*1.00	9.1	10.4	4.9
849	Vaill Island	43° 41'	70° 09'	+0 05	+0 01	*0.98	*1.03	9.0	10.3	4.8
851	Long Island	43° 41'	70° 10'	–0 01	0 00	*1.00	*1.00	9.1	10.4	4.9
853	Cow Island	43° 41'	70° 11'	–0 01	0 00	*1.00	*1.00	9.1	10.5	4.9
855	Presumpscot River Bridge	43° 41'	70° 15'	+0 01	+0 04	*1.01	*1.06	9.2	10.6	5.0
857	Back Cove	43° 41'	70° 15'	+0 02	+0 06	*0.97	*0.97	9.1	10.5	4.9
859	Great Diamond Island	43° 40'	70° 12'	–0 01	0 00	*0.99	*1.00	9.0	10.4	4.9
861	Peaks Island	43° 39'	70° 12'	–0 04	–0 08	*0.99	*0.99	9.0	10.4	4.8
863	Cushing Island	43° 39'	70° 12'	+0 01	0 00	*0.99	*1.00	9.0	10.4	4.9
865	PORTLAND	43° 40'	70° 15'		*Daily predictions*			9.1	10.4	4.9
867	Fore River	43° 38'	70° 17'	+0 02	+0 02	*1.00	*1.00	9.1	10.5	4.9
869	Portland Head Light	43° 37'	70° 12'	–0 02	–0 02	*0.97	*0.97	8.9	10.2	4.8
	MAINE, outer coast–cont.									
871	Richmond Island	43° 33'	70° 14'	–0 03	–0 03	*0.98	*0.98	8.9	10.1	4.8
873	Old Orchard Beach	43° 31'	70° 22'	0 00	–0 06	*0.97	*0.97	8.8	10.1	4.7
875	Wood Island Harbor	43° 27'	70° 21'	+0 02	–0 04	*0.96	*0.96	8.7	9.9	4.7
877	Cape Porpoise	43° 22'	70° 26'	+0 12	+0 14	*0.95	*0.95	8.7	9.9	4.7
879	Kennebunkport	43° 21'	70° 28'	+0 16	+0 16	*0.94	*0.94	8.6	9.9	4.6
881	York Harbor	43° 08'	70° 38'	+0 03	+0 13	*0.95	*0.95	8.6	9.9	4.6
883	Seapoint, Cutts Island	43° 05'	70° 40'	+0 01	–0 04	*0.96	*0.96	8.8	10.1	4.7
	MAINE and NEW HAMPSHIRE									
	Portsmouth Harbor									
885	Jaffrey Point	43° 03'	70° 43'	–0 03	–0 05	*0.95	*0.95	8.7	10.0	4.7
887	Gerrish Island	43° 04'	70° 42'	–0 02	–0 03	*0.95	*0.95	8.7	10.0	4.7
889	Fort Point	43° 04'	70° 43'	+0 03	+0 07	*0.94	*0.94	8.6	9.9	4.6
891	Kittery Point	43° 05'	70° 42'	–0 07	+0 01	*0.96	*0.96	8.7	10.0	4.7
893	Seavey Island	43° 05'	70° 45'	+0 20	+0 18	*0.89	*0.89	8.1	9.4	4.4
895	Portsmouth	43° 05'	70° 45'	+0 22	+0 17	*0.86	*0.86	7.8	9.0	4.2
	Piscataqua River									
897	Atlantic Heights	43° 05'	70° 46'	+0 37	+0 28	*0.82	*0.82	7.5	8.6	4.0
899	Dover Point	43° 07'	70° 50'	+1 33	+1 27	*0.70	*0.70	6.4	7.4	3.4
901	Salmon Falls River entrance	43° 11'	70° 50'	+1 35	+1 52	*0.75	*0.75	6.8	7.8	3.6
903	Squamscott River RR. Bridge	43° 03'	70° 55'	+2 19	+2 41	*0.75	*0.75	6.8	7.8	3.6
905	Gosport Harbor, Isles of Shoals	42° 59'	70° 37'	+0 02	–0 02	*0.93	*0.93	8.5	9.8	4.5
907	Hampton Harbor	42° 54'	70° 49'	+0 14	+0 32	*0.91	*0.91	8.3	9.5	4.5
	MASSACHUSETTS, outer coast									
909	Merrimack River entrance	42° 49'	70° 49'	+0 20	+0 24	*0.91	*0.91	8.3	9.5	4.4
911	Newburyport, Merrimack River	42° 49'	70° 52'	+0 31	+1 11	*0.86	*0.86	7.8	9.0	4.2
913	Plum Island Sound (south end)	42° 43'	70° 47'	+0 12	+0 37	*0.94	*0.94	8.6	9.9	4.6
915	Annisquam	42° 39'	70° 41'	0 00	–0 07	*0.96	*0.96	8.7	10.1	4.7
917	Rockport	42° 40'	70° 37'	+0 04	+0 02	*0.94	*0.94	8.6	10.0	4.6
					on Boston, p.36					
919	Gloucester Harbor	42° 36'	70° 40'	–0 01	–0 04	*0.91	*0.91	8.7	10.1	4.6
921	Manchester Harbor	42° 34'	70° 47'	0 00	–0 04	*0.92	*0.92	8.8	10.2	4.7
923	Beverly	42° 32'	70° 53'	+0 02	–0 03	*0.94	*0.94	9.0	10.4	4.8
925	Salem	42° 31'	70° 53'	+0 04	+0 03	*0.92	*0.92	8.8	10.2	4.7
927	Marblehead	42° 30'	70° 51'	0 00	–0 04	*0.95	*0.95	9.1	10.6	4.8
	Broad Sound									
929	Nahant	42° 25'	70° 55'	+0 01	0 00	*0.94	*0.94	9.0	10.4	4.8
931	Lynn Harbor	42° 27'	70° 58'	+0 10	+0 06	*0.96	*0.96	9.2	10.7	4.9
	Boston Harbor									
933	Boston Light	42° 20'	70° 53'	+0 02	+0 03	*0.94	*0.94	9.0	10.4	4.8
935	Lovell Island, The Narrows	42° 20'	70° 56'	+0 04	+0 03	*0.95	*0.95	9.1	10.6	4.8
937	Deer Island (south end)	42° 21'	70° 58'	+0 01	0 00	*0.97	*0.97	9.3	10.8	4.9
939	Belle Isle Inlet entrance	42° 23'	71° 00'	+0 20	+0 17	*1.00	*1.00	9.5	11.0	5.0
941	Castle Island	42° 20'	71° 01'	0 00	+0 02	*0.99	*0.99	9.4	10.9	5.0
943	BOSTON	42° 21'	71° 03'		*Daily predictions*			9.5	11.0	5.1
945	Dover St. Bridge, Fort Point Channel	42° 21'	71° 04'	+0 06	+0 08	*1.01	*1.01	9.6	11.0	5.1
	Charles River									
947	Charlestown Bridge	42° 22'	71° 04'	+0 04	+0 04	*1.00	*1.00	9.5	11.0	5.0
949	Charles River Dam	42° 22'	71° 04'	+0 07	+0 06	*1.00	*1.00	9.5	11.0	5.0
951	Charlestown	42° 22'	71° 03'	0 00	+0 01	*1.00	*1.00	9.5	11.0	5.0
953	Chelsea St. Bridge, Chelsea River	42° 23'	71° 01'	+0 01	+0 06	*1.01	*1.01	9.6	11.1	5.1
955	Neponset, Neponset River	42° 17'	71° 02'	–0 02	+0 03	*1.00	*1.00	9.5	11.0	5.0
957	Moon Head	42° 19'	70° 59'	+0 01	+0 04	*0.99	*0.99	9.4	10.9	5.0
959	Rainsford Island, Nantasket Roads	42° 19'	70° 57'	0 00	+0 02	*0.95	*0.95	9.1	10.6	4.8

Endnotes can be found at the end of table 2.

Portland, Maine, 1997

Times and Heights of High and Low Waters

January

Day	Time (h m)	Height (ft)	Height (cm)
1 W ◑	0349 0954 1604 2215	8.4 1.5 8.3 1.1	256 46 253 34
2 Th	0437 1048 1657 2305	8.5 1.4 8.1 1.2	259 43 247 37
3 F	0527 1144 1754 2358	8.7 1.3 8.0 1.1	265 40 244 34
4 Sa	0619 1241 1851	8.9 0.9 8.2	271 27 250
5 Su	0052 0712 1337 1948	1.0 9.4 0.4 8.4	30 287 12 256
6 M	0145 0804 1430 2042	0.7 9.9 −0.2 8.8	21 302 −6 268
7 Tu	0238 0855 1521 2134	0.3 10.5 −0.8 9.3	9 320 −24 283
8 W ●	0329 0945 1611 2224	−0.2 11.0 −1.3 9.7	−6 335 −40 296
9 Th	0420 1035 1700 2314	−0.6 11.4 −1.7 10.1	−18 347 −52 308
10 F	0512 1127 1750	−0.9 11.6 −2.0	−27 354 −61
11 Sa	0005 0604 1219 1841	10.3 −1.0 11.5 −1.9	314 −30 351 −58
12 Su	0058 0659 1313 1934	10.5 −1.0 11.2 −1.7	320 −30 341 −52
13 M	0152 0756 1410 2028	10.4 −0.8 10.8 −1.3	317 −24 329 −40
14 Tu	0248 0856 1510 2125	10.3 −0.5 10.2 −0.8	314 −15 311 −24
15 W ◐	0348 1000 1614 2226	10.1 −0.2 9.6 −0.3	308 −6 293 −9
16 Th	0449 1107 1721 2328	9.9 0.0 9.1 0.1	302 0 277 3
17 F	0552 1215 1828	9.8 0.1 8.8	299 3 268
18 Sa	0032 0655 1319 1933	0.5 9.7 0.1 8.6	15 296 3 262
19 Su	0132 0753 1418 2031	0.6 9.7 0.0 8.6	18 296 0 262
20 M	0228 0846 1511 2123	0.6 9.8 −0.1 8.7	18 299 −3 265
21 Tu	0318 0934 1557 2209	0.6 9.9 −0.2 8.8	18 302 −6 268
22 W	0402 1016 1639 2250	0.6 9.9 −0.3 8.8	18 302 −9 268
23 Th ○	0442 1055 1716 2327	0.5 9.9 −0.3 8.9	15 302 −9 271
24 F	0520 1131 1751	0.5 9.8 −0.2	15 299 −6
25 Sa	0002 0555 1206 1824	8.9 0.6 9.7 −0.1	271 18 296 −3
26 Su	0036 0631 1241 1857	8.9 0.6 9.5 0.1	271 18 290 3
27 M	0110 0707 1317 1931	8.8 0.7 9.3 0.2	268 21 283 6
28 Tu	0145 0745 1356 2007	8.8 0.8 9.0 0.4	268 24 274 12
29 W	0222 0826 1437 2046	8.8 0.9 8.7 0.7	268 27 265 21
30 Th	0303 0912 1522 2130	8.8 1.0 8.4 0.9	268 30 256 27
31 F ◑	0348 1002 1613 2218	8.8 1.0 8.2 1.0	268 30 250 30

February

Day	Time (h m)	Height (ft)	Height (cm)
1 Sa	0438 1058 1709 2313	8.9 1.0 8.1 1.1	271 30 247 34
2 Su	0533 1158 1811	9.0 0.7 8.1	274 21 247
3 M	0012 0632 1300 1914	0.9 9.4 0.3 8.4	27 287 9 256
4 Tu	0113 0732 1401 2014	0.6 9.9 −0.2 8.8	18 302 −6 268
5 W	0212 0830 1457 2111	0.2 10.5 −0.9 9.4	6 320 −27 287
6 Th	0309 0926 1550 2204	−0.4 11.0 −1.5 10.0	−12 335 −46 305
7 F ●	0403 1020 1641 2256	−0.9 11.5 −1.9 10.5	−27 351 −58 320
8 Sa	0457 1112 1732 2347	−1.4 11.7 −2.1 10.8	−43 357 −64 329
9 Su	0550 1205 1822	−1.6 11.6 −2.1	−49 354 −64
10 M	0038 0644 1259 1913	11.0 −1.6 11.3 −1.8	335 −49 344 −55
11 Tu	0130 0739 1354 2005	10.9 −1.3 10.8 −1.3	332 −40 329 −40
12 W	0224 0836 1451 2100	10.7 −0.9 10.1 −0.7	326 −27 308 −21
13 Th	0320 0937 1552 2159	10.3 −0.5 9.4 −0.1	314 −15 287 −3
14 F ◐	0420 1042 1657 2301	9.9 0.0 8.9 0.5	302 0 271 15
15 Sa	0523 1149 1804	9.5 0.3 8.5	290 9 259
16 Su	0005 0627 1255 1910	0.9 9.3 0.4 8.3	27 283 12 253
17 M	0109 0729 1355 2009	1.1 9.2 0.4 8.3	34 280 12 253
18 Tu	0207 0824 1448 2101	1.0 9.3 0.3 8.5	30 283 9 259
19 W	0258 0913 1535 2146	0.9 9.4 0.2 8.6	27 287 6 262
20 Th	0342 0956 1615 2226	0.7 9.6 0.1 8.8	21 293 3 268
21 F	0422 1035 1651 2302	0.6 9.6 0.0 9.0	18 293 0 274
22 Sa ○	0458 1110 1724 2334	0.4 9.7 0.0 9.1	12 296 0 277
23 Su	0533 1144 1755	0.3 9.6 0.0	9 293 0
24 M	0006 0606 1217 1826	9.1 0.3 9.5 0.1	277 9 290 3
25 Tu	0037 0640 1251 1858	9.2 0.3 9.3 0.2	280 9 283 6
26 W	0109 0716 1327 1932	9.2 0.4 9.1 0.4	280 12 277 12
27 Th	0145 0755 1406 2011	9.2 0.4 8.9 0.6	280 12 271 18
28 F	0224 0838 1450 2054	9.2 0.5 8.6 0.8	280 15 262 24

March

Day	Time (h m)	Height (ft)	Height (cm)
1 Sa	0308 0927 1540 2143	9.2 0.6 8.4 0.9	280 18 256 27
2 Su ◑	0359 1022 1636 2239	9.2 0.6 8.3 1.0	280 18 253 30
3 M	0457 1125 1740 2342	9.3 0.5 8.3 0.9	283 15 253 27
4 Tu	0601 1230 1847	9.5 0.2 8.5	290 6 259
5 W	0048 0707 1335 1951	0.6 9.9 −0.2 9.1	18 302 −6 277
6 Th	0152 0810 1435 2050	0.1 10.4 −0.8 9.7	3 317 −24 296
7 F	0252 0909 1530 2144	−0.5 10.9 −1.3 10.4	−15 332 −40 317
8 Sa ●	0349 1005 1622 2236	−1.2 11.3 −1.7 10.9	−37 344 −52 332
9 Su	0443 1058 1712 2326	−1.6 11.5 −1.9 11.3	−49 351 −58 344
10 M	0535 1150 1801	−1.9 11.5 −1.8	−58 351 −55
11 Tu	0016 0627 1242 1850	11.4 −1.8 11.2 −1.5	347 −55 341 −46
12 W	0106 0720 1335 1941	11.2 −1.6 10.6 −1.0	341 −49 323 −30
13 Th	0157 0814 1430 2034	10.8 −1.1 10.0 −0.3	329 −34 305 −9
14 F	0251 0911 1528 2130	10.3 −0.5 9.3 0.3	314 −15 283 9
15 Sa ◐	0348 1012 1629 2230	9.8 0.1 8.7 0.9	299 3 265 27
16 Su	0449 1117 1734 2335	9.3 0.5 8.3 1.3	283 15 253 40
17 M	0553 1222 1838	9.0 0.8 8.2	274 24 250
18 Tu	0039 0656 1323 1938	1.5 8.8 0.8 8.2	46 268 24 250
19 W	0138 0754 1417 2030	1.4 8.9 0.8 8.4	43 271 24 256
20 Th	0231 0845 1503 2115	1.2 9.1 0.6 8.7	37 277 18 265
21 F	0316 0929 1544 2155	0.9 9.2 0.5 8.9	27 280 15 271
22 Sa	0357 1009 1620 2230	0.6 9.4 0.4 9.2	18 287 12 280
23 Su ○	0433 1045 1652 2302	0.4 9.5 0.3 9.4	12 290 9 287
24 M	0507 1119 1723 2333	0.2 9.5 0.3 9.5	6 290 9 290
25 Tu	0540 1152 1754	0.1 9.5 0.3	3 290 9
26 W	0004 0614 1226 1827	9.6 0.0 9.4 0.4	293 0 287 12
27 Th	0037 0650 1302 1902	9.7 0.0 9.2 0.5	296 0 280 15
28 F	0113 0729 1342 1942	9.7 0.0 9.1 0.6	296 0 277 18
29 Sa	0154 0813 1427 2027	9.7 0.1 8.9 0.7	296 3 271 21
30 Su	0240 0902 1517 2118	9.6 0.2 8.7 0.9	293 6 265 27
31 M ◑	0333 0958 1615 2217	9.6 0.3 8.6 1.0	293 9 262 30

Time meridian 75° W. 0000 is midnight. 1200 is noon.
Heights are referred to mean lower low water which is the chart datum of soundings.

Boston Harbor (Deer Island Light), Massachusetts, 1997

F–Flood, Dir. 254° True E–Ebb, Dir. 111° True

January

Day	Slack h m	Maximum h m	knots
1 W		0009	1.1F
	0342	0824	1.0E
	1029	1233	1.0F
	1603	2045	0.9E
	2250		
2 Th		0100	1.1F
	0433	0914	1.0E
	1121	1329	1.0F
	1657	2136	0.9E
	2340		
3 F		0155	1.1F
	0525	1003	1.1E
	1213	1431	1.1F
	1751	2225	1.0E
4 Sa	0031	0254	1.2F
	0618	1050	1.1E
	1306	1605	1.1F
	1846	2311	1.1E
5 Su	0123	0359	1.3F
	0711	1135	1.2E
	1357	1700	1.2F
	1940	2354	1.1E
6 M	0214	0501	1.3F
	0802	1214	1.3E
	1447	1749	1.3F
	2032		
7 Tu		0031	1.2E
	0304	0550	1.4F
	0852	1248	1.4E
	1536	1835	1.4F
	2122		
8 W		0106	1.3E
	0353	0636	1.5F
	0942	1324	1.5E
	1624	1918	1.5F
	2212		
9 Th		0145	1.4E
	0443	0721	1.5F
	1031	1405	1.5E
	1713	2001	1.5F
	2301		
10 F		0230	1.4E
	0532	0806	1.5F
	1120	1450	1.5E
	1802	2043	1.5F
	2351		
11 Sa		0319	1.4E
	0624	0854	1.5F
	1210	1539	1.4E
	1851	2129	1.5F
12 Su	0041	0417	1.3E
	0717	0943	1.4F
	1301	1639	1.4E
	1943	2221	1.4F
13 M	0132	0540	1.3E
	0810	1040	1.3F
	1354	1809	1.3E
	2038	2336	1.3F
14 Tu	0226	0650	1.2E
	0908	1214	1.2F
	1450	1919	1.2E
	2132		
15 W		0050	1.2F
	0322	0754	1.2E
	1007	1326	1.1F
	1549	2023	1.2E
	2231		
16 Th		0156	1.1F
	0421	0855	1.3E
	1107	1430	1.0F
	1651	2123	1.2E
	2330		
17 F		0258	1.1F
	0521	0953	1.3E
	1209	1532	1.0F
	1753	2221	1.2E
18 Sa	0030	0357	1.1F
	0621	1050	1.4E
	1309	1630	1.1F
	1856	2316	1.3E
19 Su	0128	0453	1.1F
	0720	1143	1.5E
	1405	1724	1.1F
	1958		
20 M		0009	1.4E
	0222	0546	1.2F
	0815	1234	1.5E
	1457	1815	1.2F
	2054		
21 Tu		0059	1.4E
	0312	0635	1.2F
	0906	1323	1.5E
	1544	1903	1.3F
	2142		
22 W		0147	1.4E
	0400	0721	1.3F
	0951	1409	1.5E
	1629	1948	1.3F
	2223		
23 Th		0233	1.4E
	0444	0806	1.3F
	1033	1454	1.5E
	1710	2031	1.3F
	2302		
24 F		0317	1.3E
	0527	0847	1.2F
	1112	1537	1.4E
	1750	2111	1.3F
	2340		
25 Sa		0359	1.3E
	0608	0926	1.2F
	1151	1617	1.3E
	1830	2148	1.2F
26 Su	0017	0440	1.2E
	0649	0958	1.2F
	1229	1656	1.2E
	1910	2213	1.2F
27 M	0054	0518	1.1E
	0731	0948	1.2F
	1309	1632	1.1E
	1951	2206	1.2F
28 Tu	0134	0444	1.0E
	0816	1023	1.2F
	1350	1647	1.0E
	2034	2244	1.2F
29 W	0216	0510	1.0E
	0901	1106	1.2F
	1435	1722	1.0E
	2120	2329	1.2F
30 Th	0301	0551	1.1E
	0950	1153	1.1F
	1523	1807	1.0E
	2209		
31 F		0017	1.2F
	0350	0640	1.1E
	1041	1244	1.1F
	1616	1900	1.0E
	2300		

February

Day	Slack h m	Maximum h m	knots
1 Sa		0109	1.2F
	0442	0739	1.1E
	1136	1340	1.1F
	1711	2003	1.0E
	2354		
2 Su		0204	1.2F
	0538	0848	1.1E
	1230	1439	1.1F
	1809	2117	1.0E
3 M	0049	0303	1.2F
	0634	1049	1.2E
	1325	1545	1.2F
	1907	2322	1.1E
4 Tu	0144	0407	1.3F
	0730	1145	1.3E
	1419	1717	1.3F
	2004		
5 W		0014	1.2E
	0239	0522	1.4F
	0825	1233	1.4E
	1510	1817	1.4F
	2059		
6 Th		0102	1.3E
	0331	0629	1.5F
	0919	1319	1.5E
	1601	1908	1.5F
	2151		
7 F		0148	1.4E
	0422	0723	1.5F
	1011	1405	1.6E
	1651	1957	1.6F
	2242		
8 Sa		0235	1.5E
	0513	0813	1.6F
	1102	1451	1.6E
	1740	2045	1.6F
	2332		
9 Su		0324	1.5E
	0605	0903	1.5F
	1152	1541	1.5E
	1830	2133	1.6F
10 M	0022	0418	1.5E
	0657	0954	1.5F
	1243	1638	1.5E
	1920	2223	1.5F
11 Tu	0112	0519	1.4E
	0749	1051	1.4F
	1335	1746	1.3E
	2012	2320	1.4F
12 W	0204	0624	1.4E
	0843	1154	1.3F
	1429	1853	1.2E
	2107		
13 Th		0023	1.3F
	0258	0727	1.3E
	0941	1259	1.1F
	1526	1957	1.2E
	2203		
14 F		0127	1.1F
	0354	0829	1.3E
	1041	1403	1.0F
	1627	2058	1.2E
	2302		
15 Sa		0230	1.1F
	0454	0928	1.3E
	1142	1506	1.0F
	1731	2157	1.2E
16 Su	0003	0331	1.0F
	0554	1026	1.3E
	1243	1605	1.0F
	1834	2253	1.2E
17 M	0103	0429	1.1F
	0655	1121	1.4E
	1342	1701	1.1F
	1941	2347	1.3E
18 Tu	0201	0523	1.1F
	0754	1213	1.5E
	1436	1753	1.1F
	2048		
19 W		0038	1.3E
	0253	0614	1.1F
	0847	1302	1.5E
	152[illegible]	1842	1.2F
	2132		
20 Th		0126	1.4E
	0341	0701	1.2F
	0932	1348	1.5E
	1607	1926	1.3F
	2206		
21 F		0211	1.4E
	0424	0745	1.2F
	1013	1432	1.4E
	1647	2008	1.3F
	2241		
22 Sa		0255	1.3E
	0505	0826	1.2F
	1050	1513	1.4E
	1725	2047	1.3F
	2315		
23 Su		0335	1.3E
	0544	0903	1.2F
	1127	1551	1.3E
	1802	2121	1.3F
	2350		
24 M		0411	1.2E
	0623	0934	1.2F
	1203	1621	1.2E
	1840	2137	1.3F
25 Tu	0026	0435	1.1E
	0703	0923	1.2F
	1241	1548	1.1E
	1919	2136	1.3F
26 W	0103	0404	1.1E
	0745	0954	1.3F
	1320	1610	1.1E
	2000	2213	1.4F
27 Th	0143	0433	1.2E
	0829	1036	1.3F
	1403	1645	1.1E
	2045	2257	1.4F
28 F	0227	0512	1.2E
	0917	1122	1.2F
	1450	1729	1.1E
	2133	2344	1.3F

March

Day	Slack h m	Maximum h m	knots
1 Sa	0314	0600	1.2E
	1008	1211	1.2F
	1541	1821	1.0E
	2226		
2 Su		0034	1.3F
	0406	0656	1.1E
	1101	1304	1.2F
	1637	1921	1.0E
	2321		
3 M		0129	1.2F
	0502	0801	1.1E
	1159	1402	1.2F
	1737	2033	1.0E
4 Tu	0019	0228	1.2F
	0601	0923	1.2E
	1256	1507	1.2F
	1838	2300	1.1E
5 W	0118	0333	1.2F
	0701	1123	1.3E
	1351	1652	1.2F
	1938	2356	1.2E
6 Th	0214	0509	1.3F
	0800	1217	1.4E
	1446	1758	1.4F
	2035		
7 F		0047	1.4E
	0309	0619	1.4F
	0857	1307	1.5E
	1538	1852	1.5F
	2129		
8 Sa		0136	1.5E
	0402	0714	1.5F
	0950	1355	1.6E
	1628	1942	1.6F
	2221		
9 Su		0224	1.6E
	0453	0805	1.6F
	1042	1443	1.6E
	1718	2030	1.7F
	2311		
10 M		0312	1.6E
	0545	0854	1.6F
	1133	1532	1.6E
	1807	2118	1.6F
11 Tu	0001	0403	1.6E
	0636	0944	1.5F
	1223	1625	1.5E
	1857	2206	1.6F
12 W	0050	0457	1.5E
	0727	1036	1.4F
	1314	1724	1.4E
	1948	2258	1.5F
13 Th	0140	0557	1.4E
	0820	1132	1.3F
	1407	1827	1.3E
	2040	2355	1.3F
14 F	0231	0659	1.4E
	0915	1232	1.2F
	1502	1930	1.2E
	2136		
15 Sa		0056	1.2F
	0326	0800	1.3E
	1012	1334	1.1F
	1601	2031	1.1E
	2233		
16 Su		0159	1.1F
	0424	0900	1.3E
	1112	1436	1.0F
	1703	2130	1.1E
	2334		
17 M		0301	1.0F
	0524	0959	1.3E
	1213	1536	1.0F
	1806	2227	1.2E
18 Tu	0036	0400	1.0F
	0624	1054	1.3E
	1312	1633	1.0F
	1911	2321	1.2E
19 W	0133	0456	1.0F
	0724	1147	1.4E
	1407	1726	1.1F
	2023		
20 Th		0013	1.3E
	0228	0547	1.1F
	0819	1236	1.4E
	1455	1814	1.2F
	2105		
21 F		0101	1.3E
	0316	0635	1.1F
	0906	1323	1.4E
	1539	1859	1.2F
	2139		
22 Sa		0146	1.4E
	0359	0719	1.2F
	0947	1406	1.4E
	1619	1940	1.3F
	2213		
23 Su		0229	1.3E
	0440	0759	1.2F
	1024	1447	1.3E
	1657	2019	1.3F
	2247		
24 M		0308	1.3E
	0519	0837	1.2F
	1101	1523	1.2E
	1733	2053	1.3F
	2322		
25 Tu		0342	1.2E
	0557	0908	1.2F
	1137	1546	1.1E
	1811	2102	1.3F
	2357		
26 W		0332	1.2E
	0637	0900	1.3F
	1215	1518	1.1E
	1849	2109	1.4F
27 Th	0035	0335	1.2E
	0718	0929	1.3F
	1254	1543	1.1E
	1930	2146	1.4F
28 F	0115	0405	1.2E
	0800	1010	1.3F
	1337	1618	1.1E
	2016	2229	1.4F
29 Sa	0158	0445	1.2E
	0849	1055	1.3F
	1423	1702	1.1E
	2104	2316	1.4F
30 Su	0245	0532	1.2E
	0939	1144	1.3F
	1514	1753	1.1E
	2158		
31 M		0006	1.3F
	0337	0627	1.2E
	1033	1237	1.2F
	1609	1854	1.0E
	2255		

Time meridian 75° W. 0000 is midnight. 1200 is noon.
At times of slack water before maximum ebb, the speed actually averages 0.3 knot in a direction of 184° true.

TABLE 2 – CURRENT DIFFERENCES AND OTHER CONSTANTS

No.	PLACE	Meter Depth	POSITION Latitude	POSITION Longitude	TIME DIFFERENCES Min. before Flood	TIME DIFFERENCES Flood	TIME DIFFERENCES Min. before Ebb	TIME DIFFERENCES Ebb	SPEED RATIOS Flood	SPEED RATIOS Ebb	Minimum before Flood knots	Minimum before Flood Dir.	Maximum Flood knots	Maximum Flood Dir.	Minimum before Ebb knots	Minimum before Ebb Dir.	Maximum Ebb knots	Maximum Ebb Dir.
		ft	North	West	h m	h m	h m	h m			knots	Dir.	knots	Dir.	knots	Dir.	knots	Dir.
	BUZZARDS BAY <7>–cont. Time meridian, 75° W				on Pollock Rip Channel, p.20													
2056	Penikese Island, 0.2 mile south of		41° 26.6'	70° 55.5'	−1 43	−0 15	−1 30	−2 39	0.4	0.5	0.0	– –	0.7	093°	0.0	– –	0.9	287°
2061	Gull I. and Nashawena I., between		41° 26.2'	70° 54.2'	−2 15	−0 57	−2 01	−2 41	0.5	0.6	0.0	– –	0.9	091°	0.0	– –	1.1	247°
2066	Weepecket Island, south of		41° 30.4'	70° 44.3'	−3 16	−1 07	−1 28	−2 27	0.4	0.4	0.0	– –	0.8	069°	0.0	– –	0.6	255°
2071	Quamquisset Harbor entrance		41° 32.4'	70° 39.8'	Current weak and variable						0.0	– –	0.4	– –	0.0	– –	0.3	– –
2076	West Falmouth Harbor entrance		41° 36.5'	70° 39.3'	Current weak and variable													
2081	Megansett Harbor		41° 38.8'	70° 39.2'	Current weak and variable													
2086	Abiels Ledge, 0.4 mile south of		41° 41.1'	70° 40.4'	+0 26	−0 36	−0 06	−0 23	0.4	0.6	0.0	– –	0.8	035°	0.0	– –	1.0	216°
2091	Dumpling Rocks, 0.2 mile southeast of		41° 32.0'	70° 55.1'	−1 43	−1 03	−1 32	−2 09	0.4	0.6	0.0	– –	0.8	066°	0.0	– –	1.1	190°
2096	Apponaganset Bay		41° 35'	70° 57'	Current weak and variable													
2101	Clarks Cove		41° 36'	70° 55'	Current weak and variable													
2106	New Bedford Harbor and approaches				Current weak and variable													
2111	West Island and Long Island, between		41° 35.6'	70° 50.4'	Current weak and variable						0.0	– –	0.3	– –	0.0	– –	0.4	– –
2116	West Island, 1 mile southeast of	6	41° 34.0'	70° 48.6'	−0 43	−0 43	−1 28	−1 42	0.4	0.5	0.0	– –	0.7	079°	0.0	– –	0.8	203°
2121	Nasketucket Bay		41° 37.1'	70° 50.2'	Current weak and variable						0.0	– –	0.3	– –	0.0	– –	0.3	– –
2126	Mattapoisett Harbor		41° 38'	70° 47'	Current weak and variable													
2131	Sippican Harbor		41° 41'	70° 44'	Current weak and variable						0.0	– –	0.3	– –	0.0	– –	0.4	– –
2136	Wareham River, off Long Beach Point		41° 44.0'	70° 43.0'	−1 41	−0 31	−1 22	−1 23	0.3	0.4	0.0	– –	0.6	022°	0.0	– –	0.6	202°
2141	Wareham River, off Barneys Point		41° 44.7'	70° 42.4'	−1 49	−0 27	−1 22	−1 31	0.4	0.4	0.0	– –	0.7	010°	0.0	– –	0.6	185°
					on Cape Cod Canal, p.16													
2146	Onset Bay, south of Onset Island		41° 43.9'	70° 38.7'	Current weak and variable													
2151	Onset Bay, south of Wickets Island		41° 44.1'	70° 39.3'	Current weak and variable													
	CAPE COD CANAL																	
2156	CAPE COD CANAL, railroad bridge		41° 44.5'	70° 36.8'	*Daily predictions*						0.0	– –	4.0	070°	0.0	– –	4.5	250°
2161	Bourne Highway bridge		41° 45'	70° 35'	−0 03	−0 01	−0 03	−0 04	0.8	0.9	0.0	– –	3.3	065°	0.0	– –	4.0	245°
2166	Bournedale		41° 46'	70° 34'	−0 07	−0 03	−0 09	−0 10	0.8	0.8	0.0	– –	3.4	030°	0.0	– –	3.6	210°
2171	Sagamore Bridge		41° 46'	70° 33'	−0 09	−0 04	−0 11	−0 13	0.7	0.6	0.0	– –	2.8	095°	0.0	– –	2.5	275°
2176	Cape Cod Canal, east end	15	41° 46.5'	70° 30.0'	−0 13	−0 06	−0 17	−0 19	0.6	0.6	0.0	– –	2.4	065°	0.0	– –	2.6	245°
	NARRAGANSETT BAY <8>				on Pollock Rip Channel, p.20													
2181	Sakonnet River (except Narrows)		– – –	– – –	Current weak and variable													
2186	Black Point, SW of, Sakonnet River	15	41° 30.4'	71° 13.2'	−2 54	−1 55	−2 13	−2 26	0.2	0.2	0.0	– –	0.4	012°	0.0	– –	0.4	194°
2191	Almy Point Bridge, south of, Sakonnet River	15	41° 37.3'	71° 13.2'	−3 00	−2 10	−2 30	−3 13	0.2	0.8	0.0	– –	0.4	034°	0.0	– –	1.5	180°
2196	Tiverton, Stone bridge, Sakonnet R. <9>		41° 37.5'	71° 13.0'	−2 58	−5 02	−2 26	−3 06	1.4	1.6	0.0	– –	2.7	010°	0.0	– –	2.7	190°
						−2 54			0.3				0.6	010°				
						−0 36			1.3				2.5	010°				
2201	Tiverton, RR. bridge, Sakonnet R. <10>		41° 38.3'	71° 12.9'	−3 26	−5 06	−2 48	−3 41	1.2	1.4	0.0	– –	2.3	000°	0.0	– –	2.4	180°
						−3 04			– –				– –					
						−1 15			0.8				1.5	000°				
2206	Common Fence Point, northeast of	10	41° 39.5'	71° 12.5'	−2 38	−4 50	−2 32	−2 41	0.1	0.2	0.0	– –	0.2	026°	0.0	– –	0.3	210°
						−2 25			0.0				0.1	058°				
						−0 58			0.1				0.1	046°				
2211	Brenton Point, 1.4 n.mi. southwest of	7	41° 25.9'	71° 22.6'	−1 03	−0 38	−1 20	−1 04	0.2	0.4	0.0	– –	0.4	347°	0.0	– –	0.6	170°
2216	Castle Hill, west of, East Passage	15	41° 27.4'	71° 22.7'	−0 06	−0 42	−1 07	−0 29	0.4	0.7	0.0	– –	0.7	013°	0.0	– –	1.2	237°
2221	Bull Point, east of	10	41° 28.8'	71° 21.0'	−1 10	−0 47	−1 10	−1 33	0.6	0.8	0.0	– –	1.2	001°	0.0	– –	1.5	206°
2226	Mackerel Cove		41° 28.5'	71° 22.8'	Current weak and variable													
2231	Newport Harbor, S and E of Goat Island		41° 29'	71° 20'	Current weak and variable													
2236	Rose Island, northeast of	15	41° 30.2'	71° 19.9'	−1 57	−0 07	−1 17	−2 08	0.4	0.5	0.0	– –	0.8	310°	0.0	– –	1.0	124°
2241	Rose Island, northwest of	15	41° 30.4'	71° 21.1'	−1 38	−0 26	−1 38	−1 39	0.4	0.5	0.1	105°	0.7	007°	0.1	102°	1.0	190°
2246	Rose Island, west of		41° 29.8'	71° 21.0'	−0 42	−0 34	−1 20	−1 28	0.4	0.6	0.0	– –	0.7	001°	0.0	– –	1.0	172°
2251	Gould Island, southeast of	7	41° 31.5'	71° 20.2'	−1 40	−1 28	−1 14	−1 16	0.3	0.4	0.0	– –	0.5	033°	0.0	– –	0.7	217°
2256	Gould Island, west of	15	41° 31.9'	71° 21.5'	−0 16	−0 32	−1 13	−1 07	0.3	0.4	0.0	– –	0.6	351°	0.1	279°	0.8	193°

Endnotes can be found at the end of table 2.

Pollock Rip Channel, Massachusetts, 1997

F–Flood, Dir. 035° True   E–Ebb, Dir. 225° True

January

Day	Slack (h m)	Maximum (h m)	knots
1 W	0229	0505	1.7E
	0819	1135	1.7F
	1451	1724	1.6E
	2033	2356	1.8F
2 Th	0319	0555	1.6E
	0910	1229	1.7F
	1545	1817	1.5E
	2126		
3 F		0050	1.8F
	0409	0647	1.6E
	1002	1325	1.7F
	1640	1912	1.5E
	2221		
4 Sa		0144	1.8F
	0500	0739	1.6E
	1054	1420	1.8F
	1734	2007	1.5E
	2315		
5 Su		0238	1.8F
	0551	0831	1.7E
	1145	1512	1.9F
	1827	2101	1.6E
6 M	0009	0330	1.8F
	0640	0921	1.8E
	1234	1601	2.0F
	1917	2152	1.7E
7 Tu	0101	0418	1.8F
	0727	1010	1.9E
	1322	1648	2.1F
	2006	2242	1.8E
8 W	0150	0505	1.9F
	0814	1058	2.0E
	1409	1733	2.3F
	2053	2330	1.9E
9 Th	0239	0551	2.0F
	0901	1145	2.1E
	1456	1819	2.4F
	2140		
10 F		0018	2.0E
	0327	0637	2.1F
	0948	1233	2.2E
	1544	1906	2.5F
	2228		
11 Sa		0107	2.1E
	0416	0725	2.1F
	1038	1323	2.2E
	1633	1954	2.5F
	2318		
12 Su		0156	2.1E
	0507	0816	2.2F
	1130	1414	2.2E
	1725	2046	2.5F
13 M	0009	0248	2.1E
	0559	0911	2.1F
	1224	1508	2.1E
	1819	2141	2.4F
14 Tu	0103	0343	2.0E
	0655	1011	2.1F
	1323	1605	2.0E
	1917	2242	2.2F
15 W	0159	0441	1.9E
	0754	1117	2.0F
	1425	1707	1.8E
	2018	2349	2.1F
16 Th	0259	0543	1.8E
	0857	1228	2.0F
	1530	1814	1.7E
	2124		
17 F		0059	2.0F
	0400	0650	1.7E
	1001	1338	2.0F
	1637	1926	1.6E
	2231		
18 Sa		0208	1.9F
	0501	0759	1.7E
	1105	1444	2.0F
	1741	2037	1.5E
	2336		
19 Su		0311	1.9F
	0601	0903	1.7E
	1206	1544	2.1F
	1842	2141	1.6E
20 M	0037	0408	1.9F
	0656	1001	1.7E
	1301	1638	2.2F
	1937	2237	1.6E
21 Tu	0132	0500	2.0F
	0747	1051	1.8E
	1350	1727	2.3F
	2026	2324	1.7E
22 W	0220	0547	2.0F
	0833	1134	1.8E
	1434	1811	2.3F
	2110		
23 Th		0005	1.7E
	0303	0629	2.0F
	0915	1212	1.8E
	1514	1850	2.3F
	2150		
24 F		0041	1.7E
	0341	0707	1.9F
	0955	1246	1.8E
	1551	1926	2.2F
	2228		
25 Sa		0113	1.7E
	0417	0741	1.9F
	1034	1319	1.8E
	1627	1958	2.2F
	2305		
26 Su		0146	1.8E
	0453	0812	1.9F
	1113	1354	1.8E
	1703	2029	2.1F
	2343		
27 M		0220	1.8E
	0530	0844	1.9F
	1153	1431	1.8E
	1740	2102	2.1F
28 Tu	0022	0258	1.8E
	0608	0920	1.9F
	1235	1512	1.8E
	1820	2138	2.0F
29 W	0103	0339	1.8E
	0650	1000	1.8F
	1321	1557	1.7E
	1904	2219	2.0F
30 Th	0148	0423	1.8E
	0735	1045	1.8F
	1410	1644	1.7E
	1951	2306	1.9F
31 F	0235	0511	1.7E
	0823	1135	1.8F
	1504	1736	1.6E
	2043	2357	1.7F

February

Day	Slack (h m)	Maximum (h m)	knots
1 Sa	0326	0603	1.6E
	0915	1231	1.7F
	1600	1831	1.5E
	2139		
2 Su		0054	1.7F
	0420	0657	1.6E
	1011	1332	1.8F
	1658	1929	1.5E
	2238		
3 M		0155	1.6F
	0515	0753	1.6E
	1107	1433	1.8F
	1755	2027	1.5E
	2337		
4 Tu		0256	1.7F
	0609	0850	1.7E
	1203	1532	2.0F
	1850	2125	1.6E
5 W	0035	0353	1.8F
	0702	0945	1.8E
	1257	1626	2.1F
	1942	2220	1.8E
6 Th	0129	0446	1.9F
	0753	1037	2.0E
	1349	1717	2.3F
	2032	2311	1.9E
7 F	0220	0536	2.1F
	0842	1128	2.1E
	1439	1805	2.4F
	2121		
8 Sa		0001	2.0E
	0310	0625	2.2F
	0932	1218	2.2E
	1529	1852	2.5F
	2209		
9 Su		0050	2.1E
	0359	0713	2.3F
	1022	1308	2.3E
	1619	1940	2.5F
	2257		
10 M		0139	2.2E
	0448	0803	2.3F
	1113	1358	2.2E
	1709	2030	2.5F
	2347		
11 Tu		0228	2.1E
	0539	0855	2.3F
	1206	1450	2.2E
	1802	2123	2.4F
12 W	0039	0320	2.1E
	0632	0951	2.2F
	1303	1545	2.0E
	1857	2221	2.2F
13 Th	0133	0416	1.9E
	0728	1054	2.1F
	1403	1644	1.8E
	1956	2325	2.0F
14 F	0231	0516	1.8E
	0829	1202	2.0F
	1506	1750	1.6E
	2100		
15 Sa		0034	1.9F
	0332	0621	1.6E
	0932	1312	2.0F
	1612	1902	1.5E
	2207		
16 Su		0143	1.8F
	0434	0731	1.6E
	1037	1419	2.0F
	1717	2014	1.5E
	2313		
17 M		0247	1.8F
	0535	0838	1.6E
	1139	1520	2.1F
	1818	2119	1.5E
18 Tu	0014	0345	1.9F
	0632	0938	1.6E
	1238	1614	2.2F
	1913	2214	1.6E
19 W	0109	0437	1.9F
	0724	1028	1.7E
	1326	1703	2.2F
	2001	2301	1.7E
20 Th	0156	0523	2.0F
	0810	1112	1.8E
	1410	1746	2.3F
	2043	2340	1.7E
21 F	0238	0604	2.0F
	0852	1149	1.8E
	1450	1824	2.3F
	2122		
22 Sa		0014	1.8E
	0315	0641	2.0F
	0931	1222	1.8E
	1526	1859	2.2F
	2159		
23 Su		0045	1.8E
	0349	0713	2.0F
	1008	1253	1.9E
	1600	1929	2.2F
	2234		
24 M		0115	1.8E
	0423	0742	2.0F
	1046	1326	1.9E
	1635	1957	2.2F
	2310		
25 Tu		0148	1.9E
	0457	0811	2.0F
	1124	1402	1.9E
	1711	2027	2.1F
	2347		
26 W		0224	1.9E
	0533	0844	2.0F
	1204	1441	1.9E
	1749	2101	2.1F
27 Th	0026	0303	1.9E
	0611	0921	2.0F
	1247	1524	1.8E
	1830	2140	2.0F
28 F	0109	0346	1.8E
	0654	1004	1.9F
	1335	1610	1.7E
	1916	2225	1.8F

March

Day	Slack (h m)	Maximum (h m)	knots
1 Sa	0156	0434	1.7E
	0741	1053	1.9F
	1428	1701	1.6E
	2008	2317	1.7F
2 Su	0248	0525	1.7E
	0834	1149	1.8F
	1525	1757	1.5E
	2105		
3 M		0015	1.6F
	0344	0621	1.6E
	0932	1253	1.8F
	1626	1857	1.5E
	2208		
4 Tu		0121	1.6F
	0443	0721	1.6E
	1034	1401	1.8F
	1726	1959	1.5E
	2311		
5 W		0230	1.7F
	0543	0823	1.7E
	1136	1507	2.0F
	1825	2101	1.6E
6 Th	0012	0334	1.8F
	0640	0923	1.8E
	1235	1607	2.1F
	1920	2200	1.8E
7 F	0109	0431	2.0F
	0734	1019	2.0E
	1330	1700	2.3F
	2011	2253	1.9E
8 Sa	0202	0523	2.1F
	0826	1113	2.1E
	1423	1750	2.4F
	2100	2343	2.1E
9 Su	0252	0612	2.3F
	0916	1203	2.2E
	1513	1838	2.5F
	2148		
10 M		0032	2.2E
	0340	0659	2.4F
	1006	1252	2.2E
	1603	1925	2.5F
	2236		
11 Tu		0119	2.2E
	0428	0748	2.4F
	1057	1342	2.2E
	1653	2013	2.4F
	2324		
12 W		0207	2.1E
	0517	0838	2.3F
	1148	1432	2.1E
	1743	2104	2.3F
13 Th	0014	0257	2.0E
	0608	0931	2.2F
	1243	1525	1.9E
	1837	2159	2.1F
14 F	0107	0350	1.9E
	0702	1030	2.1F
	1340	1622	1.8E
	1934	2300	1.9F
15 Sa	0203	0447	1.7E
	0759	1135	2.0F
	1441	1725	1.6E
	2035		
16 Su		0007	1.8F
	0303	0550	1.6E
	0901	1243	1.9F
	1545	1834	1.5E
	2140		
17 M		0116	1.7F
	0405	0659	1.5E
	1005	1349	1.9F
	1648	1944	1.4E
	2245		
18 Tu		0219	1.7F
	0506	0806	1.5E
	1107	1449	2.0F
	1747	2047	1.5E
	2345		
19 W		0317	1.8F
	0604	0906	1.6E
	1204	1543	2.1F
	1840	2142	1.6E
20 Th	0038	0408	1.9F
	0656	0958	1.6E
	1255	1632	2.2F
	1928	2228	1.7E
21 F	0125	0454	2.0F
	0742	1041	1.7E
	1339	1715	2.2F
	2010	2307	1.7E
22 Sa	0206	0535	2.1F
	0825	1119	1.8E
	1420	1753	2.2F
	2049	2341	1.8E
23 Su	0243	0611	2.1F
	0904	1153	1.8E
	1457	1827	2.2F
	2126		
24 M		0012	1.9E
	0318	0642	2.1F
	0941	1225	1.9E
	1532	1856	2.2F
	2201		
25 Tu		0043	1.9E
	0351	0711	2.1F
	1018	1258	1.9E
	1606	1924	2.1F
	2237		
26 W		0115	1.9E
	0424	0740	2.1F
	1056	1334	1.9E
	1642	1954	2.1F
	2313		
27 Th		0151	1.9E
	0459	0812	2.1F
	1136	1412	1.9E
	1720	2028	2.0F
	2352		
28 F		0231	1.9E
	0537	0849	2.1F
	1219	1455	1.9E
	1802	2108	1.9F
29 Sa	0035	0314	1.9E
	0620	0932	2.0F
	1306	1542	1.8E
	1848	2154	1.8F
30 Su	0122	0402	1.8E
	0708	1022	2.0F
	1359	1633	1.7E
	1941	2246	1.7F
31 M	0216	0455	1.7E
	0802	1119	1.9F
	1457	1730	1.6E
	2040	2348	1.6F

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