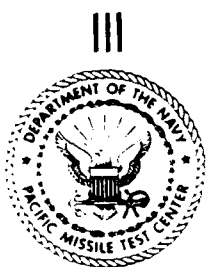


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Technical Publication 000051



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TIDAL AND LUNAR DATA FOR
POINT MUGU, SAN NICOLAS ISLAND,
AND THE BARKING SANDS AREA
DURING 1990

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DEC 05 1989
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Compiled by
RICH DIXON
Geophysics Division

31 December 1989



Approved For Public Release; Distribution Is Unlimited

PACIFIC MISSILE TEST CENTER

Point Mugu, California 93042

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PACIFIC MISSILE TEST CENTER

AN ACTIVITY OF THE NAVAL AIR SYSTEMS COMMAND

Mr. M. J. BURKHARDT, Head, Geophysical Instrumentation Branch;
MR. R. W. DIXON, Task Engineer; LCDR T. D. SNOW, Geophysics Officer;
MR. J. S. ROSENTHAL, Associate Range Operations Officer (Acting);
and CAPT M. MERICKEL, Director Range Directorate (Acting), have
approved this report for publication.

OPSEC review by MR. M. FLORES.

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Executive Director

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<p>Basic lunar and tidal data for Point Mugu, San Nicolas Island and the Barking Sands Area during 1990 are provided. The data presented are: (1) Tidal data; (2) times of moonrise and moonset, (3) times of lunar phases, and (4) times of sunrise and sunset.</p>				
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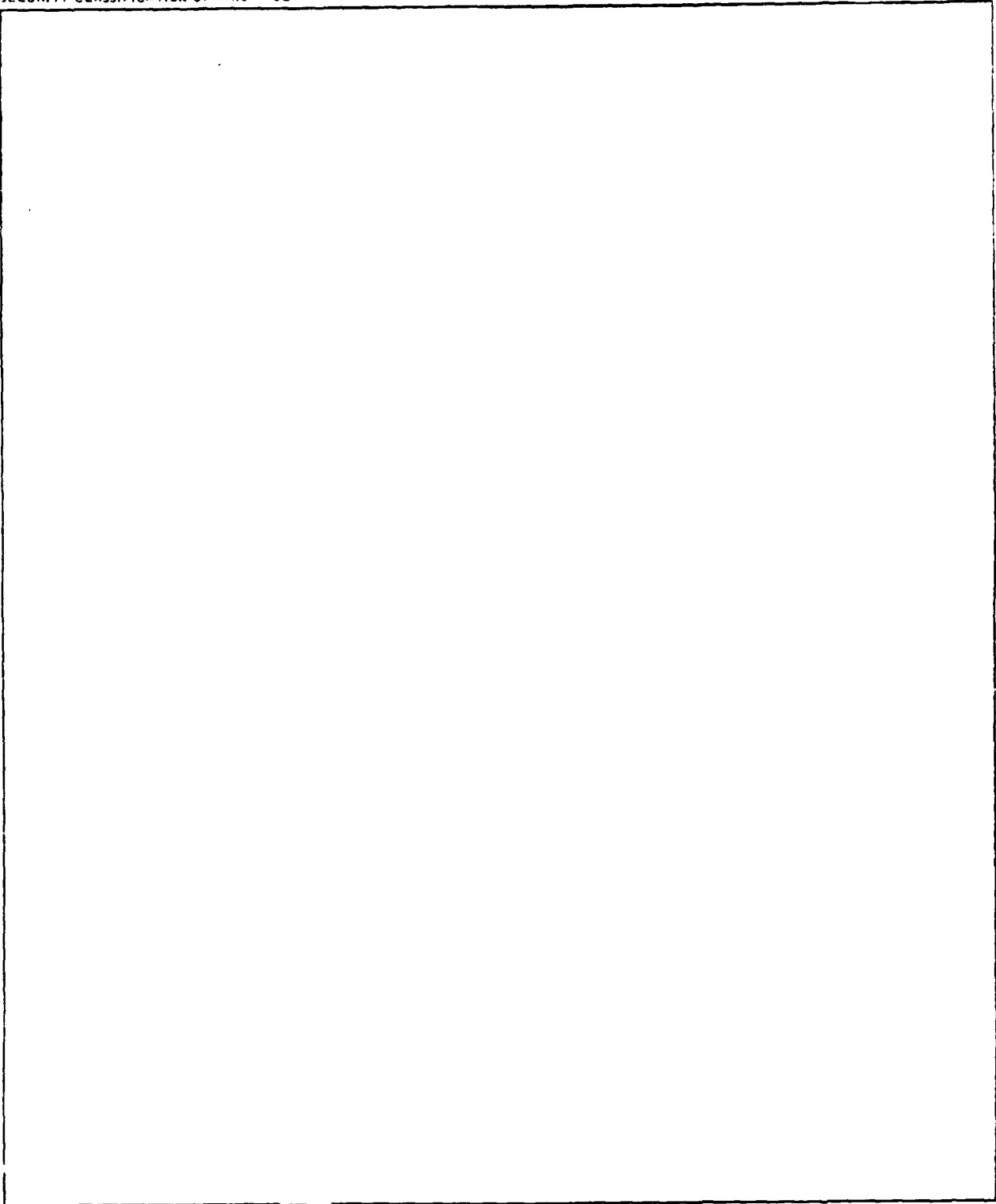
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INTRODUCTION

This publication combines into a single source all tidal and lunar data for operational locations of the Pacific Missile Test Center for use in Calendar Year 1990.

The data presentations are in two main divisions: one for Point Mugu and San Nicolas Island, and the other for the Barking Sands area. Within each division, the times of moonrise and moonset and tidal data are given. Appendixes provide information on lunar phases, sunrise and sunset times and calculation of the tide at any time. This publication is issued annually. Information regarding this data may be obtained from the Geophysics Division of the Range Operations Department.

DATA SOURCE AND TIME REFERENCES

The data given here have been prepared from information contained in Tide Tables for the West Coast of North and South America including the Hawaiian Islands, 1990, published by the National Ocean Service.

For Point Mugu and San Nicolas Island, all times listed are Pacific Standard Time (PST); add eight hours to obtain Universal Coordinated Time (UCT or Z). When Daylight Savings Time (PDT) is in effect, 1 hour is to be added to the times given. In 1990, Pacific Daylight Time is scheduled to commence at 0200 PST on Sunday 1 April, and to end at 0200 PDT on Sunday 28 October.

For the Barking Sands Area, all times listed are Alaska-Hawaii Standard Time (AHST); add ten hours to obtain UCT. Daylight Savings Time is not observed in Hawaii.

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TIDAL DATA

The ranges of tidal heights that may be expected at Point Mugu and San Nicolas Island are shown in table 1. The range of heights for the primary harbor in the Barking Sands area, Port Allen, is shown in table 2. The times and height of high and low tides for 1990 at Point Mugu are given in the even-numbered tables 4 through 26, and at San Nicolas Island in the odd-numbered tables 5 through 27. Similar tide data for Port Allen are given in tables 29 through 40.

Table 1. Tidal ranges for Point Mugu and San Nicolas Island

Tidal Levels	Point Mugu	San Nicolas Is.
	Height (Ft)	Height (Ft)
Extreme high water	7.3	6.7
Mean higher high water	5.3	4.9
Mean high water	4.5	4.1
Mean tide level (mean sea level)	2.7	2.5
Mean low water	0.9	0.8
Mean lower low water	0.0	0.0
Extreme low water	-2.0	-1.8

Table 2. Tidal Ranges for Port Allen

Tidal Levels	Height (Ft)
Extreme high water	2.6
Mean higher high water	1.6
Mean high water	1.2
Mean tide level (mean sea level)	0.7
Mean low water	0.2
Mean lower low water	0.0
Extreme low water	-0.4

These tables list the times and heights of high and low tide for each month of the year and chronologically through each day. The heights are all measured from mean lower low water and are values for a sea unaffected by wind waves or swell. The height and character of the sea surface are influenced by factors other than the predictable positions of the moon and sun, and thus are likely to be higher or lower than computed values indicate.

LUNAR DATA

Times of moonrise and moonset for the Point Mugu-San Nicolas Island area in 1990 are given in table 3, and for the Barking Sands area in table 28, preceding the tidal data for the respective stations. Information regarding the phases of the moon in 1990 is found in appendix B.

POINT MUGU TIDES
JANUARY 1990
34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0027	3.9	0529	2.3	1111	4.9	1823	0.0	0040	3.6	0526	2.1
2	0104	4.1	0640	2.2	1206	4.2	1904	.5	0117	3.8	0637	2.0
3	0151	4.4	0813	1.9	1325	3.3	1946	1.1	0204	4.0	0810	1.8
4	0242	4.8	0950	1.4	1514	3.0	2041	1.5	0255	4.4	0947	1.3
5	0338	5.2	1117	.7	1712	2.9	2147	2.0	0351	4.8	1114	.6
6	0434	5.6	1218	-1	1840	3.1	2256	2.2	0447	5.1	1215	-1
7	0529	6.0	1311	-8	1942	3.4	0002	2.2*	0542	5.5	1308	-7
8	0621	6.3	1359	-1.2	2030	3.6	0002	2.2*	0634	5.8	1356	-1.1
9	0057	2.2	0710	6.5	1444	-1.5	2110	3.8	0054	2.0	0723	6.0
10	0150	2.0	0757	6.6	1523	-1.5	2148	3.9	0147	1.8	0810	6.1
11	0236	1.9	0839	6.5	1602	-1.4	2224	4.0	0233	1.8	0852	6.0
12	0321	1.8	0921	6.2	1638	-1.2	2302	4.1	0318	1.7	0934	5.7
13	0408	1.8	1003	5.8	1712	-7	2338	4.2	0405	1.7	1016	5.3
14	0457	1.8	1045	5.2	1744	-2	1815	.4	0454	1.7	1058	4.8
15	0013	4.2	0549	1.9	1124	4.4	1815	.4	0026	3.9	0546	1.8
16	0051	4.2	0651	2.0	1210	3.7	1844	1.0	0104	3.9	0648	1.8
17	0133	4.3	0811	1.9	1312	3.0	1915	1.5	0146	4.0	0808	1.8
18	0219	4.3	0957	1.7	1508	2.5	1944	2.0	0232	4.0	0954	1.6
19	0315	4.4	1127	1.2	1801	2.5	2039	2.4	0328	4.0	1124	1.1
20	0415	4.6	1226	.8	1924	2.8	2215	2.7	0428	4.2	1223	.7
21	0508	4.8	1308	.3	2002	3.1	2332	2.7	0521	4.4	1305	.3
22	0556	5.1	1343	.2	2024	3.3	1814	.9	0609	4.7	1340	.2
23	0025	2.6	0638	5.5	1414	.5	2046	3.5	0022	2.4	0651	5.0
24	0106	2.4	0713	5.8	1444	-.8	2108	3.6	0103	2.2	0726	5.3
25	0145	2.1	0749	6.0	1511	-1.0	2133	3.7	0142	1.9	0802	5.5
26	0223	1.9	0824	6.0	1540	-1.0	2158	3.9	0220	1.8	0837	5.5
27	0302	1.7	0902	6.0	1609	-1.0	2227	4.1	0259	1.6	0915	5.5
28	0343	1.5	0941	5.8	1641	-.7	2257	4.4	0340	1.4	0954	5.3
29	0432	1.3	1020	5.3	1710	-.3	2329	4.6	0429	1.2	1033	4.8
30	0523	1.3	1109	4.6	1742	.3	1814	.9	0520	1.2	1122	4.2
31	0005	4.8	0629	1.2	1205	3.8	1814	.9	0018	4.4	0626	1.1

* ... TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* ... TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SMI - BARGE BEACH TIDES
JANUARY 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0040	3.6	0526	2.1	1124	4.5	1820	0.0	0040	3.6	0526	2.1
2	0117	3.8	0637	2.0	1219	3.9	1901	.4	0117	3.8	0637	2.0
3	0204	4.0	0810	1.8	1338	3.2	1943	1.0	0204	4.0	0810	1.8
4	0255	4.4	0947	1.3	1527	2.7	2038	1.4	0255	4.4	0947	1.3
5	0351	4.8	1114	.6	1725	2.6	2144	1.8	0351	4.8	1114	.6
6	0447	5.1	1215	-1	1853	2.8	2253	2.0	0447	5.1	1215	-1
7	0542	5.5	1308	-7	1955	3.1	2359	2.0	0542	5.5	1308	-7
8	0634	5.8	1356	-1.1	2043	3.3	1812	.4	0634	5.8	1356	-1.1
9	0054	2.0	0723	6.0	1441	-1.4	1912	1.4	0054	2.0	0723	6.0
10	0147	1.8	0810	6.1	1520	-1.4	2201	3.6	0147	1.8	0810	6.1
11	0233	1.8	0852	6.0	1559	-1.3	2237	3.7	0233	1.8	0852	6.0
12	0318	1.7	0934	5.7	1635	-1.1	2315	3.8	0318	1.7	0934	5.7
13	0405	1.7	1016	5.3	1709	-.6	2351	3.9	0405	1.7	1016	5.3
14	0454	1.7	1058	4.8	1741	-.2	1812	.4	0454	1.7	1058	4.8
15	0026	3.9	0546	1.8	1137	4.0	1812	.4	0026	3.9	0546	1.8
16	0104	3.9	0648	1.8	1223	3.4	1841	.9	0104	3.9	0648	1.8
17	0146	4.0	0808	1.8	1325	2.7	1912	1.4	0146	4.0	0808	1.8
18	0232	4.0	0954	1.6	1521	2.3	1941	1.8	0232	4.0	0954	1.6
19	0328	4.0	1124	1.1	1814	2.3	2036	2.2	0328	4.0	1124	1.1
20	0428	4.2	1223	.7	1937	2.6	2212	2.5	0428	4.2	1223	.7
21	0521	4.4	1305	.3	2015	2.8	2329	2.5	0521	4.4	1305	.3
22	0609	4.7	1340	-.2	2037	3.0	1812	.4	0609	4.7	1340	-.2
23	0022	2.4	0651	5.0	1411	-.4	2059	3.2	0022	2.4	0651	5.0
24	0103	2.2	0726	5.3	1441	-.7	2121	3.3	0103	2.2	0726	5.3
25	0142	1.9	0802	5.5	1508	-.9	2146	3.4	0142	1.9	0802	5.5
26	0220	1.8	0837	5.5	1537	-.9	2211	3.6	0220	1.8	0837	5.5
27	0259	1.6	0915	5.5	1606	-.9	2240	3.8	0259	1.6	0915	5.5
28	0340	1.4	0954	5.3	1638	-.6	2310	4.0	0340	1.4	0954	5.3
29	0429	1.2	1033	4.8	1707	-.3	2342	4.2	0429	1.2	1033	4.8
30	0520	1.2	1122	4.2	1739	-.3	1811	.8	0520	1.2	1122	4.2
31	0018	4.4	0626	1.1	1218	3.5	1811	.8	0018	4.4	0626	1.1

POINT MUGU TIDES
FEBRUARY 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT				
1	0051	4.9	0749	1.2	1322	3.1	1853	1.5	0104	4.5	0746	1.1	1335	2.8	1850	1.4
2	0146	5.0	0932	.9	1536	2.6	1938	2.1	0159	4.6	0929	.8	1549	2.4	1935	1.9
3	0256	5.1	1108	.3	1801	2.8	2111	2.5	0309	4.7	1105	.3	1814	2.6	2108	2.3
4	0413	5.3	1217	.3	1909	3.2	2258	2.6	0426	4.8	1214	.3	1922	2.9	2255	2.4
5	0522	5.7	1310	.8	1951	3.5	-----	-----	0535	5.2	1307	.7	2004	3.2	-----	-----
6	0013	2.3	0621	6.0	1352	-1.2	2023	3.7	0010	2.1	0634	5.5	1349	-1.1	2036	3.4
7	0107	2.0	0710	6.1	1430	-1.2	2051	4.0	0104	1.8	0723	5.6	1427	-1.1	2104	3.7
8	0153	1.6	0752	6.1	1503	-1.2	2120	4.2	0150	1.5	0805	5.6	1500	-1.1	2133	3.9
9	0236	1.4	0834	6.0	1535	-1.1	2148	4.4	0233	1.3	0847	5.5	1532	-1.0	2201	4.0
10	0314	1.2	0910	5.8	1603	-.7	2216	4.5	0311	1.1	0923	5.3	1600	-.6	2229	4.1
11	0356	1.2	0948	5.3	1628	-.3	2242	4.5	0353	1.1	1001	4.8	1625	-.3	2255	4.1
12	0435	1.2	1020	4.7	1654	-.2	2310	4.5	0432	1.1	1033	4.3	1651	-.2	2323	4.1
13	0517	1.2	1059	4.1	1715	.8	2338	4.5	0514	1.1	1112	3.8	1712	.7	2351	4.1
14	0606	1.2	1138	3.5	1734	1.2	-----	-----	0602	1.1	1151	3.2	1731	1.1	-----	-----
15	0006	4.4	0704	1.4	1231	2.8	1747	1.7	0019	4.0	0701	1.3	1244	2.6	1744	1.6
16	0043	4.3	0838	1.4	1424	2.3	1741	2.2	0056	4.0	0835	1.3	1437	2.1	1738	2.0
17	0136	4.2	1039	1.2	-----	-----	-----	-----	0149	3.9	1036	1.1	-----	-----	-----	-----
18	0303	4.2	1157	.8	-----	-----	-----	-----	0316	3.9	1154	.7	-----	-----	-----	-----
19	0427	4.4	1242	.3	1951	3.1	2319	2.8	0440	4.0	1239	.3	2004	2.8	2316	2.6
20	0530	4.8	1315	-.1	1956	3.4	-----	-----	0543	4.4	1312	-.1	2009	3.1	-----	-----
21	0017	2.5	0617	5.2	1343	-.5	2010	3.6	0014	2.3	0630	4.8	1340	-.4	2023	3.3
22	0058	2.1	0654	5.5	1412	-.7	2029	3.8	0055	1.9	0707	5.0	1409	-.6	2042	3.5
23	0135	1.6	0736	5.8	1437	-.9	2051	4.2	0132	1.5	0749	5.3	1434	-.8	2104	3.9
24	0214	1.2	0812	5.8	1506	-.8	2112	4.5	0211	1.1	0825	5.3	1503	-.7	2125	4.1
25	0255	.8	0850	5.7	1534	-.6	2140	4.8	0252	.7	0903	5.2	1531	-.5	2153	4.4
26	0337	.5	0933	5.4	1559	-.3	2209	5.1	0334	.4	0946	4.9	1556	-.3	2222	4.7
27	0423	.3	1018	4.8	1631	.2	2243	5.3	0420	.3	1031	4.4	1628	.2	2256	4.8
28	0515	.2	1110	4.1	1703	.8	2320	5.3	0512	.2	1123	3.8	1700	.7	2333	4.8

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
FEBRUARY 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0104	4.5	0746	1.1	1335	2.8	1850	1.4				
2	0159	4.6	0929	.8	1549	2.4	1935	1.9				
3	0309	4.7	1105	.3	1814	2.6	2108	2.3				
4	0426	4.8	1214	.3	1922	2.9	2255	2.4				
5	0535	5.2	1307	.7	2004	3.2	-----	-----				
6	0010	2.1	0634	5.5	1349	-1.1	2036	3.4				
7	0104	1.8	0723	5.6	1427	-1.1	2104	3.7				
8	0150	1.5	0805	5.6	1500	-1.1	2133	3.9				
9	0233	1.3	0847	5.5	1532	-1.0	2201	4.0				
10	0311	1.1	0923	5.3	1600	-.6	2229	4.1				
11	0353	1.1	1001	4.8	1625	-.3	2255	4.1				
12	0432	1.1	1033	4.3	1651	-.2	2323	4.1				
13	0514	1.1	1112	3.8	1712	.7	2351	4.1				
14	0602	1.1	1151	3.2	1731	1.1	-----	-----				
15	0019	4.0	0701	1.3	1244	2.6	1744	1.6				
16	0056	4.0	0835	1.3	1437	2.1	1738	2.0				
17	0149	3.9	1036	1.1	-----	-----	-----	-----				
18	0316	3.9	1154	.7	-----	-----	-----	-----				
19	0440	4.0	1239	.3	2004	2.8	2316	2.6				
20	0543	4.4	1312	-.1	2009	3.1	-----	-----				
21	0014	2.3	0630	4.8	1340	-.4	2023	3.3				
22	0055	1.9	0707	5.0	1409	-.6	2042	3.5				
23	0132	1.5	0749	5.3	1434	-.8	2104	3.9				
24	0211	1.1	0825	5.3	1503	-.7	2125	4.1				
25	0252	.7	0903	5.2	1531	-.5	2153	4.4				
26	0334	.4	0946	4.9	1556	-.3	2222	4.7				
27	0420	.3	1031	4.4	1628	.2	2256	4.8				
28	0512	.2	1123	3.8	1700	.7	2333	4.8				

POINT MUGU TIDES
MARCH 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0617	3	1213	3.4	1735	1.4	1810	2.0
2	0006	5.2	0736	4	1346	2.8	1914	2.5
3	0106	5.0	0916	3	1628	2.7	2136	2.8
4	0226	4.9	1052	0.0	1815	3.1	2322	2.5
5	0401	4.9	1201	4	1855	3.5	---	---
6	0518	5.2	1249	7	1925	3.7	---	---
7	0025	2.0	0617	5.4	1331	1.8	1954	4.1
8	0113	1.5	0705	5.5	1403	1.8	2019	4.3
9	0154	1.2	0747	5.5	1432	1.7	2042	4.6
10	0229	1.8	0823	5.3	1500	1.4	2105	4.7
11	0305	1.6	0857	5.0	1522	0.0	2127	4.8
12	0340	1.4	0932	4.6	1544	1.4	2149	4.9
13	0412	1.4	1006	4.2	1604	1.8	2211	4.9
14	0451	1.5	1043	3.6	1623	1.2	2233	4.8
15	0530	1.6	1124	3.2	1638	1.6	2300	4.6
16	0622	1.8	1221	2.7	1644	2.0	2333	4.4
17	0735	1.1	---	---	---	---	---	---
18	0016	4.2	0928	1.0	---	---	---	---
19	0142	4.0	1101	1.7	---	---	---	---
20	0335	4.0	1151	1.4	1905	3.3	2307	2.7
21	0452	4.3	1226	0.0	1908	3.6	0001	2.2*
22	0543	4.7	1258	1.3	1921	3.8	---	---
23	0042	1.6	0630	5.0	1326	1.4	1939	4.3
24	0121	1.1	0715	5.2	1352	1.4	2001	4.7
25	0203	1.4	0800	5.2	1424	1.3	2026	5.2
26	0245	1.2	0845	5.1	1453	0.0	2055	5.6
27	0329	1.6	0930	4.7	1524	1.4	2127	5.8
28	0417	1.8	1020	4.2	1556	1.9	2206	5.9
29	0510	1.8	1120	3.6	1631	1.4	2245	5.7
30	0611	1.6	1233	3.2	1710	1.9	2334	5.4
31	0728	1.3	1420	2.9	1758	2.4	---	---

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

MARCH 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0614	3	1226	3.1	1732	1.3	1807	1.8
2	0019	4.8	0733	4	1359	2.6	1911	2.3
3	0119	4.6	0913	3	1641	2.5	2133	2.6
4	0239	4.5	1049	0.0	1828	2.8	2319	2.3
5	0414	4.5	1158	1.4	1908	3.2	---	---
6	0531	4.8	1246	1.6	1938	3.4	---	---
7	0022	1.8	0630	4.9	1328	1.7	2007	3.8
8	0110	1.4	0718	5.0	1400	1.7	2032	4.0
9	0151	1.1	0800	5.0	1429	1.6	2055	4.2
10	0226	1.7	0836	4.8	1457	1.4	2118	4.3
11	0302	1.5	0910	4.6	1519	0.0	2140	4.4
12	0337	1.4	0945	4.2	1541	1.4	2202	4.5
13	0409	1.4	1019	3.9	1601	1.7	2224	4.5
14	0448	1.4	1056	3.3	1620	1.1	2246	4.4
15	0527	1.5	1137	2.9	1635	1.5	2313	4.2
16	0619	1.7	1234	2.5	1641	1.8	2346	4.0
17	0732	1.0	---	---	---	---	---	---
18	0029	3.9	0925	1.9	---	---	---	---
19	0155	3.7	1058	1.6	---	---	---	---
20	0348	3.7	1148	1.4	1918	3.0	2304	2.5
21	0505	4.0	1223	0.0	1921	3.3	2358	2.0
22	0556	4.3	1255	1.3	1934	3.5	---	---
23	0039	1.5	0643	4.6	1323	1.4	1952	4.0
24	0118	1.0	0728	4.8	1349	1.4	2014	4.3
25	0200	1.4	0813	4.8	1421	1.3	2039	4.3
26	0242	1.2	0858	4.7	1450	0.0	2108	5.1
27	0326	1.5	0943	4.3	1521	1.4	2140	5.3
28	0414	1.7	1033	3.9	1553	1.8	2219	5.4
29	0507	1.7	1133	3.3	1628	1.3	2258	5.2
30	0608	1.5	1246	2.9	1707	1.8	2347	4.9
31	0725	1.3	1433	2.6	1755	2.2	---	---

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
APRIL 1990
34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0040	5.0	0854	-2	1630	3.0	1941	2.8
2	0209	4.6	1021	-2	1741	3.4	2205	2.6
3	0346	4.5	1124	-3	1814	3.7	2327	2.1
4	0508	4.6	1217	-4	1846	4.1	---	---
5	0625	1.5	0604	4.7	1254	-3	1914	4.4
6	0108	1.1	0654	4.7	1326	-1	1939	4.7
7	0146	.6	0735	4.6	1352	.2	1958	4.9
8	0219	.3	0813	4.4	1415	.5	2020	5.1
9	0253	0.0	0849	4.2	1438	.8	2039	5.2
10	0325	-1.1	0924	3.9	1500	1.2	2103	5.2
11	0357	-2.2	1001	3.6	1519	1.4	2122	5.2
12	0433	-1.1	1040	3.3	1540	1.7	2151	5.0
13	0514	.1	1128	3.0	1556	2.0	2216	4.8
14	0600	.3	1235	2.7	1603	2.3	2249	4.6
15	0659	.5	2334	4.3	---	---	---	---
16	0818	.6	---	---	---	---	---	---
17	0043	4.0	0938	.5	1754	3.2	2044	3.0
18	0226	3.9	1038	.4	1748	3.5	2239	2.6
19	0402	3.9	1120	.2	1802	3.8	2337	1.9
20	0509	4.1	1159	.2	1822	4.3	---	---
21	0622	1.2	0607	4.3	1231	.2	1846	4.8
22	0107	.4	0659	4.4	1305	.3	1912	5.4
23	0149	-1.0	0748	4.4	1339	.5	1944	5.9
24	0235	-1.3	0840	4.3	1413	.9	2019	6.1
25	0320	-1.3	0934	4.1	1451	1.2	2056	6.3
26	0409	-1.4	1030	3.7	1527	1.5	2138	6.2
27	0504	-1.3	1134	3.5	1612	1.9	2225	6.0
28	0606	-1.2	1249	3.3	1704	2.3	2321	5.6
29	0712	.8	1418	3.3	1814	2.6	---	---
30	0024	5.0	0826	.5	1542	3.5	2006	2.7

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
APRIL 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0053	4.6	0851	-2	1643	2.7	1938	2.6
2	0222	4.2	1018	-2	1754	3.1	2202	2.4
3	0359	4.1	1121	-3	1827	3.4	2324	1.9
4	0521	4.2	1214	-4	1859	3.8	---	---
5	0622	1.4	0617	4.3	1251	-3	1927	4.0
6	0105	1.0	0707	4.3	1323	-1	1952	4.3
7	0143	.5	0748	4.2	1349	.2	2011	4.5
8	0216	.3	0826	4.0	1412	.4	2033	4.7
9	0250	0.0	0902	3.9	1435	.7	2052	4.8
10	0322	-1.1	0937	3.6	1457	1.1	2116	4.8
11	0354	-2.2	1014	3.3	1516	1.3	2135	4.8
12	0430	-1.1	1053	3.0	1537	1.6	2204	4.6
13	0511	.1	1141	2.7	1553	1.8	2229	4.4
14	0557	.3	1248	2.5	1600	2.1	2302	4.2
15	0656	.4	2347	4.0	---	---	---	---
16	0815	.5	---	---	---	---	---	---
17	0056	3.7	0935	.4	1807	2.9	2041	2.7
18	0239	3.6	1035	.4	1801	3.2	2236	2.4
19	0415	3.6	1117	.2	1815	3.5	2334	1.8
20	0522	3.8	1156	.2	1835	4.0	---	---
21	0019	1.1	0620	4.0	1228	.2	1859	4.4
22	0104	.4	0712	4.0	1302	.3	1925	4.9
23	0146	-1.3	0801	4.0	1336	.4	1957	5.4
24	0232	-1.9	0853	4.0	1410	.8	2032	5.6
25	0317	-1.2	0947	3.8	1448	1.1	2109	5.9
26	0406	-1.3	1043	3.4	1524	1.4	2151	5.7
27	0501	-1.2	1147	3.2	1609	1.8	2233	5.5
28	0603	-1.1	1302	3.0	1701	2.1	2334	5.1
29	0709	-1.1	1431	3.0	1811	2.4	---	---
30	0037	4.6	0823	.4	1555	3.2	2003	2.5

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES

MAY 1990
34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0150	4.5	0936	-2	1642	3.8	2158	2.4
2	0323	4.1	1036	0.0	1724	4.1	2315	1.8
3	0439	3.9	1123	-2	1757	4.5	---	---
4	0012	1.2	0545	3.9	1205	.5	1828	4.8
5	0058	.8	0641	3.8	1237	.8	1852	5.0
6	0137	3	0727	3.7	1306	1.1	1915	5.2
7	0209	0.0	0808	3.6	1331	1.3	1939	5.3
8	0241	-3	0847	3.6	1356	1.5	2001	5.4
9	0316	-5	0928	3.4	1418	1.8	2026	5.5
10	0348	-5	1010	3.3	1443	2.0	2052	5.4
11	0424	-4	1051	3.1	1508	2.2	2124	5.3
12	0502	-3	1142	3.0	1533	2.4	2154	5.1
13	0547	-2	1243	2.9	1559	2.6	2230	4.9
14	0637	0.0	1406	2.9	1644	2.8	2315	4.6
15	0729	2	1515	3.1	1814	3.0	---	---
16	0015	4.2	0826	-3	1557	3.5	2022	2.9
17	0136	3.8	0918	-4	1629	3.7	2205	2.4
18	0309	3.6	1008	-6	1654	4.2	2311	1.6
19	0435	3.6	1052	-7	1724	4.8	0004	.8*
20	0545	3.6	1134	-9	1756	5.4	---	---
21	0052	-1	0649	3.7	1216	1.2	1826	5.9
22	0140	-8	0749	3.7	1258	1.3	1911	6.3
23	0229	-1.3	0844	3.7	1340	1.5	1952	6.6
24	0315	-1.7	0940	3.7	1422	1.7	2036	6.7
25	0407	-1.8	1035	3.6	1511	1.9	2122	6.5
26	0459	-1.6	1134	3.6	1604	2.2	2214	6.1
27	0552	-1.3	1240	3.6	1704	2.4	2307	5.7
28	0648	-1.0	1341	3.6	1821	2.5	---	---
29	0006	5.0	0744	-5	1444	3.8	1952	2.5
30	0119	4.3	0839	0.0	1540	4.1	2130	2.2
31	0241	3.7	0934	.5	1625	4.4	2251	1.7

* ... TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

MAY 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0203	4.1	0933	-2	1655	3.5	2155	2.2
2	0336	3.8	1033	0.0	1737	3.8	2312	1.7
3	0452	3.6	1120	-2	1810	.1	---	---
4	0009	1.1	0558	3.6	1202	.4	1841	4.4
5	0055	.7	0654	3.5	1234	.7	1905	4.6
6	0134	.3	0740	3.4	1303	1.0	1928	4.8
7	0206	0.0	0821	3.3	1328	1.2	1952	4.8
8	0238	-3	0900	3.3	1353	1.4	2014	4.9
9	0313	-4	0941	3.1	1415	1.7	2039	5.0
10	0345	-4	1023	3.0	1440	1.8	2105	4.9
11	0421	-4	1104	2.8	1505	2.0	2137	4.8
12	0459	-3	1155	2.7	1530	2.2	2207	4.7
13	0544	-2	1256	2.6	1556	2.4	2243	4.5
14	0634	0.0	1419	2.6	1641	2.6	2328	4.2
15	0726	.2	1528	2.8	1811	2.7	---	---
16	0028	3.9	0823	-3	1610	3.2	2019	2.6
17	0149	3.5	0915	-4	1642	3.4	2202	2.2
18	0322	3.3	1005	-5	1707	3.9	2308	1.5
19	0448	3.3	1049	-6	1737	4.4	0001	.7*
20	0558	3.3	1131	-8	1809	4.9	---	---
21	0049	-1	0702	3.4	1213	1.1	1839	5.4
22	0137	-7	0802	3.4	1255	1.2	1924	5.8
23	0226	-1.2	0857	3.4	1337	1.4	2005	6.1
24	0317	-1.6	0953	3.4	1419	1.6	2049	6.2
25	0404	-1.7	1048	3.3	1508	1.8	2135	6.0
26	0456	-1.5	1147	3.3	1601	2.0	2227	5.6
27	0549	-1.2	1253	3.3	1701	2.2	2320	5.2
28	0645	-0.9	1354	3.3	1818	2.3	---	---
29	0019	4.6	0741	-4	1457	3.5	1949	2.3
30	0132	4.0	0836	0.0	1553	3.8	2127	2.0
31	0254	3.4	0911	.4	1638	4.0	2248	1.6

* ... TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

9	0415	-6	1014	3.3	1420	2.4	2006	5.7	0910	3.0	1317	2.0	1918	5.0
10	0451	-6	1050	3.3	1456	2.4	2036	5.7	0949	3.0	1349	2.1	1947	5.1
11	0526	-5	1132	3.3	1534	2.5	2110	5.6	1027	3.0	1417	2.2	2019	5.2
12	0605	-3	1216	3.4	1617	2.6	2145	5.5	1103	3.0	1453	2.2	2123	5.1
13	0644	0.0	1301	3.5	1713	2.7	2222	5.2	1145	3.0	1531	2.3	2158	5.0
14	0724	-3	1342	3.6	1824	2.7	2303	4.8	1229	3.1	1614	2.4	2235	4.8
15	0104	3.8	1424	3.9	1955	2.5	2355	4.3	1314	3.2	1710	2.5	2316	4.4
16	0232	3.4	0809	.6	1509	4.3	2126	2.0	1355	3.3	1821	2.5	0008	4.0*
17	0414	3.2	0858	1.0	1550	4.7	2247	1.3	1437	3.6	1952	2.3	---	---
18	0543	3.2	0949	1.3	1632	5.3	2351	.5	0806	.5	1522	4.0	2123	1.8
19	0046	-3	1042	1.6	1716	5.8	---	---	0855	.9	1603	4.3	2244	1.2
20	0135	-1.0	0657	3.3	1137	1.9	1804	6.2	0946	1.2	1645	4.8	2348	.4
21	0224	-1.4	0758	3.5	1229	2.0	1850	6.6	1039	1.5	1729	5.3	---	---
22	0313	-1.7	0852	3.6	1322	2.0	1939	6.8	0710	3.0	1134	1.8	1817	5.7
23	0359	-1.7	0941	3.7	1414	2.0	2025	6.8	0811	3.2	1226	1.8	1903	6.1
24	0444	-1.5	1030	3.8	1507	2.0	2115	6.6	0905	3.3	1319	1.8	1952	6.2
25	0528	-1.2	1115	3.9	1601	2.1	2203	6.2	0954	3.4	1411	1.8	2038	6.2
26	0613	-7	1203	4.0	1657	2.1	2251	5.7	1043	3.5	1504	1.8	2128	6.1
27	0656	-1	1251	4.1	1803	2.2	2343	5.0	1216	3.7	1558	1.9	2216	5.7
28	0042	4.2	1338	4.3	1918	2.2	---	---	1254	3.8	1654	1.9	2304	5.2
29	0151	3.5	1427	4.4	2044	2.1	2044	2.1	1304	3.8	1800	2.0	2356	4.6
30	0328	3.0	1515	4.6	2216	1.7	2216	1.7	1351	4.0	1915	2.0	---	---
			1601	4.8	2332	1.2	2332	1.2	0653	-1	1915	2.0	---	---
									0055	3.9	1440	4.0	2041	1.9
									0204	3.2	1528	4.2	2213	1.6
									0341	2.7	1614	4.4	2329	1.1

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
JUNE 1990
34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0405	3.4	1020	9	1704	4.7	2354	1.2
2	0526	3.3	1106	1.2	1736	5.0	1807	5.2
3	0044	7	0632	3.2	1141	1.6	1836	5.4
4	0126	2	0727	3.2	1217	1.8	1905	5.5
5	0201	1.1	0813	3.3	1248	2.0	1934	5.6
6	0233	4	0857	3.3	1320	2.2	2006	5.7
7	0305	5	0936	3.3	1352	2.3	2036	5.7
8	0340	6	1014	3.3	1420	2.4	2110	5.6
9	0415	6	1050	3.3	1456	2.4	2145	5.5
10	0451	6	1132	3.3	1534	2.5	2222	5.2
11	0526	5	1216	3.4	1617	2.6	2303	4.8
12	0605	3	1301	3.5	1713	2.7	2355	4.3
13	0644	0.0	1342	3.6	1824	2.7	---	---
14	0724	3	1424	3.9	1955	2.5	2126	2.0
15	0104	3.8	0809	6	1509	4.3	2247	1.3
16	0232	3.4	0858	1.0	1550	4.7	2351	5
17	0414	3.2	0949	1.3	1632	5.3	---	---
18	0543	3.2	1042	1.6	1716	5.8	1804	6.2
19	0046	3	0657	3.3	1137	1.9	1850	6.6
20	0135	1.0	0758	3.5	1229	2.0	1939	6.8
21	0224	1.4	0852	3.6	1322	2.0	2025	6.8
22	0313	1.7	0941	3.7	1414	2.0	2115	6.6
23	0359	1.7	1030	3.8	1507	2.0	2203	6.2
24	0444	1.5	1115	3.9	1601	2.1	2251	5.7
25	0528	1.2	1203	4.0	1657	2.1	2343	5.0
26	0613	7	1251	4.1	1803	2.2	---	---
27	0656	1.1	1338	4.3	1918	2.2	2044	2.1
28	0042	4.2	0736	5	1427	4.4	2216	1.7
29	0151	3.5	0818	1.1	1515	4.6	2332	1.2
30	0328	3.0	0907	1.6	1601	4.8	---	---

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
JUNE 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0418	3.1	1017	8	1717	4.3	2351	1.1
2	0539	3.0	1103	1.1	1749	4.6	1820	4.8
3	0041	6	0645	2.9	1138	1.5	1849	4.9
4	0123	2	0740	2.9	1214	1.7	1918	5.0
5	0158	1.1	0826	3.0	1245	1.8	1947	5.1
6	0230	4	0910	3.0	1317	2.0	2019	5.2
7	0302	4	0949	3.0	1349	2.1	2049	5.2
8	0337	5	1027	3.0	1417	2.2	2123	5.1
9	0412	5	1103	3.0	1453	2.2	2158	5.0
10	0448	5	1145	3.0	1531	2.3	2235	4.8
11	0523	4	1229	3.1	1614	2.4	2316	4.4
12	0602	3	1314	3.2	1710	2.5	0008	4.0*
13	0641	0.0	1355	3.3	1821	2.5	---	---
14	0721	3	1437	3.6	1952	2.3	2123	1.8
15	0117	3.5	0806	5	1522	4.0	2244	1.2
16	0245	3.1	0855	9	1603	4.3	2348	4
17	0427	2.9	0946	1.2	1645	4.8	---	---
18	0556	2.9	1039	1.5	1729	5.3	1817	5.7
19	0043	3	0710	3.0	1134	1.8	1903	6.1
20	0132	9	0811	3.2	1226	1.8	1952	6.2
21	0221	1.3	0905	3.3	1319	1.8	2038	6.2
22	0310	1.6	0954	3.4	1411	1.8	2128	6.1
23	0356	1.6	1043	3.5	1504	1.8	2216	5.7
24	0441	1.4	1128	3.6	1558	1.9	2304	5.2
25	0525	1.1	1216	3.7	1654	1.9	2356	4.6
26	0610	6	1304	3.8	1800	2.0	---	---
27	0653	1.1	1351	4.0	1915	2.0	2041	1.9
28	0055	3.9	0733	4	1440	4.0	2213	1.6
29	0204	3.2	0815	1.0	1528	4.2	2329	1.1
30	0341	2.7	0904	1.5	1614	4.4	---	---

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES

AUGUST 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0054	.6	0746	3.3	1119	2.9	1740	5.2
2	0130	.2	0815	3.5	1217	2.8	1825	5.5
3	0202	-1	0833	3.6	1256	2.6	1902	5.8
4	0230	-4	0855	3.8	1335	2.4	1939	6.0
5	0258	-5	0917	3.9	1411	2.1	2014	6.0
6	0324	-5	0942	4.2	1450	1.9	2046	6.0
7	0352	-4	1006	4.4	1529	1.7	2123	5.8
8	0417	-2	1032	4.6	1612	1.5	2203	5.4
9	0446	-2	1101	4.8	1701	1.4	2245	4.8
10	0515	.7	1134	5.0	1758	1.3	2338	4.1
11	0544	1.2	1216	5.1	1909	1.3	---	---
12	0617	3.5	0616	1.7	1303	5.2	2041	1.2
13	0239	2.9	0659	2.3	1409	5.3	2221	.8
14	0511	3.0	0814	2.7	1527	5.5	2340	.2
15	0639	3.3	1011	2.9	1642	5.8	---	---
16	0036	-4	0721	3.6	1137	2.7	1748	6.1
17	0121	-8	0753	4.0	1238	2.3	1841	6.3
18	0203	-9	0824	4.3	1329	1.9	1930	6.4
19	0239	-9	0853	4.6	1414	1.5	2014	6.3
20	0312	-7	0922	4.8	1458	1.3	2056	6.1
21	0343	-4	0950	5.0	1540	1.2	2135	5.7
22	0412	.1	1019	5.1	1622	1.2	2214	5.1
23	0437	.6	1049	5.1	1704	1.2	2253	4.4
24	0502	1.2	1118	5.0	1755	1.3	2336	3.8
25	0521	1.7	1150	4.9	1855	1.5	---	---
26	0037	3.2	0542	2.2	1229	4.7	2018	1.6
27	0239	2.8	0541	2.7	1322	4.5	2211	1.4
28	1445	4.5	2332	1.1	---	---	---	---
29	1615	4.6	---	---	---	---	---	---
30	0022	.7	0726	3.6	1116	3.1	1717	5.0
31	0058	.4	0739	3.7	1209	2.8	1803	5.3

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

AUGUST 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0051	.5	0759	3.0	1116	2.6	1753	4.8
2	0127	.2	0828	3.2	1214	2.6	1838	5.0
3	0159	-1	0846	3.3	1253	2.4	1915	5.3
4	0227	-4	0908	3.5	1332	2.2	1952	5.5
5	0255	-4	0930	3.6	1408	1.9	2027	5.5
6	0321	-4	0955	3.9	1447	1.8	2059	5.5
7	0349	-4	1019	4.0	1526	1.6	2136	5.3
8	0414	-2	1045	4.2	1609	1.4	2216	4.9
9	0443	.2	1114	4.4	1658	1.3	2258	4.4
10	0512	.6	1147	4.6	1755	1.2	2351	3.8
11	0541	1.1	1229	4.7	1906	1.2	---	---
12	0100	3.2	0613	1.6	1316	4.8	2038	1.1
13	0252	2.6	0656	2.1	1422	4.8	2218	.7
14	0524	2.7	0811	2.5	1540	5.0	2337	.2
15	0652	3.0	1008	2.6	1655	5.3	---	---
16	0033	-4	0734	3.3	1134	2.5	1801	5.6
17	0118	-7	0806	3.7	1235	2.1	1854	5.8
18	0200	-8	0837	4.0	1326	1.8	1943	5.9
19	0236	-8	0906	4.2	1411	1.4	2027	5.8
20	0309	-6	0935	4.4	1455	1.2	2109	5.6
21	0340	-4	1003	4.6	1537	1.1	2148	5.2
22	0409	.1	1032	4.7	1619	1.1	2227	4.7
23	0434	.5	1102	4.7	1701	1.1	2306	4.0
24	0459	1.1	1131	4.6	1752	1.2	2349	3.5
25	0518	1.6	1203	4.5	1852	1.4	---	---
26	0050	2.9	0539	2.0	1242	4.3	2015	1.5
27	0252	2.6	0538	2.5	1335	4.1	2208	1.3
28	1458	4.1	2329	1.0	---	---	---	---
29	1628	4.2	---	---	---	---	---	---
30	0019	.6	0739	3.3	1113	2.8	1730	4.6
31	0055	.4	0752	3.4	1206	2.6	1816	4.8

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
SEPTEMBER 1990
34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

SNI - BARGE BEACH TIDES
SEPTEMBER 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT				
1	0126	.1	0751	3.9	1249	2.4	1842	5.6	0123	.1	0804	3.6	1246	2.2	1855	5.1
2	0152	-.1	0809	4.2	1325	2.0	1920	5.8	0149	-.1	0822	3.9	1322	1.8	1933	5.3
3	0217	-.2	0827	4.5	1400	1.5	1955	5.8	0214	-.2	0840	4.1	1357	1.4	2008	5.4
4	0243	-.1	0849	4.9	1436	1.2	2034	5.8	0240	-.1	0902	4.5	1433	1.1	2047	5.3
5	0311	0.0	0914	5.2	1517	.9	2113	5.5	0308	0.0	0927	4.8	1514	.8	2126	5.0
6	0336	.4	0943	5.4	1600	.6	2158	5.0	0333	.4	0956	4.9	1557	.5	2211	4.6
7	0405	.8	1014	5.6	1648	.5	2244	4.4	0402	.7	1027	5.1	1645	.4	2257	4.0
8	0433	1.2	1046	5.7	1747	.5	2344	3.7	0430	1.1	1059	5.2	1744	.4	2357	3.4
9	0505	1.8	1128	5.6	1856	.6	---	---	0502	1.7	1141	5.1	---	---	---	---
10	0109	3.2	0539	2.4	1224	5.5	2029	.6	0122	2.9	0536	2.2	1237	5.0	2026	.5
11	0333	3.1	0629	2.9	1342	5.3	2208	.4	0346	2.8	0626	2.6	1355	4.8	2205	.4
12	0534	3.4	0849	3.2	1517	5.3	2322	0.0	0547	3.1	0846	2.9	1530	4.8	2319	0.0
13	0620	3.7	1043	2.9	1640	5.5	---	---	0633	3.4	1040	2.6	1653	5.0	---	---
14	0017	-.3	0654	4.1	1153	2.4	1746	5.7	0014	-.3	0707	3.8	1150	2.2	1759	5.2
15	0057	-.4	0724	4.5	1246	1.9	1838	5.9	0054	-.4	0737	4.1	1243	1.8	1851	5.4
16	0135	-.4	0749	4.8	1330	1.4	1923	5.8	0132	-.4	0802	4.4	1327	1.3	1936	5.3
17	0204	-.2	0814	5.1	1409	1.0	2003	5.7	0201	-.2	0827	4.7	1406	.9	2016	5.2
18	0233	.1	0839	5.3	1448	.7	2042	5.4	0230	.1	0852	4.8	1445	.6	2055	4.9
19	0301	.5	0903	5.5	1524	.6	2121	5.0	0320	.8	0916	5.0	1521	.5	2134	4.6
20	0323	.9	0926	5.5	1559	.5	2158	4.5	0358	.4	0939	5.0	1556	.4	2211	4.1
21	0345	1.3	0951	5.4	1638	.6	2236	4.0	0342	1.2	1004	4.9	1635	.5	2249	3.7
22	0406	1.8	1016	5.3	1720	.8	2321	3.6	0403	1.7	1029	4.8	1717	.7	2334	3.3
23	0425	2.2	1043	5.1	1813	1.1	---	---	0422	2.0	1056	4.7	1810	1.0	---	---
24	0027	3.1	0430	2.6	1113	4.8	1925	1.2	0400	2.8	0427	2.4	1126	4.4	1922	1.1
25	1203	4.5	2108	1.2	---	---	---	---	1216	4.1	2105	1.1	---	---	---	---
26	1327	4.3	2237	1.1	---	---	---	---	1340	4.0	2234	1.0	---	---	---	---
27	0657	3.6	0936	3.5	1515	4.3	2330	.8	0710	3.3	0933	3.2	1528	4.0	2327	.7
28	0642	3.7	1109	3.1	1639	4.5	0007	.5*	0655	3.4	1106	2.8	1652	4.1	0004	.4*
29	0646	4.0	1156	2.6	1730	4.8	---	---	0659	3.7	1153	2.4	1743	4.4	---	---
30	0038	.4	0700	4.3	1231	2.0	1817	5.1	0035	.4	0713	4.0	1228	1.8	1830	4.7

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
OCTOBER 1990

34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0103	.3	0716	4.7	1210	1.4	1858	5.3
2	0129	.3	0738	5.1	1347	.9	1940	5.3
3	0157	.4	0803	5.6	1423	.3	2023	5.2
4	0225	.7	0828	6.0	1506	-1.1	2107	4.9
5	0254	1.0	0900	6.1	1551	-4	2156	4.5
6	0326	1.4	0935	6.2	1640	-5	2252	4.0
7	0401	1.9	1014	6.1	1739	-3	---	---
8	0003	3.6	0433	2.3	1059	6.0	1851	-1.1
9	0141	3.3	0526	2.8	1200	5.6	2016	-1.1
10	0346	3.4	0659	3.2	1326	5.1	2140	-1.1
11	0501	3.7	0922	3.1	1505	4.9	2250	0.0
12	0543	4.2	1055	2.6	1631	4.9	2340	0.0
13	0615	4.6	1156	2.0	1737	5.0	---	---
14	0025	.1	0645	5.0	1244	1.3	1830	5.0
15	0057	.3	0710	5.3	1326	.9	1915	4.9
16	0126	.6	0734	5.5	1402	.5	1957	4.7
17	0153	1.0	0757	5.7	1440	.2	2036	4.5
18	0216	1.2	0821	5.8	1512	0.0	2114	4.2
19	0240	1.6	0843	5.8	1544	0.0	2151	3.9
20	0302	1.9	0906	5.7	1620	.1	2233	3.6
21	0317	2.2	0933	5.5	1702	.3	2323	3.3
22	0335	2.5	1000	5.3	1747	.5	---	---
23	0039	3.1	0350	2.8	1032	5.0	1848	.8
24	1117	4.7	2002	.9	---	---	---	---
25	1220	4.3	2118	.9	---	---	---	---
26	0531	3.6	0855	3.5	1402	4.1	2214	.8
27	0538	3.8	1036	3.0	1542	4.1	2300	.8
28	0546	4.2	1130	2.3	1652	4.2	2335	.7
29	0604	4.7	1212	1.6	1748	4.3	0007	.8*
30	0624	5.2	1251	.9	1839	4.5	---	---
31	0039	.9	0649	5.7	1332	.1	1928	4.5

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES

OCTOBER 1990

33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0100	.3	0729	4.3	1307	1.3	1911	4.8
2	0126	.3	0751	4.7	1344	.8	1953	4.8
3	0154	.4	0816	5.1	1420	.3	2036	4.8
4	0222	.6	0841	5.5	1503	-1.1	2120	4.5
5	0251	.9	0913	5.6	1548	-4	2209	4.1
6	0323	1.3	0948	5.7	1637	-4	2305	3.7
7	0358	1.8	1027	5.6	1736	-3	---	---
8	0016	3.3	0430	2.1	1112	5.5	1848	-1.1
9	0154	3.0	0523	2.6	1213	5.1	2013	-1.1
10	0359	3.1	0656	2.9	1339	4.7	2137	-1.1
11	0514	3.4	0919	2.8	1518	4.5	2247	0.0
12	0556	3.9	1052	2.4	1644	4.5	2337	0.0
13	0628	4.2	1153	1.8	1750	4.6	---	---
14	0022	.1	0658	4.6	1241	1.2	1843	4.6
15	0054	.3	0723	4.8	1323	.8	1928	4.5
16	0123	.5	0747	5.0	1359	.4	2010	4.3
17	0150	.9	0810	5.2	1437	.2	2049	4.1
18	0213	1.1	0834	5.3	1509	0.0	2127	3.9
19	0237	1.5	0856	5.3	1541	0.0	2204	3.6
20	0259	1.8	0919	5.2	1617	.1	2246	3.3
21	0314	2.0	0946	5.0	1659	.3	2336	3.0
22	0332	2.3	1013	4.8	1744	.4	---	---
23	0052	2.8	0347	2.6	1045	4.6	1845	.7
24	1130	4.3	1959	.8	---	---	---	---
25	1233	4.0	2115	.8	---	---	---	---
26	0544	3.3	0852	3.2	1415	3.8	2211	.7
27	0551	3.5	1033	2.7	1555	3.8	2257	.7
28	0559	3.9	1127	2.1	1705	3.9	2332	.6
29	0617	4.3	1209	1.5	1801	4.0	0004	.7*
30	0637	4.8	1248	.8	1852	4.1	---	---
31	0036	.8	0702	5.2	1329	.1	1941	4.1

* --- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
NOVEMBER 1990
34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0111	1.1	0718	6.1	1414	-5	2020	4.4	0108	1.0
2	0146	1.2	0752	6.5	1457	-1.0	2109	4.3	0143	1.1
3	0221	1.5	0829	6.7	1545	-1.2	2203	4.0	0218	1.4
4	0300	1.9	0908	6.7	1638	-1.2	2302	3.7	0257	1.8
5	0339	2.2	0956	6.5	1734	-1.0	---	---	0336	2.0
6	0015	3.6	0428	2.6	1046	6.0	1838	-7	0028	3.3
7	0134	3.6	0533	2.9	1149	5.6	1949	-3	0147	3.3
8	0304	3.7	0720	3.1	1307	5.0	2058	0.0	0317	3.4
9	0406	4.1	0917	2.8	1440	4.5	2202	-2	0419	3.8
10	0454	4.5	1048	2.2	1609	4.2	2253	-5	0507	4.1
11	0530	4.9	1150	1.5	1722	4.1	2337	-8	0543	4.5
12	0604	5.2	1239	1.0	1822	4.0	---	---	0617	4.8
13	0014	1.1	0630	5.5	1321	-5	1914	3.9	0011	1.0
14	0046	1.4	0657	5.7	1359	-1	2000	3.8	0043	1.3
15	0111	1.6	0723	5.8	1431	-2	2039	3.7	0108	1.5
16	0139	1.9	0748	5.9	1503	-3	2118	3.6	0136	1.8
17	0204	2.1	0812	5.9	1536	-4	2200	3.6	0201	1.9
18	0230	2.3	0841	5.8	1611	-3	2239	3.4	0227	2.1
19	0255	2.5	0910	5.7	1649	-2	2328	3.3	0252	2.3
20	0321	2.7	0941	5.5	1731	0.0	---	---	0318	2.5
21	0027	3.2	0353	2.9	1013	5.2	1814	-2	0040	2.9
22	0136	3.2	0432	3.1	1055	4.8	1906	-4	0149	2.9
23	0245	3.4	0544	3.2	1147	4.4	1958	-6	0258	3.1
24	0334	3.6	0756	3.2	1256	4.0	2047	-8	0347	3.3
25	0406	3.9	0948	2.8	1433	3.6	2140	1.0	0419	3.6
26	0434	4.4	1058	2.0	1610	3.6	2223	1.2	0447	4.0
27	0503	4.9	1153	1.2	1725	3.6	2306	1.3	0516	4.5
28	0536	5.5	1238	-4	1831	3.6	2351	1.5	0549	5.0
29	0609	6.0	1321	-4	1927	3.8	---	---	0622	5.5
30	0032	1.6	0647	6.4	1406	-1.1	2024	3.8	0029	1.5

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

SNI - BARGE BEACH TIDES
NOVEMBER 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT
1	0108	1.0	0731	5.6	1411	-4	2033	4.0	0108	1.0
2	0143	1.1	0805	6.0	1454	-9	2122	4.0	0143	1.1
3	0218	1.4	0842	6.2	1542	-1.1	2216	3.7	0218	1.4
4	0257	1.8	0921	6.2	1635	-1.1	2315	3.4	0257	1.8
5	0336	2.0	1009	6.0	1731	-9	---	---	0336	2.0
6	0028	3.3	0425	2.4	1059	5.5	1835	-6	0028	3.3
7	0147	3.3	0530	2.6	1202	5.1	1946	-3	0147	3.3
8	0317	3.4	0717	2.8	1320	4.6	2055	0.0	0317	3.4
9	0419	3.8	0914	2.6	1453	4.1	2159	-2	0419	3.8
10	0507	4.1	1045	2.0	1622	3.9	2250	-4	0507	4.1
11	0543	4.5	1147	1.4	1735	3.8	2334	-7	0543	4.5
12	0617	4.8	1236	-9	1835	3.7	---	---	0617	4.8
13	0011	1.0	0643	5.0	1318	-4	1927	3.6	0011	1.0
14	0043	1.3	0710	5.2	1356	-1	2013	3.5	0043	1.3
15	0108	1.5	0736	5.3	1428	-2	2052	3.4	0108	1.5
16	0136	1.8	0801	5.4	1500	-3	2131	3.3	0136	1.8
17	0201	1.9	0825	5.4	1533	-4	2213	3.3	0201	1.9
18	0227	2.1	0854	5.3	1608	-3	2252	3.1	0227	2.1
19	0252	2.3	0923	5.2	1646	-2	2341	3.0	0252	2.3
20	0318	2.5	0954	5.0	1728	0.0	---	---	0318	2.5
21	0040	2.9	0350	2.6	1026	4.8	1811	-2	0040	2.9
22	0149	2.9	0429	2.8	1108	4.4	1903	-4	0149	2.9
23	0258	3.1	0541	2.9	1200	4.0	1955	-5	0258	3.1
24	0347	3.3	0753	2.9	1309	3.7	2044	-7	0347	3.3
25	0419	3.6	0945	2.6	1446	3.3	2137	-9	0419	3.6
26	0447	4.0	1055	1.8	1623	3.3	2220	1.1	0447	4.0
27	0516	4.5	1150	1.1	1738	3.3	2303	1.2	0516	4.5
28	0549	5.0	1235	-4	1844	3.3	2348	1.4	0549	5.0
29	0622	5.5	1318	-4	1940	3.5	---	---	0622	5.5
30	0029	1.5	0700	5.9	1403	-1.0	2037	3.5	0029	1.5

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

POINT MUGU TIDES
DECEMBER 1990
34 DEG 07 MIN N, 119 DEG 07 MIN W - OCEAN PIER

SNI - BARGE BEACH TIDES
DECEMBER 1990
33 DEG 13 MIN N, 119 DEG 27 MIN W - SOUTHEAST BEACH

DATE	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT	TIME PST	HGT FT				
1	0114	1.8	0729	6.8	1452	-1.4	2113	3.9	0111	1.7	0742	6.2	1449	-1.3	2126	3.6
2	0159	1.9	0811	7.0	1543	-1.6	3208	3.8	0156	1.8	0824	6.4	1540	-1.5	2221	3.5
3	0245	2.0	0858	6.9	1632	-1.6	2304	3.8	0242	1.8	0911	6.3	1629	-1.5	2317	3.5
4	0337	2.2	0946	6.6	1721	-1.3	---	---	0334	2.0	0959	6.1	1718	-1.2	---	---
5	0003	3.8	0433	2.4	1040	6.1	1914	-1.0	0016	3.5	0430	2.2	1053	5.6	1811	-9
6	0102	3.9	0542	2.5	1136	5.5	1910	-5	0115	3.6	0539	2.3	1149	5.0	1907	-4
7	0201	4.0	0708	2.6	1242	4.7	2003	-1	0214	3.7	0705	2.4	1255	4.3	2000	-1
8	0300	4.3	0846	2.4	1404	4.0	2059	-6	0313	4.0	0843	2.2	1417	3.7	2056	-5
9	0352	4.6	1022	1.9	1534	3.6	2150	1.1	0405	4.2	1019	1.8	1547	3.3	2147	1.0
10	0439	4.9	1138	1.3	1707	3.3	2242	1.4	0452	4.5	1135	1.2	1720	3.0	2239	1.3
11	0516	5.2	1230	-8	1822	3.3	2328	1.8	0529	4.8	1227	-7	1835	3.0	2325	1.7
12	0553	5.4	1313	-3	1921	3.4	0007	2.1*	0606	4.9	1310	-3	1934	3.1	0004	1.9*
13	0625	5.6	1351	-1	2012	3.4	---	---	0638	5.1	1348	-1	2025	3.1	---	---
14	0042	2.2	0655	5.7	1426	-4	2051	3.5	0039	2.0	0708	5.2	1423	-4	2104	3.2
15	0114	2.3	0726	5.8	1457	-5	2126	3.5	0111	2.1	0739	5.3	1454	-4	2139	3.2
16	0146	2.4	0755	5.9	1529	-6	2158	3.5	0143	2.2	0808	5.4	1526	-5	2211	3.2
17	0218	2.4	0827	5.9	1602	-6	2323	3.5	0215	2.2	0840	5.4	1559	-5	2336	3.2
18	0250	2.5	0900	5.8	1633	-5	2309	3.5	0247	2.3	0913	5.3	1630	-4	2322	3.2
19	0325	2.5	0932	5.6	1707	-4	2351	3.5	0322	2.3	0945	5.1	1704	-4	0004	3.2*
20	0404	2.6	1004	5.4	1742	-2	---	---	0401	2.4	1017	4.9	1739	-2	---	---
21	0026	3.6	0449	2.7	1041	5.0	1814	-1	0039	3.3	0446	2.5	1054	4.6	1811	-1
22	0108	3.6	0550	2.7	1123	4.4	1853	-4	0121	3.3	0547	2.5	1136	4.0	1850	-4
23	0150	3.9	0711	2.6	1221	3.8	1928	-8	0203	3.6	0708	2.4	1234	3.5	1925	-7
24	0232	4.2	0849	2.3	1344	3.3	2014	1.2	0245	3.9	0846	2.1	1357	3.0	2011	1.1
25	0318	4.6	1022	1.6	1536	3.0	2106	1.5	0331	4.2	1019	1.5	1549	2.7	2103	1.4
26	0405	5.0	1131	-9	1724	3.0	2208	1.9	0418	4.6	1128	-8	1737	2.7	2205	1.8
27	0450	5.6	1227	0.0	1838	3.2	2308	2.1	0503	5.1	1224	0.0	1851	2.9	2305	1.9
28	0540	6.0	1318	-8	1942	3.4	0007	2.1*	0553	5.5	1315	-7	1955	3.1	0004	1.9*
29	0628	6.5	1404	-1.3	2031	3.6	---	---	0641	6.0	1401	-1.2	2044	3.3	---	---
30	0058	2.1	0716	6.8	1450	-1.7	2114	3.8	0055	1.9	0729	6.2	1447	-1.6	2127	3.5
31	0154	2.0	0805	7.0	1535	-1.8	2200	3.9	0151	1.8	0818	6.4	1532	-1.7	2213	3.6

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

* -- TIDE OCCURS ON NEXT DATE.
ADD ONE HOUR WHEN DAYLIGHT SAVINGS TIME IS IN EFFECT.

Barking Sands Training Area, Kauai, Hawaiian Islands
Moonrise and Moonset for 1990

Latitude 22 02 N
Longitude 159 47 W

Nautical Almanac Office
U.S. Naval Observatory
Washington, D.C. 20392-5100

Hawaii-Aleutian Standard Time

	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		
Day	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	
1	1042	2246	1113	0956	2338	1135	0042	1232	0108	1359	0130	1426	0107	1550	0147	1651	0312	1639	0348	1708	0528	1731	0627		
2	1117	2344	1158	1045	1238	1018	1328	0138	1449	0201	1518	0143	1642	0237	1730	0331	1808	0506	1754	0445	1756	0634	1836	0736	
3	1153	1248	1146	1140	0044	1339	0227	1421	0224	1540	0234	1612	0222	1730	0331	1808	0506	1754	0544	1851	0743	1945	0842		
4	1232	0042	1345	1240	0148	1437	0310	1512	0257	1631	0308	1705	0306	1815	0427	1845	0603	1835	0645	1952	0853	2053	0941		
5	1313	0144	1446	1342	0248	1532	0348	1603	0328	1724	0344	1758	0353	1856	0524	1921	0701	1919	0749	2058	1000	2158	1032		
6	1401	0248	1549	1444	0342	1625	0422	1653	0400	1818	0425	1848	0445	1935	0621	1959	0800	2009	0856	2205	1100	2259	1116		
7	1455	0355	1653	1544	0429	1716	0455	1744	0432	1911	0509	1935	0540	2011	0718	2040	0900	2105	1004	2309	1154	2356	1155		
8	1555	0502	1754	1642	0510	1806	0526	1836	0507	2003	0558	2018	0636	2047	0814	2125	1004	2206	1110		1240		1231		
9	1659	0605	1851	1737	0547	1857	0558	1929	0545	2052	0651	2058	0733	2122	0911	2216	1109	2310	1213	0010	1320	0050	1305		
10	1805	0704	1946	1829	0621	1948	0631	2023	0626	2137	0746	2135	0829	2200	1009	2312	1215	1309	1309	0108	1356	0143	1338		
11	1908	0754	2038	1921	0653	2041	0706	2116	0712	2219	0842	2210	0924	2241	1109		1319	0014	1358	0202	1430	0234	1412		
12	2008	0838	2129	2012	0725	2134	0745	2207	0802	2257	0938	2245	1020	2327	1211	0013	1418	0116	1441	0255	1503	0326	1448		
13	2105	0917	2220	2103	0805	2228	0828	2254	0855	2333	1033	2321	1116	1316	0117	1512	0215	1519	0346	1536	0419	1527			
14	2158	0952	2311	2158	0858	2320	0915	2338	0951		1128	2359	1214	0019	1422	0220	1559	0312	1555	0438	1611	0512	1610		
15	2249	1024		1032	2248	0907	1006		1046	0009	1224	1315		0117	1525	0322	1641	0406	1628	0530	1648	0605	1657		
16	2339	1055	0004	1110	2342	0947	0011	1101	0019	1142	0044	1321	0042	0220	1624	0421	1719	0458	1701	0624	1728	0657	1746		
17		1127	0057	1152		1032	0058	1157	0057	1239	0121	1421	0130	0325	1717	0517	1754	0550	1755	0717	1812	0747	1839		
18	0030	1200	0151	1239	0035	1121	0141	1254	0134	1335	0202	1525	0226	0430	1803	0612	1828	0643	1811	0810	1900	0833	1933		
19	0121	1236	0245	1330	0128	1214	0222	1352	0209	1433	0248	1633	0327	0532	1844	0705	1901	0736	1849	0901	1951	0915	2027		
20	0214	1315	0338	1426	0218	1310	0300	1450	0247	1533	0341	1742	0434	0632	1921	0758	1936	0830	1930	0950	2044	0954	2120		
21	0308	1359	0428	1525	0305	1408	0338	1549	0326	1637	0441	1850	0541	0728	1956	0851	2012	0923	2016	1035	2137	1030	2213		
22	0403	1449	0514	1625	0348	1508	0415	1649	0411	1745	0547	1953	0646	0822	2030	0944	2051	1016	2104	1116	2231	1105	2306		
23	0457	1543	0557	1725	0429	1607	0454	1753	0501	1855	0655	2049	0748	0915	2103	1038	2134	1106	2156	1154	2325	1139	2359		
24	0549	1641	0637	1825	0507	1707	0537	1900	0559	2006	0802	2136	0846	1007	2138	1131	2221	1154	2249	1230		1213			
25	0638	1741	0715	1926	0545	1808	0625	2010	0702	2112	0905	2218	0941	1100	2215	1223	2211	1238	2344	1305	0018	1250	0055		
26	0722	1841	0752	2026	0624	1911	0719	2121	0810	2211	1004	2355	1034	1154	2256	1313		1318		1340	0112	1330	0153		
27	0803	1941	0831	2128	0704	2016	0818	2228	0916	2301	1059	2329	1126	1247	2340	1400	0004	1357	0039	1416	0208	1417	0255		
28	0842	2039	0911	2232	0749	2123	0923	2329	1020	2345	1152		1218	1341		1444	0059	1433	0134	1456	0307	1510	0402		
29	0918	2138			0838	2232	1028		1120		1243	0001	1310	1433	0028	1524	0155	1509	0229	1541	0410	1611	0510		
30	0955	2237			0933	2339	1132	0023	1215	0023	1334	0034	1403	1522	0120	1602	0251	1546	0326	1632	0517	1718	0618		
31	1032	2338																							
									1308	0057											1457	0101	1608	0215	
																								1828	0721

PORT ALLEN TIDES
 JANUARY 1990
 21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0616	1.7	1346	.1	1933	.9	---	---
2	0026	.4	0654	1.5	1418	0.0	2046	1.0
3	0154	.6	0733	1.3	1457	0.0	2202	1.3
4	0356	.8	0822	1.0	1536	-.1	2310	1.5
5	0611	.7	0924	.8	1622	-.1	---	---
6	0006	1.7	0750	.5	1047	.6	1711	-.2
7	0059	2.0	0850	.3	1206	.5	1801	-.2
8	0146	2.1	0932	.3	1315	.5	1851	-.2
9	0230	2.2	1011	.2	1413	.5	1947	-.2
10	0311	2.2	1046	.1	1506	.5	2032	-.2
11	0351	2.1	1121	.1	1554	.6	2114	-.1
12	0427	2.0	1152	.1	1643	.7	2203	0.0
13	0502	1.9	1221	.1	1732	.8	2246	-.2
14	0534	1.7	1253	.1	1827	.9	---	---
15	2337	.3*	0606	1.5	1322	.1	1927	.9
16	0033	.5	0634	1.3	1351	.1	2036	1.0
17	0151	.7	0703	1.0	1423	.2	2148	1.1
18	0354	.8	0724	.9	1456	.2	2254	1.3
19	1542	.2	---	---	---	---	---	---
20	2350	1.4	1631	.1	---	---	---	---
21	0037	1.6	0857	.4	1123	.5	1721	-.1
22	0117	1.7	0918	.3	1232	.5	1814	0.0
23	0153	1.9	0937	.3	1320	.5	1856	-.1
24	0227	2.0	0958	.3	1405	.6	1941	-.1
25	0301	2.0	1023	.2	1447	.6	2021	-.1
26	0332	2.0	1048	.1	1529	.7	2106	-.1
27	0404	2.0	1114	.1	1616	.8	2148	0.0
28	0436	1.9	1141	0.0	1703	.9	2236	.1
29	0509	1.7	1211	0.0	1755	1.0	2333	.3
30	0544	1.4	1242	0.0	1858	1.1	---	---
31	0041	.4	0615	1.2	1316	-.1	2007	1.3

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
 FEBRUARY 1990
 21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0215	.6	0651	.9	1354	-.1	2126	1.4
2	0440	.6	0729	.7	1440	0.0	2245	1.6
3	1542	0.0	---	---	---	---	---	---
4	2350	1.8*	0813	.3	1102	.4	1649	0.0
5	0046	1.9	0845	.3	1232	.4	1754	-.1
6	0133	2.0	0916	.2	1330	.5	1854	-.1
7	0215	2.0	0942	.1	1420	.6	1944	-.1
8	0251	2.0	1009	.1	1503	.8	2030	-.1
9	0326	1.9	1032	0.0	1542	.9	2116	0.0
10	0355	1.8	1056	0.0	1621	.9	2158	.1
11	0426	1.6	1119	0.0	1700	1.0	2243	.2
12	0455	1.4	1144	0.0	1742	1.1	2332	.3
13	0521	1.3	1207	.1	1827	1.1	---	---
14	0024	.4	0546	1.0	1229	.1	1919	1.2
15	0138	.6	0607	.1	1301	.1	2025	1.2
16	0339	.6	0618	.7	1332	.2	2148	1.3
17	1426	.2	---	---	---	---	---	---
18	1537	.2	---	---	---	---	---	---
19	2358	1.5*	0824	.3	1123	.4	1650	.2
20	0042	1.6	0835	.3	1225	.5	1752	.1
21	0121	1.7	0851	.2	1312	.6	1844	0.0
22	0153	1.8	0912	.2	1355	.7	1929	-.1
23	0229	1.8	0930	.1	1434	.9	2018	-.1
24	0301	1.8	0953	0.0	1513	1.0	2107	-.1
25	0333	1.7	1018	-.1	1559	1.1	2154	0.0
26	0405	1.5	1046	-.1	1645	1.3	2248	.1
27	0439	1.4	1112	-.2	1733	1.4	---	---
28	2349	.3*	0511	1.1	1144	-.2	1829	1.4

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
 APRIL 1990
 21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0500	.2	0833	.3	1328	.1	2140	1.6		
2	0606	.1	1045	.3	1502	.2	2247	1.5		
3	0641	0.0	1158	.5	1641	.3				
4	2346	1.4*	0713	0.0	1247	.7	1758	.2		
5	0032	1.4	0737	-.1	1326	.9	1902	.2		
6	0110	1.4	0800	-.1	1400	1.0	1951	.2		
7	0142	1.2	0818	-.1	1431	1.2	2040	.2		
8	0215	1.1	0837	-.1	1500	1.4	2124	.2		
9	0243	.9	0857	-.1	1529	1.4	2307	.2		
10	0311	.9	0916	-.1	1602	1.4	2252	.2		
11	0343	.7	0940	-.1	1637	1.5				
12	2341	2.2*	0412	.6	1002	-.1	1714	1.5		
13	0038	.3	0440	.5	1030	0.0	1757	1.4		
14	0146	.3	0512	.4	1056	0.0	1850	1.4		
15	0318	.3	0605	.3	1133	.1	1948	1.4		
16	0448	.2	0745	.2	1226	.2	2052	1.4		
17	0526	.2	0856	.3	1352	.3	2151	1.4		
18	0555	.1	1109	.5	1538	.3	2247	1.4		
19	0620	0.0	1158	.7	1704	.3				
20	2334	1.3*	0642	-.1	1238	.9	1817	.2		
21	0018	1.3	0707	-.2	1317	1.1	1922	.2		
22	0100	1.1	0732	-.3	1357	1.4	2022	.1		
23	0142	1.0	0800	-.3	1442	1.6	2123	0.0		
24	0224	.9	0831	-.3	1525	1.8	2222	0.0		
25	0307	.7	0906	-.3	1610	1.9	2327	0.0		
26	0351	.5	0942	-.3	1659	2.0				
27	0036	0.0	0440	.4	1020	-.3	1754	1.9		
28	0151	.1	0546	.3	1105	-.2	1852	1.8		
29	0307	0.0	0711	.3	1200	0.0	1954	1.7		
30	0411	0.0	0901	.3	1310	.2	2057	1.5		

* - - - TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
 MARCH 1990
 21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0108	.4	0546	.9	1217	-.1	1937	1.5		
2	0254	.5	0628	.6	1302	-.1	2054	1.5		
3	0529	.3	0727	.4	1358	0.0	2215	1.6		
4	0705	.3	0954	.3	1517	.1				
5	2326	1.7*	0740	.2	1147	.4	1643	.1		
6	0024	1.7	0805	.1	1249	.5	1759	.1		
7	0109	1.7	0834	.1	1334	.7	1858	0.0		
8	0151	1.7	0856	0.0	1413	.9	1950	0.0		
9	0223	1.6	0917	0.0	1448	.9	2035	0.0		
10	0253	1.5	0936	0.0	1520	1.1	2118	.1		
11	0322	1.4	0958	-.1	1555	1.2	2201	.1		
12	0350	1.2	1016	0.0	1627	1.3	2245	.2		
13	0415	1.1	1036	0.0	1703	1.4	2331	.3		
14	0444	.9	1058	0.0	1745	1.4				
15	0028	.3	0509	.8	1123	0.0	1830	1.4		
16	0141	.4	0528	.6	1148	.1	1929	1.3		
17	0341	.4	0546	.5	1220	.1	2041	1.3		
18	1311	.2	2256	1.4						
19	0703	.3	0945	.3	1441	.2	2301	1.4		
20	0711	.3	1123	.4	1614	.2				
21	2351	1.4*	0730	.2	1216	.5	1726	.2		
22	0033	1.5	0751	.1	1258	.7	1829	.1		
23	0112	1.5	0809	0.0	1337	.9	1924	0.0		
24	0146	1.5	0832	-.1	1416	1.1	2016	0.0		
25	0221	1.4	0856	-.2	1455	1.3	2109	0.0		
26	0300	1.3	0924	-.3	1540	1.4	2205	0.0		
27	0335	1.1	0951	-.3	1627	1.6	2306	.1		
28	0414	.9	1021	-.3	1717	1.7				
29	0015	.2	0452	.7	1056	-.3	1810	1.7		
30	0137	.3	0538	.5	1135	-.2	1914	1.7		
31	0317	.3	0641	.3	1221	-.1	2025	1.6		

* - - - TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
MAY 1990
21 DEG 51 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0503	-1	1044	.5	1453	.3	2158	1.4	0505	-1
2	0541	-1	1142	.7	1632	.3	2254	1.3	0532	-1
3	0611	-1	1228	.9	1758	.3	---	---	0558	-1
4	0639	1.1*	0636	-1	1307	1.1	1905	.3	0008	.6
5	0018	.9	0700	-2	1339	1.3	2002	.3	0053	.5
6	0057	.9	0720	-2	1407	1.4	2050	.3	0135	.4
7	0133	.7	0740	-2	1439	1.5	2136	.2	0217	.4
8	0207	.6	0803	-2	1511	1.6	2222	.2	0255	.4
9	0239	.5	0827	-2	1543	1.6	2310	.2	0337	.3
10	0314	.4	0855	-2	1618	1.7	---	---	0029	.1
11	0356	.2*	0346	.4	0925	-2	1656	1.7	0108	.1
12	0045	.2	0429	.3	0954	-1	1736	1.6	0146	.1
13	0140	.2	0520	.3	1029	0.0	1821	1.6	0218	.3
14	0236	.1	0629	.3	1111	.1	1907	1.5	0254	0.0
15	0328	.1	0757	.3	1203	.2	1957	1.4	0326	-1
16	0407	0.0	0931	.4	1326	.3	2048	1.4	0401	-1
17	0438	0.0	1040	.6	1506	.4	2139	1.3	0436	-2
18	0506	-1	1131	.9	1649	.4	2230	1.1	0513	-3
19	0537	-2	1214	1.1	1815	.3	2321	.9	2335	.6*
20	0606	-3	1300	1.4	1930	.3	---	---	0041	.5
21	0014	.9	0638	-3	1342	1.7	2039	.2	0139	.4
22	0104	.7	0714	-4	1427	1.9	2141	.1	0242	.4
23	0155	.5	0752	-4	1512	2.0	2240	0.0	0341	.4
24	0247	.4	0831	-4	1600	2.1	---	---	0012	0.0
25	0339	0.0*	0343	.3	0915	-3	1647	2.1	0538	.5
26	0037	0.0	0442	.3	1001	-3	1738	2.0	0051	0.0
27	0133	-1	0551	.3	1050	-1	1828	1.9	0130	0.0
28	0226	-1	0712	.3	1145	.1	1919	1.7	0208	0.0
29	0315	-1	0842	.5	1258	.3	2006	1.4	0244	0.0
30	0356	-1	1008	.7	1427	.4	2055	1.3	0319	0.0
31	0433	-1	1110	.9	1613	.5	2147	1.0	0352	0.0

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
JUNE 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0505	-1	1203	1.1	1752	.5	2233	.9	0505	-1
2	0532	-1	1241	1.3	1913	.5	2319	.8	0532	-1
3	0558	-1	1315	1.4	2020	.4	---	---	0558	-1
4	0008	.6	0623	-1	1347	1.5	2112	.3	0008	.6
5	0053	.5	0652	-2	1423	1.7	2155	.3	0053	.5
6	0135	.4	0721	-2	1455	1.8	2233	.2	0135	.4
7	0217	.4	0756	-2	1527	1.8	2311	.2	0217	.4
8	0255	.4	0828	-2	1603	1.8	---	---	0255	.4
9	0337	.3	0903	-2	1639	1.8	---	---	0337	.3
10	0029	.1	0426	.3	0938	-1	1715	1.8	0029	.1
11	0108	.1	0519	.4	1020	0.0	1751	1.7	0108	.1
12	0146	.1	0619	.4	1102	.1	1829	1.6	0146	.1
13	0218	.3	0733	.5	1158	.3	1908	1.5	0218	.3
14	0254	0.0	0847	.7	1314	.4	1949	1.4	0254	0.0
15	0326	-1	0957	.9	1454	.5	2034	1.2	0326	-1
16	0401	-1	1100	1.1	1649	.6	2130	.9	0401	-1
17	0436	-2	1152	1.4	1835	.5	2229	.8	0436	-2
18	0513	-3	1243	1.7	1958	.3	---	---	0513	-3
19	0041	.5	0554	-3	1230	1.9	2104	.3	0041	.5
20	0041	.5	0640	-3	1415	2.1	2156	.1	0041	.5
21	0139	.4	0726	-3	1503	2.2	2245	.1	0139	.4
22	0242	.4	0814	-3	1547	2.2	2330	0.0	0242	.4
23	0341	.4	0903	-3	1632	2.1	---	---	0341	.4
24	0012	0.0	0438	.4	0952	-2	1714	2.0	0012	0.0
25	0051	0.0	0538	.5	1044	0.0	1756	1.9	0051	0.0
26	0130	0.0	0647	.6	1140	.2	1835	1.6	0130	0.0
27	0208	0.0	0759	.8	1242	.4	1914	1.4	0208	0.0
28	0244	0.0	0912	.9	1402	.6	1952	1.2	0244	0.0
29	0319	0.0	1021	1.0	1554	.7	2031	.9	0319	0.0
30	0352	0.0	1119	1.3	1800	.7	2117	.8	0352	0.0

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
JULY 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

PORT ALLEN TIDES
AUGUST 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0426	0.0	1209	1.4	1940	.5	2212	.6	0505	.2	1301	1.7
2	0502	0.0	1251	1.5	2042	.4	2321	.5	0025	.6	0558	.2
3	0538	0.0	1330	1.7	2124	.3	---	---	0112	.6	0646	.1
4	0027	.5	0617	0.0	1405	1.8	2153	.3	0155	.7	0728	0.0
5	0117	.4	0659	-.1	1437	1.9	2224	.3	0233	.8	0810	0.0
6	0205	.5	0738	-.1	1511	2.0	2250	.3	0315	.9	0850	.1
7	0247	.5	0816	-.1	1543	2.0	2318	.2	0357	.9	0935	.1
8	0327	.5	0854	-.1	1615	2.0	---	---	0440	1.0	1020	.3
9	0347	.2*	0413	.6	0936	0.0	1647	1.9	2341	.1*	0529	1.2
10	0015	.1	0502	.7	1015	.1	1721	1.8	0013	.1	0624	1.3
11	0044	.1	0557	.8	1104	.3	1753	1.7	0041	.1	0727	1.4
12	0115	.1	0657	.9	1203	.4	1825	1.4	0117	.1	0842	1.5
13	0147	0.0	0809	1.0	1319	.6	1903	1.3	0207	.1	1002	1.7
14	0223	0.0	0918	1.2	1504	.7	1945	1.0	0302	.1	1111	1.9
15	0258	0.0	1030	1.4	1718	.7	2034	.8	0411	.1	1213	2.0
16	0343	-.1	1132	1.7	1917	.5	2153	.6	2355	.6*	0520	.1
17	0434	-.1	1229	1.9	2027	.4	---	---	0101	.7	0626	.1
18	2326	.5*	0529	-.2	1317	2.0	2112	.3	0152	.8	0722	.1
19	0045	.5	0625	-.2	1405	2.2	2149	.2	0239	.9	0814	.1
20	0146	.5	0720	-.2	1449	2.2	2223	.1	0318	1.0	0859	.1
21	0242	.6	0809	-.2	1530	2.2	2257	.1	0400	1.2	0948	.3
22	0331	.7	0901	-.1	1609	2.1	2328	.1	0443	1.3	1035	.3
23	0423	.8	0950	0.0	1645	2.0	---	---	0525	1.4	1125	.4
24	2358	1.1*	0512	.9	1036	.2	1717	1.8	2344	.2*	0611	1.4
25	0028	.1	0607	.9	1128	.3	1753	1.5	0008	.3	0703	1.4
26	0059	.1	0703	1.0	1228	.5	1821	1.3	0037	.3	0809	1.4
27	012	.2	0806	1.1	1345	.7	1853	1.1	0112	.3	0921	1.4
28	0200	.2	0917	1.3	1538	.8	1918	.9	0205	.3	1036	1.5
29	0235	.2	1027	1.4	---	---	---	---	0322	.4	1139	1.6
30	0318	.2	1129	1.5	---	---	---	---	2327	.6*	0440	.3
31	0411	.2	1219	1.6	2040	.4	2316	.5	0022	.7	0537	.3

* - - TIDE OCCURS ON PREVIOUS DATE.

* - - TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
OCTOBER 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT						
1	0101	.8	0634	.3	1336	1.9	2046	.3	0121	1.2	0708	.3	1322	1.6	2005	.2
2	0141	.9	0720	.2	1405	1.9	2106	.3	0159	1.4	0800	.3	1354	1.5	2027	.1
3	0217	1.1	0805	.2	1437	1.9	2126	.2	0235	1.6	0852	.3	1430	1.4	2053	0.0
4	0256	1.2	0848	.2	1509	1.8	2148	.2	0317	1.8	0945	.3	1508	1.3	2121	0.0
5	0336	1.4	0937	.3	1541	1.6	2216	.1	0359	1.9	1042	.3	1544	1.1	2150	0.0
6	0418	1.5	1028	.3	1613	1.4	2242	.1	0448	2.0	1148	.4	1622	.9	2225	0.0
7	0506	1.6	1128	.4	1648	1.3	2311	.1	0540	2.0	1309	.4	1708	.8	2301	.1
8	0559	1.7	1239	.5	1723	1.0	---	---	0639	2.0	1444	.4	1810	.6	---	---
9	0701	1.8	0701	1.8	1415	.6	1802	.9	0748	2.0	1623	.4	1810	.6	1958	.5
10	0029	.2	0814	1.8	1632	.6	1905	.7	0901	1.9	1729	.3	1729	.3	2209	.6
11	0118	.3	0933	1.9	1814	.5	2114	.6	1011	1.8	1811	.3	1811	.3	---	---
12	0233	.3	1046	1.9	1900	.3	2313	.6	0407	.8	1110	1.8	1110	1.8	1843	.2
13	0406	.3	1147	2.0	1934	.3	---	---	0530	.5	1158	1.7	1158	1.7	1908	.2
14	0022	.8	0526	.3	1237	2.0	2001	.3	0104	1.2	1240	1.5	1240	1.5	1931	.1
15	0111	.9	0634	.3	1320	1.9	2026	.2	0139	1.5	1351	1.3	1351	1.3	1954	.1
16	0150	1.1	0727	.3	1355	1.8	2047	.2	0736	.4	1319	1.4	1319	1.4	2013	.1
17	0225	1.3	0819	.3	1430	1.7	2109	.2	0914	.4	1423	1.2	1423	1.2	2033	.1
18	0300	1.4	0905	.3	1459	1.5	2131	.2	0315	1.7	1000	.4	1451	1.0	2055	.1
19	0336	1.5	0950	.3	1529	1.4	2152	.2	0348	1.8	1046	.4	1523	.9	2117	.1
20	0411	1.6	1037	.4	1559	1.2	2212	.2	0421	1.9	1135	.4	1555	.8	2141	.2
21	0450	1.6	1128	.5	1624	1.1	2234	.3	0459	1.8	1232	.5	1627	.7	2207	.2
22	0528	1.6	1228	.6	1656	.9	2259	.3	0541	1.8	1346	.5	1709	.6	2236	.3
23	0614	1.6	1338	.6	1721	.8	2324	.3	0633	1.7	1508	.4	1805	.5	2310	.3
24	0713	1.6	1538	.5	1754	.7	---	---	0729	1.7	1620	.4	1805	.5	---	---
25	0000	.4	0820	1.5	---	---	---	---	2359	1.4	0829	1.6	1706	.4	2159	.6
26	0049	.4	0935	1.6	1830	.5	2215	.6	0128	.5	0928	1.6	1738	.3	2306	.8
27	0228	.5	1041	1.6	1848	.4	---	---	0315	.6	1021	1.5	1756	.3	---	---
28	0327	.7	0404	.5	1130	1.7	1906	.4	2348	.9	0448	.6	1107	1.5	1819	.2
29	0013	.9	0517	.4	1212	1.7	1924	.3	0027	1.2	0601	.5	1151	1.4	1841	.1
30	0045	1.0	0615	.4	1248	1.7	1945	.3	0102	1.4	0704	.4	1233	1.4	1907	0.0
31	---	---	---	---	---	---	---	---	0139	1.6	0806	.4	1315	1.2	1933	.1

PORT ALLEN TIDES
SEPTEMBER 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT						
1	0101	.8	0634	.3	1336	1.9	2046	.3	0121	1.2	0708	.3	1322	1.6	2005	.2
2	0141	.9	0720	.2	1405	1.9	2106	.3	0159	1.4	0800	.3	1354	1.5	2027	.1
3	0217	1.1	0805	.2	1437	1.9	2126	.2	0235	1.6	0852	.3	1430	1.4	2053	0.0
4	0256	1.2	0848	.2	1509	1.8	2148	.2	0317	1.8	0945	.3	1508	1.3	2121	0.0
5	0336	1.4	0937	.3	1541	1.6	2216	.1	0359	1.9	1042	.3	1544	1.1	2150	0.0
6	0418	1.5	1028	.3	1613	1.4	2242	.1	0448	2.0	1148	.4	1622	.9	2225	0.0
7	0506	1.6	1128	.4	1648	1.3	2311	.1	0540	2.0	1309	.4	1708	.8	2301	.1
8	0559	1.7	1239	.5	1723	1.0	---	---	0639	2.0	1444	.4	1810	.6	---	---
9	0701	1.8	0701	1.8	1415	.6	1802	.9	0748	2.0	1623	.4	1810	.6	1958	.5
10	0029	.2	0814	1.8	1632	.6	1905	.7	0901	1.9	1729	.3	1729	.3	2209	.6
11	0118	.3	0933	1.9	1814	.5	2114	.6	1011	1.8	1811	.3	1811	.3	---	---
12	0233	.3	1046	1.9	1900	.3	2313	.6	0407	.8	1110	1.8	1110	1.8	1843	.2
13	0406	.3	1147	2.0	1934	.3	---	---	0530	.5	1158	1.7	1158	1.7	1908	.2
14	0022	.8	0526	.3	1237	2.0	2001	.3	0104	1.2	1240	1.5	1240	1.5	1931	.1
15	0111	.9	0634	.3	1320	1.9	2026	.2	0139	1.5	1351	1.3	1351	1.3	1954	.1
16	0150	1.1	0727	.3	1355	1.8	2047	.2	0736	.4	1319	1.4	1319	1.4	2013	.1
17	0225	1.3	0819	.3	1430	1.7	2109	.2	0914	.4	1423	1.2	1423	1.2	2033	.1
18	0300	1.4	0905	.3	1459	1.5	2131	.2	0315	1.7	1000	.4	1451	1.0	2055	.1
19	0336	1.5	0950	.3	1529	1.4	2152	.2	0348	1.8	1046	.4	1523	.9	2117	.1
20	0411	1.6	1037	.4	1559	1.2	2212	.2	0421	1.9	1135	.4	1555	.8	2141	.2
21	0450	1.6	1128	.5	1624	1.1	2234	.3	0459	1.8	1232	.5	1627	.7	2207	.2
22	0528	1.6	1228	.6	1656	.9	2259	.3	0541	1.8	1346	.5	1709	.6	2236	.3
23	0614	1.6	1338	.6	1721	.8	2324	.3	0633	1.7	1508	.4	1805	.5	2310	.3
24	0713	1.6	1538	.5	1754	.7	---	---	0729	1.7	1620	.4	1805	.5	---	---
25	0000	.4	0820	1.5	---	---	---	---	2359	1.4	0829	1.6	1706	.4	2159	.6
26	0049	.4	0935	1.6	1830	.5	2215	.6	0128	.5	0928	1.6	1738	.3	2306	.8
27	0228	.5	1041	1.6	1848	.4	---	---	0315	.6	1021	1.5	1756	.3	---	---
28	0327	.7	0404	.5	1130	1.7	1906	.4	2348	.9	0448	.6	1107	1.5	1819	.2
29	0013	.9	0517	.4	1212	1.7	1924	.3	0027	1.2	0601	.5	1151	1.4	1841	.1
30	0045	1.0	0615	.4	1248	1.7	1945	.3	0102	1.4	0704	.4	1233	1.4	1907	0.0
31	---	---	---	---	---	---	---	---	0139	1.6	0806	.4	1315	1.2	1933	.1

* --- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
NOVEMBER 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0218	1.9	0903	.3	1354	1.0	2003	-.1	0249	2.2	1020	.3
2	0301	2.0	1002	.3	1439	.9	2036	-.2	0335	2.3	1112	.2
3	0346	2.2	1102	.3	1521	.8	2112	-.2	0423	2.3	1208	.2
4	0435	2.2	1206	.3	1610	.6	2150	-.1	0509	2.3	1300	.1
5	0526	2.2	1319	.3	1709	.5	2235	0.0	0559	2.1	1352	.1
6	0621	2.1	1435	.3	1830	.5	2325	.2	0648	2.0	1441	.1
7	0720	2.0	1541	.3	2021	.5	---	---	0736	1.7	0736	1.7
8	0829	.3	0823	1.9	1629	.2	2207	.7	0825	1.4	0825	1.4
9	0209	.5	0922	1.7	1708	.2	2319	.9	0917	1.2	0917	1.2
10	0359	.6	1020	1.5	1742	.1	---	---	1006	1.0	1006	1.0
11	0011	1.1	0535	.6	1109	1.4	1811	.1	0025	1.4	0708	.7
12	0053	1.4	0652	.6	1155	1.2	1835	.1	0105	1.6	0817	.5
13	0126	1.5	0752	.5	1237	1.0	1858	0.0	0141	1.8	0910	.4
14	0154	1.7	0844	.5	1312	.9	1920	0.0	0213	1.9	0948	.3
15	0226	1.8	0930	.4	1347	.8	1944	0.0	0245	2.0	1024	.3
16	0258	1.9	1015	.4	1423	.7	2010	0.0	0317	2.0	1059	.3
17	0330	2.0	1101	.3	1455	.7	2037	0.0	0350	2.0	1133	.3
18	0405	2.0	1146	.3	1536	.6	2106	.1	0424	2.0	1206	.3
19	0440	2.0	1232	.3	1612	.6	2138	.1	0458	2.0	1241	.3
20	0520	1.9	1324	.3	1705	.5	2211	.2	0533	1.9	1317	.2
21	0601	1.8	1413	.3	1809	.5	2251	.3	0605	1.8	1348	.2
22	0644	1.7	1504	.3	1932	.5	---	---	0641	1.6	1348	.2
23	0729	1.6	0729	1.6	1543	.3	2107	.7	0641	1.6	1420	.2
24	0815	1.5	0815	1.5	1612	.2	2223	.9	0716	1.4	1420	.2
25	0908	1.4	0908	1.4	1641	.2	2316	1.0	0755	1.3	1454	.1
26	0959	1.3	0959	1.3	1709	.1	---	---	0847	1.0	1529	.1
27	2358	1.3*	0556	.7	1049	1.1	1740	0.0	0847	1.0	1605	0.0
28	0040	1.6	0713	.5	1144	.9	---	---	0612	.7	0949	.9
29	0122	1.9	0821	.4	1236	.9	1811	-.1	0018	1.7	0612	.7
30	0204	2.0	0920	.3	1328	.7	1847	-.2	0109	2.0	0741	.5
							1926	-.3	0154	2.1	0841	.3
									0240	2.3	0936	.3
									0324	2.3	1018	.2
									1100	.1	1417	.5
									1514	.5	1514	.5

* -- TIDE OCCURS ON PREVIOUS DATE.

* -- TIDE OCCURS ON PREVIOUS DATE.

PORT ALLEN TIDES
DECEMBER 1990
21 DEG 54 MIN N, 159 DEG 35 MIN W - HANAPEPE BAY

DATE	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT	TIME AHST	HGT FT
1	0249	2.2	1020	.3	1421	.6	2007	-.3	0249	2.2	1020	.3
2	0335	2.3	1112	.2	1513	.5	2052	-.3	0335	2.3	1112	.2
3	0423	2.3	1208	.2	1611	.5	2137	-.2	0423	2.3	1208	.2
4	0509	2.3	1300	.1	1717	.5	2226	0.0	0509	2.3	1300	.1
5	0559	2.1	1352	.1	1831	.5	2320	.2	0559	2.1	1352	.1
6	0648	2.0	1441	.1	1958	.7	---	---	0648	2.0	1441	.1
7	0736	1.7	0736	1.7	2130	.9	---	---	0736	1.7	0736	1.7
8	0825	1.4	0825	1.4	1602	.1	2244	1.0	0825	1.4	0825	1.4
9	0917	1.2	0917	1.2	1639	.1	---	---	0917	1.2	0917	1.2
10	1006	1.0	1006	1.0	1709	.1	---	---	1006	1.0	1006	1.0
11	1102	.9	1102	.9	1740	0.0	---	---	1102	.9	1102	.9
12	1152	.7	1152	.7	1809	0.0	---	---	1152	.7	1152	.7
13	1243	.6	1243	.6	1838	0.0	---	---	1243	.6	1243	.6
14	1328	.6	1328	.6	1911	0.0	---	---	1328	.6	1328	.6
15	1407	.6	1407	.6	1943	0.0	---	---	1407	.6	1407	.6
16	1449	.5	1449	.5	2018	0.0	---	---	1449	.5	1449	.5
17	1527	.5	1527	.5	2053	0.0	---	---	1527	.5	1527	.5
18	1613	.5	1613	.5	2129	.1	---	---	1613	.5	1613	.5
19	1659	.6	1659	.6	2204	.1	---	---	1659	.6	1659	.6
20	1752	.6	1752	.6	2246	.3	---	---	1752	.6	1752	.6
21	1859	.7	1859	.7	---	---	---	---	1859	.7	1859	.7
22	1420	.2	1420	.2	2011	.8	---	---	1420	.2	1420	.2
23	1454	.1	1454	.1	2124	.9	---	---	1454	.1	1454	.1
24	1529	.1	1529	.1	2233	1.2	---	---	1529	.1	1529	.1
25	1605	0.0	1605	0.0	---	---	---	---	1605	0.0	1605	0.0
26	0949	.9	0949	.9	1644	-.1	---	---	0949	.9	0949	.9
27	1102	.7	1102	.7	1729	-.2	---	---	1102	.7	1102	.7
28	1211	.6	1211	.6	1817	-.3	---	---	1211	.6	1211	.6
29	1317	.5	1317	.5	1902	-.3	---	---	1317	.5	1317	.5
30	1417	.5	1417	.5	1955	-.3	---	---	1417	.5	1417	.5
31	1514	.5	1514	.5	2043	-.3	---	---	1514	.5	1514	.5

* -- TIDE OCCURS ON PREVIOUS DATE.

* -- TIDE OCCURS ON PREVIOUS DATE.

APPENDIX A

HEIGHT OF THE TIDE AT ANY TIME

The height of the tide at times intermediate to the times of high and low water is needed on occasion, and may be computed by numerical methods. An example of the method, (adapted from table 3 of the data source), is presented here, using the predicted tides for a day at Point Mugu.

Problem: Given that the predicted times and heights of the tides are:

TIME	HEIGHT
0039	4.9
0814	0.2
1510	3.1
1933	2.4

What is the height of the tide at 0300?

Numerical Method

The duration of fall is 08h 14m - 00h 39m = 7h 35m

The time after high water is 03h 00m - 00h 39m = 2h 21m

The range of tide is 4.9 - 0.2 = 4.7 feet

Entering table A-1 at the duration of fall of 7h 40m, which is the nearest value to 7h 35m, the nearest value on the horizontal line to 2h 21m is 2h 18m after high water. Following down this column to its intersection with a range of 4.5 feet which is the nearest value to 4.7 feet, one obtains 0.9 which, being calculated from high water, must be subtracted from 4.9. The approximate height at 0300 is therefore 4.0 feet.

When the duration of rise or fall is greater than 10h 40m, enter the table with one-half the given duration and with one-half the time from nearest high or low water; but if the duration of rise or fall is less than 4h 00m, enter the table with double the given duration and time.

APPENDIX B

EQUINOXES, SOLSTICES, AND LUNAR PHASES 1990

The dates and times for Vernal and Autumnal Equinoxes and Summer and Winter Solstices during 1990 are listed in table B-1. The 1990 dates and times for phases of the moon are given in table B-2. Times are Pacific Standard Time, add 1 hour when Daylight Savings Time is in effect; add 2 hours for times in the Barking Sands area.

Table B-1. Equinoxes and Solstices, 1990, Point Mugu Area

Vernal Equinox	20 March	1319 PST	Beginning of Spring Day and night equal length
Summer Solstice	21 June	0733 PST	Beginning of Summer Greatest duration daylight
Autumnal Equinox	22 September	2255 PST	Beginning of Autumn Day and night equal length
Winter Solstice	21 December	1907 PST	Beginning of Winter Greatest duration darkness

Table B-2. Lunar Phases, 1990, Point Mugu Area

	JANUARY		FEBRUARY		MARCH		APRIL	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
First Quarter	04	0240	02	1032	03	1805	02	0224
Full Moon	10	2057	09	1116	11	0258	09	1918
Last Quarter	18	1317	17	1048	19	0630	17	2302
New Moon	26	1120	25	0054	26	1148	24	2027
	MAY		JUNE		JULY		AUGUST	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
First Quarter	01	1218	--	----	--	----	--	----
Full Moon	09	1131	08	0301	07	1723	06	0619
Last Quarter	17	1145	15	2048	15	0304	13	0754
New Moon	24	0347	22	1055	21	1854	20	0439
First Quarter	31	0011	29	1407	29	0601	27	2334
	SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER	
	DATE	TIME	DATE	TIME	DATE	TIME	DATE	TIME
Full Moon	04	1746	04	0402	02	1348	01	2350
Last Quarter	11	1253	10	1931	09	0502	08	1804
New Moon	18	1646	18	0737	17	0105	16	2022
First Quarter	26	1806	26	1226	25	0511	24	1916
Full Moon	--	---	--	----	--	----	31	1035

Because the earth's period of revolution about the sun (365.24+ days) is not evenly divisible by the moon's period of revolution about the earth (27.32+ days), the dates and times of lunar phases, moonrise and moonset, and tidal data must be recomputed for each year. The following information, however, is based on geometrical relationships and holds true for all times:

1. The New Moon rises at sunrise, crosses the meridian at noon, and sets at sunset.
2. The First Quarter Moon rises at noon, crosses the meridian at sunset, and sets at midnight.
3. The Full Moon rises at sunset, crosses the meridian at midnight, and sets at sunrise.
4. The Last Quarter Moon rises at midnight, crosses the meridian at sunrise and sets at noon.

APPENDIX C
SUNRISE AND SUNSET TABLES

Sunrise, Sunset, and Duration of Twilight for Point Mugu, CA
 34°07' N, 119°07' W

Note: All times are Pacific Standard Time (120th meridian); add 1 hour when Daylight Savings Time is in effect.

Date	January		February		March		April		May		June		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0702	1658	0654	1727	0626	1753	0544	1817	0507	1840	0446	1903	1
2	0703	1659	0653	1728	0624	1753	0543	1818	0506	1841	0446	1903	2
3	0703	1700	0652	1729	0623	1754	0541	1819	0505	1842	0445	1904	3
4	0703	1700	0652	1730	0622	1755	0540	1819	0504	1843	0445	1904	4
5	0703	1701	0651	1731	0621	1756	0539	1820	0503	1843	0445	1905	5
6	0703	1702	0650	1732	0619	1757	0537	1821	0502	1844	0445	1905	6
7	0703	1703	0649	1733	0618	1758	0536	1822	0502	1845	0445	1906	7
8	0703	1704	0648	1734	0617	1758	0535	1822	0501	1846	0444	1906	8
9	0703	1705	0647	1734	0615	1759	0533	1823	0500	1846	0444	1907	9
10	0703	1705	0647	1735	0614	1800	0532	1824	0459	1847	0444	1907	10
11	0703	1706	0646	1736	0613	1801	0531	1825	0458	1848	0444	1908	11
12	0703	1707	0645	1737	0611	1802	0530	1825	0457	1849	0444	1908	12
13	0703	1708	0644	1738	0610	1802	0528	1826	0456	1849	0444	1909	13
14	0702	1709	0643	1739	0609	1803	0527	1827	0456	1850	0444	1909	14
15	0702	1710	0642	1740	0607	1804	0526	1828	0455	1851	0444	1909	15
16	0702	1711	0641	1741	0606	1805	0525	1829	0454	1852	0444	1910	16
17	0702	1712	0640	1742	0605	1806	0523	1829	0453	1852	0444	1910	17
18	0701	1713	0638	1743	0603	1806	0522	1830	0453	1853	0445	1910	18
19	0701	1714	0637	1744	0602	1807	0521	1831	0452	1854	0445	1911	19
20	0701	1715	0636	1745	0601	1808	0520	1832	0451	1855	0445	1911	20
21	0700	1716	0635	1746	0599	1809	0518	1832	0451	1855	0445	1911	21
22	0700	1717	0634	1747	0598	1809	0517	1833	0450	1856	0445	1911	22
23	0659	1718	0633	1747	0596	1810	0516	1834	0450	1857	0446	1911	23
24	0659	1719	0632	1748	0595	1811	0515	1835	0449	1857	0446	1912	24
25	0658	1720	0630	1749	0594	1812	0514	1835	0449	1858	0446	1912	25
26	0658	1721	0629	1750	0592	1813	0513	1836	0448	1859	0446	1912	26
27	0657	1722	0628	1751	0591	1813	0512	1837	0448	1900	0447	1912	27
28	0657	1723	0627	1752	0590	1814	0511	1838	0447	1900	0447	1912	28
29	0656	1724	0626	1752	0588	1815	0509	1839	0447	1901	0447	1912	29
30	0655	1725			0587	1816	0508	1839	0447	1901	0448	1912	30
31	0655	1726			0586	1816			0446	1902			31
	Average twilight Civil: 27 min. Nautical: 38 min.	Average twilight Civil: 26 min. Nautical: 35 min.	Average twilight Civil: 25 min. Nautical: 34 min.	Average twilight Civil: 24 min. Nautical: 33 min.	Average twilight Civil: 23 min. Nautical: 31 min.	Average twilight Civil: 22 min. Nautical: 29 min.	Average twilight Civil: 21 min. Nautical: 27 min.	Average twilight Civil: 20 min. Nautical: 25 min.	Average twilight Civil: 19 min. Nautical: 23 min.	Average twilight Civil: 18 min. Nautical: 21 min.	Average twilight Civil: 17 min. Nautical: 19 min.	Average twilight Civil: 16 min. Nautical: 17 min.	
Date	July		August		September		October		November		December		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0448	1912	0507	1858	0530	1823	0551	1741	0616	1704	0644	1647	1
2	0449	1912	0508	1857	0530	1821	0551	1740	0617	1703	0645	1647	2
3	0449	1912	0509	1856	0531	1820	0552	1738	0618	1702	0646	1647	3
4	0450	1912	0510	1855	0532	1819	0553	1737	0619	1701	0646	1647	4
5	0450	1912	0510	1854	0532	1817	0554	1736	0620	1700	0647	1647	5
6	0451	1911	0511	1853	0533	1816	0554	1734	0621	1659	0648	1647	6
7	0451	1911	0512	1852	0534	1815	0555	1733	0621	1658	0649	1647	7
8	0452	1911	0512	1851	0535	1813	0556	1732	0622	1658	0650	1647	8
9	0452	1911	0513	1850	0535	1812	0557	1730	0623	1657	0650	1647	9
10	0453	1910	0514	1849	0536	1810	0557	1729	0624	1656	0651	1647	10
11	0453	1910	0515	1848	0537	1809	0558	1728	0625	1655	0652	1647	11
12	0454	1910	0515	1847	0537	1808	0559	1726	0626	1655	0653	1648	12
13	0454	1909	0516	1846	0538	1806	0600	1725	0627	1654	0653	1648	13
14	0455	1909	0517	1845	0539	1805	0601	1724	0628	1653	0654	1648	14
15	0456	1909	0518	1844	0539	1803	0601	1723	0629	1653	0655	1648	15
16	0456	1908	0518	1843	0540	1802	0602	1721	0630	1652	0655	1649	16
17	0457	1908	0519	1841	0541	1801	0603	1720	0631	1652	0656	1649	17
18	0458	1907	0520	1840	0541	1759	0604	1719	0632	1651	0657	1650	18
19	0458	1907	0520	1839	0542	1758	0605	1718	0633	1651	0657	1650	19
20	0459	1906	0521	1838	0543	1756	0606	1717	0634	1650	0658	1650	20
21	0500	1906	0522	1837	0544	1755	0606	1715	0635	1650	0658	1651	21
22	0500	1905	0523	1835	0544	1754	0607	1714	0636	1649	0659	1651	22
23	0501	1904	0523	1834	0545	1752	0608	1713	0637	1649	0659	1652	23
24	0502	1904	0524	1833	0546	1751	0609	1712	0637	1649	0700	1653	24
25	0502	1903	0525	1832	0546	1749	0610	1711	0638	1648	0700	1653	25
26	0503	1902	0525	1830	0547	1748	0611	1710	0639	1648	0700	1654	26
27	0504	1902	0526	1829	0548	1747	0611	1709	0640	1648	0701	1654	27
28	0504	1901	0527	1828	0549	1745	0612	1708	0641	1647	0701	1655	28
29	0505	1900	0528	1827	0549	1744	0613	1707	0642	1647	0702	1656	29
30	0506	1859	0528	1825	0550	1742	0614	1706	0643	1647	0702	1656	30
31	0507	1858	0529	1824			0615	1705			0702	1657	31
	Average twilight Civil: 29 min. Nautical: 43 min.	Average twilight Civil: 28 min. Nautical: 41 min.	Average twilight Civil: 27 min. Nautical: 39 min.	Average twilight Civil: 26 min. Nautical: 37 min.	Average twilight Civil: 25 min. Nautical: 35 min.	Average twilight Civil: 24 min. Nautical: 33 min.	Average twilight Civil: 23 min. Nautical: 31 min.	Average twilight Civil: 22 min. Nautical: 29 min.	Average twilight Civil: 21 min. Nautical: 27 min.	Average twilight Civil: 20 min. Nautical: 25 min.	Average twilight Civil: 19 min. Nautical: 23 min.	Average twilight Civil: 18 min. Nautical: 21 min.	

Reprint for use in future years. These data valid through 2028.

**Sunrise, Sunset, and Duration of Twilight for Barking Sands, Kauai, HI
22°02' N, 159°47' W**

Note: All times are Alaska-Hawaii Standard Time (150th Meridian).

Date	January		February		March		April		May		June		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0718	1807	0718	1826	0700	1843	0632	1854	0607	1905	0555	1919	1
2	0719	1808	0717	1829	0659	1843	0631	1855	0607	1906	0555	1919	2
3	0719	1809	0717	1830	0659	1844	0630	1855	0606	1906	0555	1920	3
4	0719	1809	0716	1830	0658	1844	0629	1855	0606	1906	0555	1920	4
5	0719	18 0	0716	1831	0657	1845	0628	1856	0605	1907	0555	1920	5
6	0720	1811	0715	1831	0656	1845	0627	1856	0604	1907	0555	1921	6
7	0720	1811	0715	1832	0655	1846	0627	1856	0604	1908	0555	1921	7
8	0720	1812	0714	1833	0654	1846	0626	1857	0603	1908	0555	1921	8
9	0720	1813	0714	1833	0653	1846	0625	1857	0603	1909	0555	1922	9
10	0720	1813	0713	1834	0653	1847	0624	1857	0602	1909	0555	1922	10
11	0720	1814	0713	1834	0652	1847	0623	1858	0602	1909	0555	1922	11
12	0721	1815	0712	1835	0651	1847	0622	1858	0601	1910	0555	1923	12
13	0721	1815	0712	1835	0650	1848	0621	1858	0601	1910	0555	1923	13
14	0721	1816	0711	1836	0649	1848	0620	1859	0600	1911	0555	1923	14
15	0721	1817	0710	1836	0648	1848	0620	1859	0600	1911	0555	1924	15
16	0721	1818	0710	1837	0647	1849	0619	1859	0559	1912	0555	1924	16
17	0721	1818	0709	1837	0646	1849	0618	1900	0559	1912	0556	1924	17
18	0721	1819	0709	1838	0645	1850	0617	1900	0559	1913	0556	1925	18
19	0721	1820	0708	1838	0644	1850	0616	1900	0558	1913	0556	1925	19
20	0720	1820	0707	1839	0643	1850	0615	1901	0558	1914	0556	1925	20
21	0720	1821	0706	1839	0642	1851	0615	1901	0558	1914	0556	1925	21
22	0720	1822	0706	1840	0641	1851	0614	1902	0557	1914	0557	1925	22
23	0720	1822	0705	1840	0641	1851	0613	1902	0557	1915	0557	1926	23
24	0720	1823	0704	1841	0640	1852	0612	1902	0557	1915	0557	1926	24
25	0720	1824	0703	1841	0639	1852	0612	1903	0557	1916	0557	1926	25
26	0719	1824	0703	1842	0638	1852	0611	1903	0556	1916	0558	1926	26
27	0719	1825	0702	1842	0637	1853	0610	1904	0556	1917	0558	1926	27
28	0719	1826	0701	1843	0636	1853	0609	1904	0556	1917	0558	1926	28
29	0719	1826	0701	1843	0635	1853	0609	1904	0556	1917	0558	1926	29
30	0718	1827			0634	1854	0608	1905	0555	1918	0559	1927	30
31	0718	1828			0633	1854			0555	1918			31
	Average twilight Civil: 24 min. Nautical: 51 min.		Average twilight Civil: 23 min. Nautical: 49 min.		Average twilight Civil: 22 min. Nautical: 48 min.		Average twilight Civil: 23 min. Nautical: 50 min.		Average twilight Civil: 24 min. Nautical: 53 min.		Average twilight Civil: 25 min. Nautical: 55 min.		
Date	July		August		September		October		November		December		Date
	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	Sunrise	Sunset	
1	0659	1927	0611	1919	0622	1856	0630	1827	0643	1802	0702	1755	1
2	0659	1927	0612	1919	0622	1855	0631	1826	0643	1802	0702	1755	2
3	0600	1927	0612	1918	0623	1854	0631	1825	0644	1801	0703	1755	3
4	0600	1927	0612	1918	0623	1853	0631	1824	0645	1801	0703	1755	4
5	0600	1927	0613	1917	0623	1852	0632	1823	0645	1800	0704	1755	5
6	0601	1927	0613	1916	0623	1851	0632	1822	0646	1800	0705	1756	6
7	0601	1927	0614	1916	0624	1850	0632	1821	0646	1759	0705	1756	7
8	0602	1927	0614	1915	0624	1849	0633	1820	0647	1759	0706	1756	8
9	0602	1926	0614	1914	0624	1848	0633	1819	0647	1758	0707	1756	9
10	0602	1926	0615	1914	0625	1847	0633	1819	0648	1758	0707	1757	10
11	0603	1926	0615	1913	0625	1846	0634	1818	0649	1758	0708	1757	11
12	0603	1926	0616	1912	0625	1845	0634	1817	0649	1757	0709	1757	12
13	0603	1926	0616	1912	0625	1844	0634	1816	0650	1757	0709	1758	13
14	0604	1926	0616	1911	0626	1843	0635	1815	0650	1757	0710	1758	14
15	0604	1926	0617	1910	0626	1842	0635	1814	0651	1756	0710	1758	15
16	0605	1925	0617	1909	0626	1841	0636	1813	0652	1756	0711	1759	16
17	0605	1925	0617	1909	0626	1840	0636	1813	0652	1756	0712	1759	17
18	0606	1925	0618	1908	0627	1839	0636	1812	0653	1756	0712	1800	18
19	0606	1925	0618	1907	0627	1838	0637	1811	0654	1755	0713	1800	19
20	0606	1924	0618	1906	0627	1837	0637	1810	0654	1755	0713	1800	20
21	0607	1924	0619	1905	0628	1836	0638	1810	0655	1755	0714	1801	21
22	0607	1924	0619	1905	0628	1836	0638	1809	0656	1755	0714	1801	22
23	0608	1923	0619	1904	0628	1835	0639	1808	0656	1755	0715	1802	23
24	0608	1923	0620	1903	0628	1834	0639	1807	0657	1755	0715	1803	24
25	0608	1922	0620	1902	0629	1833	0639	1807	0658	1755	0716	1803	25
26	0609	1922	0620	1901	0629	1832	0640	1806	0658	1755	0716	1804	26
27	0609	1922	0621	1900	0629	1831	0640	1805	0659	1755	0716	1804	27
28	0610	1921	0621	1859	0630	1830	0641	1805	0700	1755	0717	1805	28
29	0610	1921	0621	1859	0630	1829	0641	1804	0700	1755	0717	1805	29
30	0610	1920	0621	1858	0630	1828	0642	1803	0701	1755	0718	1806	30
31	0611	1920	0622	1857			0642	1803			0718	1807	31
	Average twilight Civil: 25 min. Nautical: 54 min.		Average twilight Civil: 25 min. Nautical: 50 min.		Average twilight Civil: 22 min. Nautical: 48 min.		Average twilight Civil: 23 min. Nautical: 49 min.		Average twilight Civil: 24 min. Nautical: 51 min.		Average twilight Civil: 24 min. Nautical: 52 min.		

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