

I slightly modified Thorstensen's code to print out the time between evening twilight and morning twilight. For Okie-Tex site (site code = o) near Kenton OK I used same time zone as for Oklahoma City.

W. Romanishin- August 2013 - email: wromanishin at ou.edu - Here is stuff from John T. intro:

***** 2013 Night-time Astronomical Calendar for Cheddar Ranch *****

By John Thorstensen, Dartmouth College

This calendar is designed to provide information useful for the planning of nighttime observations. The format should minimize confusion; each line gives the phenomena for a single (local!) night, and each line is labeled with both evening and morning (local) day and date. Note that all times given are LOCAL CIVIL (zone) times. DAYLIGHT SAVINGS time is used using conventions for the USA; for 2007+, 2nd Sunday in March to first Sunday in November.

The rise/set times printed are the times at which the center of the object is 50 arcminutes below the geometrical horizon. At the given twilight, the center of the sun is -0.0 degrees below the geometrical horizon.

The moon positions (and rise/set times) are generated by an implementation of the Low-Precision formulae in the Astronomical Almanac. The Almanac states that the error seldom exceeds 0.3 degrees. Topocentric corrections are included. Comparisons with tables for Kitt Peak in the NOAO Newsletter indicate that the rise-set times are good to +/- 2 min or so. The moon's RA, Dec, and illuminated fraction are given for local midnight, regardless of whether the moon is actually up at that time. Note that the moonrise and moonset times are not printed if they occur near mid-day.

The LST at evening and morning twilight are tabulated. This gives an accurate idea of the range of RA's accessible during the night.

The JD is given (severely rounded off) for local midnight. Again, this avoids any ambiguity.

Some credits: The sidereal time and Julian date routines were originally coded in PL/I by Steve Maker of Dartmouth College. The algorithms originated in the old American Ephemeris. The routine to convert JD back to calendar date is adapted from Numerical Recipes in C, by Press et al.

CAUTIONS: I believe that the program which generates these tables is reasonably accurate. However, it has not been exhaustively tested, so you should be sure to run 'sanity checks' on the results. Also, in view of the approximations used, the results should not be used when high precision is needed. Extension to dates far from the present (1990) should be done with great caution. The code has not been tested for the eastern or southern hemispheres. Rise/set times are slightly inaccurate and rather confusing at circumpolar latitudes, where the concept of a 'night' is blurry.

The daylight savings time conventions (if used) are quite specific (to U. S., post-1986) and subject to change. I know that the code has many infelicities; if you should find actual errors, please notify
John.Thorstensen@dartmouth.edu

[This output comes from a (hopefully) portable, completely self-contained program in the c language. It is available from the author and may be used freely for scientific or educational purposes. If you use it for profit, please contact the author to arrange a (modest!) fee. Source code is copyright John Thorstensen, 1990.]

MOON PHASES FOR 2013, at Cheddar Ranch

Times and dates are given in local time, zone = 6 hr West.
 They are generally better than +/- 2 minutes.
 Daylight savings time used.

The end of the previous year and the beginning of the next
 are included for continuity.

NEW		1ST		FULL		LAST	
Dec 13	2 42	Dec 19	23 20	Dec 28	4 23	Jan 04	21 59
Jan 11	13 45	Jan 18	17 46	Jan 26	22 40	Feb 03	7 58
Feb 10	1 23	Feb 17	14 31	Feb 25	14 29	Mar 04	15 55
Mar 11	14 54	Mar 19	12 28	Mar 27	4 30	Apr 02	23 39
Apr 10	4 39	Apr 18	7 33	Apr 25	15 00	May 02	6 17
May 09	19 32	May 17	23 36	May 24	23 27	May 31	14 00
Jun 08	10 59	Jun 16	12 25	Jun 23	6 34	Jun 29	23 55
Jul 08	2 16	Jul 15	22 20	Jul 22	13 17	Jul 29	12 45
Aug 06	16 52	Aug 14	5 58	Aug 20	20 45	Aug 28	4 36
Sep 05	6 36	Sep 12	12 10	Sep 19	6 13	Sep 26	22 56
Oct 04	19 34	Oct 11	18 04	Oct 18	18 38	Oct 26	18 42
Nov 03	6 50	Nov 09	23 59	Nov 17	9 17	Nov 25	13 30
Dec 02	18 22	Dec 09	9 13	Dec 17	3 29	Dec 25	7 50
Jan 01	5 15	Jan 07	21 40	Jan 15	22 54	Jan 23	23 21

Calendar for Cheddar Ranch, west longitude (h.m.s) = 6 34 04, latitude (d.m) = 35 46.0
 Rise/set times in Central time (6 hr W), uncorrected for elevation, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 JANUARY *****

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twi-Twi hours		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Tue Jan 01/Wed Jan 02	6 14	17 32	19 03	6 13	7 44	1 16	12 28	21 55	.....	78	10 28.6	3 54	11.2
Wed Jan 02/Thu Jan 03	6 18	17 32	19 04	6 13	7 44	1 21	12 32	22 54	.....	69	11 17.0	- 0 42	11.2
Thu Jan 03/Fri Jan 04	6 22	17 33	19 04	6 13	7 45	1 26	12 36	23 56	.....	59	12 06.4	- 5 21	11.1
Fri Jan 04/Sat Jan 05	6 26	17 34	19 05	6 14	7 45	1 30	12 41	0 59	.....	48	12 57.6	- 9 51	11.1
Sat Jan 05/Sun Jan 06	6 30	17 35	19 06	6 14	7 45	1 35	12 45	2 04	.....	37	13 51.2	-13 57	11.1
Sun Jan 06/Mon Jan 07	6 34	17 36	19 07	6 14	7 45	1 40	12 49	3 12	.....	27	14 47.9	-17 23	11.1
Mon Jan 07/Tue Jan 08	6 38	17 37	19 08	6 14	7 45	1 44	12 53	4 19	.....	17	15 47.7	-19 50	11.1
Tue Jan 08/Wed Jan 09	6 42	17 38	19 08	6 14	7 44	1 49	12 57	5 25	.....	9	16 49.8	-21 03	11.1
Wed Jan 09/Thu Jan 10	6 46	17 39	19 09	6 14	7 44	1 54	13 01	6 26	15 41	4	17 53.0	-20 52	11.1
Thu Jan 10/Fri Jan 11	6 50	17 39	19 10	6 14	7 44	1 59	13 04	7 20	16 48	1	18 55.7	-19 15	11.1
Fri Jan 11/Sat Jan 12	6 54	17 40	19 11	6 14	7 44	2 03	13 08	8 07	17 58	0	19 56.2	-16 24	11.1
Sat Jan 12/Sun Jan 13	6 57	17 41	19 12	6 14	7 44	2 08	13 12	.....	19 08	3	20 53.8	-12 35	11.0
Sun Jan 13/Mon Jan 14	7 01	17 42	19 12	6 14	7 44	2 13	13 16	.....	20 16	8	21 48.4	- 8 10	11.0
Mon Jan 14/Tue Jan 15	7 05	17 43	19 13	6 13	7 43	2 18	13 20	.....	21 22	15	22 40.2	- 3 27	11.0
Tue Jan 15/Wed Jan 16	7 09	17 44	19 14	6 13	7 43	2 23	13 24	.....	22 24	23	23 30.0	- 1 16	11.0
Wed Jan 16/Thu Jan 17	7 13	17 45	19 15	6 13	7 43	2 27	13 27	.....	23 25	32	0 18.5	5 47	11.0
Thu Jan 17/Fri Jan 18	7 17	17 46	19 16	6 13	7 42	2 32	13 31	.....	0 23	42	1 06.4	9 54	10.9
Fri Jan 18/Sat Jan 19	7 21	17 47	19 17	6 13	7 42	2 37	13 35	.....	1 20	52	1 54.4	13 30	10.9
Sat Jan 19/Sun Jan 20	7 25	17 48	19 18	6 12	7 41	2 42	13 38	.....	2 16	61	2 43.0	16 28	10.9
Sun Jan 20/Mon Jan 21	7 29	17 49	19 18	6 12	7 41	2 47	13 42	.....	3 10	70	3 32.4	18 41	10.9
Mon Jan 21/Tue Jan 22	7 33	17 50	19 19	6 12	7 41	2 52	13 46	.....	4 02	79	4 22.7	20 04	10.9
Tue Jan 22/Wed Jan 23	7 37	17 51	19 20	6 11	7 40	2 56	13 49	.....	4 51	86	5 13.7	20 32	10.8
Wed Jan 23/Thu Jan 24	7 41	17 52	19 21	6 11	7 39	3 01	13 53	.....	5 37	92	6 05.1	20 03	10.8
Thu Jan 24/Fri Jan 25	7 45	17 53	19 22	6 10	7 39	3 06	13 56	15 58	6 20	96	6 56.4	18 38	10.8
Fri Jan 25/Sat Jan 26	7 49	17 54	19 23	6 10	7 38	3 11	14 00	16 53	6 59	99	7 47.3	16 19	10.8
Sat Jan 26/Sun Jan 27	7 53	17 55	19 24	6 09	7 38	3 16	14 03	17 50	7 35	100	8 37.6	13 12	10.8
Sun Jan 27/Mon Jan 28	7 57	17 57	19 25	6 09	7 37	3 21	14 07	18 49	8 09	99	9 27.1	9 25	10.7
Mon Jan 28/Tue Jan 29	8 01	17 58	19 26	6 08	7 36	3 25	14 10	19 48	.....	95	10 16.3	5 08	10.7
Tue Jan 29/Wed Jan 30	8 04	17 59	19 27	6 08	7 36	3 30	14 13	20 48	.....	90	11 05.4	0 34	10.7
Wed Jan 30/Thu Jan 31	8 08	18 00	19 27	6 07	7 35	3 35	14 17	21 49	.....	83	11 55.0	- 4 07	10.7
Thu Jan 31/Fri Feb 01	8 12	18 01	19 28	6 07	7 34	3 40	14 20	22 52	.....	74	12 45.9	- 8 40	10.6

***** 2013 FEBRUARY *****

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twi-Twi hours		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Fri Feb 01/Sat Feb 02	8 16	18 02	19 29	6 06	7 33	3 45	14 23	23 56	.....	64	13 38.5	-12 51	10.6
Sat Feb 02/Sun Feb 03	8 20	18 03	19 30	6 05	7 32	3 50	14 26	1 01	.....	53	14 33.5	-16 25	10.6
Sun Feb 03/Mon Feb 04	8 24	18 04	19 31	6 05	7 32	3 55	14 30	2 06	.....	42	15 31.0	-19 07	10.6
Mon Feb 04/Tue Feb 05	8 28	18 05	19 32	6 04	7 31	3 59	14 33	3 10	.....	31	16 30.7	-20 42	10.5
Tue Feb 05/Wed Feb 06	8 32	18 06	19 33	6 03	7 30	4 04	14 36	4 11	.....	21	17 31.7	-21 00	10.5
Wed Feb 06/Thu Feb 07	8 36	18 07	19 34	6 02	7 29	4 09	14 39	5 07	.....	12	18 32.8	-19 58	10.5
Thu Feb 07/Fri Feb 08	8 40	18 08	19 35	6 01	7 28	4 14	14 42	5 56	.....	6	19 32.8	-17 41	10.4
Fri Feb 08/Sat Feb 09	8 44	18 09	19 36	6 01	7 27	4 19	14 45	6 40	16 45	2	20 30.8	-14 19	10.4
Sat Feb 09/Sun Feb 10	8 48	18 10	19 37	6 00	7 26	4 24	14 49	7 19	17 53	0	21 26.2	-10 12	10.4
Sun Feb 10/Mon Feb 11	8 52	18 11	19 37	5 59	7 25	4 28	14 52	7 56	19 00	1	22 19.3	- 5 37	10.4
Mon Feb 11/Tue Feb 12	8 56	18 12	19 38	5 58	7 24	4 33	14 55	.....	20 05	5	23 10.4	- 0 52	10.3
Tue Feb 12/Wed Feb 13	9 00	18 13	19 39	5 57	7 23	4 38	14 58	.....	21 08	10	0 00.2	3 47	10.3
Wed Feb 13/Thu Feb 14	9 04	18 14	19 40	5 56	7 22	4 43	15 01	.....	22 08	17	0 49.1	8 07	10.3
Thu Feb 14/Fri Feb 15	9 08	18 15	19 41	5 55	7 21	4 48	15 03	.....	23 07	25	1 37.8	11 57	10.2
Fri Feb 15/Sat Feb 16	9 12	18 16	19 42	5 54	7 20	4 53	15 06	.....	0 05	34	2 26.7	15 11	10.2
Sat Feb 16/Sun Feb 17	9 15	18 17	19 43	5 53	7 18	4 58	15 09	.....	1 00	44	3 16.0	17 40	10.2
Sun Feb 17/Mon Feb 18	9 19	18 18	19 44	5 52	7 17	5 02	15 12	.....	1 53	53	4 06.0	19 21	10.1
Mon Feb 18/Tue Feb 19	9 23	18 19	19 45	5 51	7 16	5 07	15 15	.....	2 44	62	4 56.5	20 09	10.1
Tue Feb 19/Wed Feb 20	9 27	18 20	19 45	5 50	7 15	5 12	15 18	.....	3 31	71	5 47.4	20 01	10.1
Wed Feb 20/Thu Feb 21	9 31	18 21	19 46	5 49	7 14	5 17	15 21	.....	4 15	80	6 38.4	18 58	10.0
Thu Feb 21/Fri Feb 22	9 35	18 22	19 47	5 47	7 13	5 22	15 24	.....	4 55	87	7 29.2	17 00	10.0
Fri Feb 22/Sat Feb 23	9 39	18 23	19 48	5 46	7 11	5 27	15 26	.....	5 32	93	8 19.7	14 12	10.0
Sat Feb 23/Sun Feb 24	9 43	18 24	19 49	5 45	7 10	5 31	15 29	16 38	6 08	97	9 09.8	10 40	9.9
Sun Feb 24/Mon Feb 25	9 47	18 25	19 50	5 44	7 09	5 36	15 32	17 37	6 41	99	9 59.7	6 32	9.9
Mon Feb 25/Tue Feb 26	9 51	18 26	19 51	5 43	7 08	5 41	15 35	18 38	7 15	100	10 49.8	2 00	9.9
Tue Feb 26/Wed Feb 27	9 55	18 27	19 52	5 41	7 06	5 46	15 37	19 40	7 48	97	11 40.4	- 2 44	9.8
Wed Feb 27/Thu Feb 28	9 59	18 28	19 53	5 40	7 05	5 51	15 40	20 43	.....	93	12 32.2	- 7 25	9.8
Thu Feb 28/Fri Mar 01	10 03	18 29	19 53	5 39	7 04	5 56	15 43	21 48	.....	86	13 25.6	-11 46	9.8

Calendar for Cheddar Ranch, west longitude (h.m.s) = 6 34 04, latitude (d.m) = 35 46.0
 Rise/set times in Central time (6 hr W), uncorrected for elevation, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 MARCH *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Fri Mar 01/Sat Mar 02	10 07	18 29	19 54	5 38	7 02	6 00	15 45	22 53	.....	78	14 20.9	-15 33	9.7
Sat Mar 02/Sun Mar 03	10 11	18 30	19 55	5 36	7 01	6 05	15 48	23 59	.....	68	15 18.3	-18 28	9.7
Sun Mar 03/Mon Mar 04	10 15	18 31	19 56	5 35	7 00	6 10	15 50	1 03	.....	57	16 17.4	-20 18	9.6
Mon Mar 04/Tue Mar 05	10 19	18 32	19 57	5 34	6 58	6 15	15 53	2 04	.....	45	17 17.5	-20 55	9.6
Tue Mar 05/Wed Mar 06	10 22	18 33	19 58	5 32	6 57	6 20	15 56	2 59	.....	34	18 17.4	-20 15	9.6
Wed Mar 06/Thu Mar 07	10 26	18 34	19 59	5 31	6 56	6 25	15 58	3 50	.....	24	19 16.3	-18 21	9.5
Thu Mar 07/Fri Mar 08	10 30	18 35	20 00	5 30	6 54	6 29	16 01	4 34	.....	15	20 13.4	-15 25	9.5
Fri Mar 08/Sat Mar 09	10 34	18 36	20 01	5 28	6 53	6 34	16 03	5 15	.....	8	21 08.3	-11 39	9.5
Sat Mar 09/Sun Mar 10*	10 38	18 37	20 02	6 27	7 51	6 39	16 06	6 52	16 43	3	22 01.1	- 7 20	9.4
Sun Mar 10/Mon Mar 11	9 42	19 38	21 02	6 25	7 50	6 44	16 08	7 26	18 47	1	22 49.4	- 2 56	9.4
Mon Mar 11/Tue Mar 12	9 46	19 38	21 03	6 24	7 49	6 49	16 11	.....	19 50	0	23 39.4	1 42	9.3
Tue Mar 12/Wed Mar 13	9 50	19 39	21 04	6 22	7 47	6 54	16 13	.....	20 52	2	0 28.7	6 09	9.3
Wed Mar 13/Thu Mar 14	9 54	19 40	21 05	6 21	7 46	6 59	16 16	.....	21 52	6	1 17.8	10 13	9.3
Thu Mar 14/Fri Mar 15	9 58	19 41	21 06	6 19	7 44	7 03	16 18	.....	22 51	11	2 07.0	13 42	9.2
Fri Mar 15/Sat Mar 16	10 02	19 42	21 07	6 18	7 43	7 08	16 21	.....	23 48	18	2 56.6	16 30	9.2
Sat Mar 16/Sun Mar 17	10 06	19 43	21 08	6 16	7 42	7 13	16 23	.....	0 43	26	3 46.7	18 31	9.1
Sun Mar 17/Mon Mar 18	10 10	19 44	21 09	6 15	7 40	7 18	16 26	.....	1 35	35	4 37.1	19 39	9.1
Mon Mar 18/Tue Mar 19	10 14	19 44	21 10	6 13	7 39	7 23	16 28	.....	2 23	44	5 27.8	19 53	9.1
Tue Mar 19/Wed Mar 20	10 18	19 45	21 11	6 12	7 37	7 28	16 30	.....	3 08	54	6 18.4	19 12	9.0
Wed Mar 20/Thu Mar 21	10 21	19 46	21 12	6 10	7 36	7 33	16 33	.....	3 50	63	7 08.8	17 38	9.0
Thu Mar 21/Fri Mar 22	10 25	19 47	21 13	6 09	7 34	7 38	16 35	.....	4 28	73	7 58.8	15 13	8.9
Fri Mar 22/Sat Mar 23	10 29	19 48	21 14	6 07	7 33	7 42	16 38	.....	5 04	81	8 48.6	12 02	8.9
Sat Mar 23/Sun Mar 24	10 33	19 49	21 14	6 06	7 32	7 47	16 40	.....	5 38	88	9 38.3	8 12	8.9
Sun Mar 24/Mon Mar 25	10 37	19 49	21 15	6 04	7 30	7 52	16 42	17 23	6 12	94	10 28.3	3 51	8.8
Mon Mar 25/Tue Mar 26	10 41	19 50	21 16	6 03	7 29	7 57	16 45	18 25	6 46	98	11 19.1	- 0 49	8.8
Tue Mar 26/Wed Mar 27	10 45	19 51	21 17	6 01	7 27	8 02	16 47	19 28	.....	100	12 11.3	- 5 35	8.7
Wed Mar 27/Thu Mar 28	10 49	19 52	21 18	6 00	7 26	8 07	16 50	20 34	.....	99	13 05.3	-10 10	8.7
Thu Mar 28/Fri Mar 29	10 53	19 53	21 19	5 58	7 24	8 12	16 52	21 41	.....	95	14 01.5	-14 16	8.6
Fri Mar 29/Sat Mar 30	10 57	19 54	21 20	5 56	7 23	8 17	16 54	22 48	.....	89	14 59.9	-17 33	8.6
Sat Mar 30/Sun Mar 31	11 01	19 54	21 21	5 55	7 22	8 22	16 57	23 55	.....	81	16 00.1	-19 46	8.6
Sun Mar 31/Mon Apr 01	11 05	19 55	21 22	5 53	7 20	8 27	16 59	0 58	.....	71	17 01.1	-20 44	8.5

***** 2013 APRIL *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Mon Apr 01/Tue Apr 02	11 09	19 56	21 23	5 52	7 19	8 32	17 01	1 55	.....	61	18 01.8	-20 24	8.5
Tue Apr 02/Wed Apr 03	11 13	19 57	21 24	5 50	7 17	8 37	17 04	2 47	.....	49	19 01.1	-18 49	8.4
Wed Apr 03/Thu Apr 04	11 17	19 58	21 25	5 48	7 16	8 42	17 06	3 33	.....	38	19 58.2	-16 11	8.4
Thu Apr 04/Fri Apr 05	11 21	19 59	21 26	5 47	7 14	8 47	17 08	4 14	.....	28	20 52.9	-12 41	8.3
Fri Apr 05/Sat Apr 06	11 25	19 59	21 27	5 45	7 13	8 51	17 11	4 51	.....	19	21 45.3	- 8 37	8.3
Sat Apr 06/Sun Apr 07	11 28	20 00	21 28	5 44	7 12	8 56	17 13	5 25	.....	11	22 35.8	- 4 12	8.3
Sun Apr 07/Mon Apr 08	11 32	20 01	21 29	5 42	7 10	9 01	17 15	5 59	17 39	5	23 25.1	0 19	8.2
Mon Apr 08/Tue Apr 09	11 36	20 02	21 31	5 40	7 09	9 06	17 18	6 32	18 40	2	0 13.8	4 44	8.2
Tue Apr 09/Wed Apr 10	11 40	20 03	21 32	5 39	7 08	9 11	17 20	.....	19 40	0	1 02.4	8 50	8.1
Wed Apr 10/Thu Apr 11	11 44	20 04	21 33	5 37	7 06	9 16	17 22	.....	20 39	1	1 51.2	12 28	8.1
Thu Apr 11/Fri Apr 12	11 48	20 04	21 34	5 36	7 05	9 22	17 25	.....	21 37	3	2 40.5	15 28	8.0
Fri Apr 12/Sat Apr 13	11 52	20 05	21 35	5 34	7 04	9 27	17 27	.....	22 32	7	3 30.4	17 43	8.0
Sat Apr 13/Sun Apr 14	11 56	20 06	21 36	5 32	7 02	9 32	17 29	.....	23 26	13	4 20.7	19 08	7.9
Sun Apr 14/Mon Apr 15	12 00	20 07	21 37	5 31	7 01	9 37	17 32	.....	0 16	20	5 11.1	19 39	7.9
Mon Apr 15/Tue Apr 16	12 04	20 08	21 38	5 29	7 00	9 42	17 34	.....	1 02	28	6 01.4	19 16	7.9
Tue Apr 16/Wed Apr 17	12 08	20 09	21 39	5 28	6 58	9 47	17 36	.....	1 45	37	6 51.3	18 00	7.8
Wed Apr 17/Thu Apr 18	12 12	20 09	21 40	5 26	6 57	9 52	17 39	.....	2 24	46	7 40.7	15 55	7.8
Thu Apr 18/Fri Apr 19	12 16	20 10	21 41	5 25	6 56	9 57	17 41	.....	3 00	56	8 29.6	13 04	7.7
Fri Apr 19/Sat Apr 20	12 20	20 11	21 43	5 23	6 54	10 02	17 44	.....	3 34	66	9 18.3	9 34	7.7
Sat Apr 20/Sun Apr 21	12 24	20 12	21 44	5 21	6 53	10 07	17 46	.....	4 08	75	10 07.2	5 30	7.6
Sun Apr 21/Mon Apr 22	12 28	20 13	21 45	5 20	6 52	10 12	17 48	.....	4 41	84	10 56.9	1 01	7.6
Mon Apr 22/Tue Apr 23	12 32	20 14	21 46	5 18	6 51	10 17	17 51	.....	5 15	91	11 48.1	- 3 41	7.5
Tue Apr 23/Wed Apr 24	12 35	20 14	21 47	5 17	6 50	10 22	17 53	18 14	5 52	96	12 41.4	- 8 22	7.5
Wed Apr 24/Thu Apr 25	12 39	20 15	21 48	5 15	6 48	10 27	17 56	19 21	6 32	99	13 37.4	-12 44	7.4
Thu Apr 25/Fri Apr 26	12 43	20 16	21 50	5 14	6 47	10 33	17 58	20 29	.....	100	14 36.3	-16 28	7.4
Fri Apr 26/Sat Apr 27	12 47	20 17	21 51	5 12	6 46	10 38	18 00	21 38	.....	97	15 37.8	-19 11	7.4
Sat Apr 27/Sun Apr 28	12 51	20 18	21 52	5 11	6 45	10 43	18 03	22 45	.....	92	16 40.9	-20 38	7.3
Sun Apr 28/Mon Apr 29	12 55	20 19	21 53	5 09	6 44	10 48	18 05	23 47	.....	84	17 44.2	-20 41	7.3
Mon Apr 29/Tue Apr 30	12 59	20 19	21 54	5 08	6 43	10 53	18 08	0 43	.....	74	18 46.0	-19 23	7.2
Tue Apr 30/Wed May 01	13 03	20 20	21 55	5 06	6 42	10 58	18 10	1 32	.....	64	19 45.3	-16 55	7.2

Calendar for Cheddar Ranch, west longitude (h.m.s) = 6 34 04, latitude (d.m) = 35 46.0
 Rise/set times in Central time (6 hr W), uncorrected for elevation, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 MAY *****

Date (eve/morn)	LMST midn	----- set	Sun: ----- twi.end twi.beg	rise	LST twilight: eve morn	----- rise	Moon: ----- set %illum	RA	Dec	Twi-Twi hours
Wed May 01/Thu May 02	13 07	20 21	21 57	5 05 6 41	11 03 18 13	2 14	.....	52	20 41.4 -13 32	7.1
Thu May 02/Fri May 03	13 11	20 22	21 58	5 04 6 40	11 09 18 15	2 52	.....	41	21 34.7 - 9 32	7.1
Fri May 03/Sat May 04	13 15	20 23	21 59	5 02 6 39	11 14 18 18	3 27	.....	31	22 25.5 - 5 11	7.1
Sat May 04/Sun May 05	13 19	20 24	22 00	5 01 6 37	11 19 18 21	4 01	.....	22	23 14.7 - 0 43	7.0
Sun May 05/Mon May 06	13 23	20 24	22 01	5 00 6 37	11 24 18 23	4 33	.....	14	0 02.9 3 40	7.0
Mon May 06/Tue May 07	13 27	20 25	22 03	4 58 6 36	11 29 18 26	5 06	17 32	8	0 50.7 7 48	6.9
Tue May 07/Wed May 08	13 31	20 26	22 04	4 57 6 35	11 34 18 28	5 41	18 31	3	1 38.8 11 30	6.9
Wed May 08/Thu May 09	13 35	20 27	22 05	4 56 6 34	11 39 18 31	6 18	19 28	1	2 27.4 14 38	6.8
Thu May 09/Fri May 10	13 39	20 28	22 06	4 54 6 33	11 45 18 34	.....	20 24	0	3 16.7 17 04	6.8
Fri May 10/Sat May 11	13 43	20 29	22 07	4 53 6 32	11 50 18 36	.....	21 19	1	4 06.6 18 42	6.8
Sat May 11/Sun May 12	13 46	20 29	22 09	4 52 6 31	11 55 18 39	.....	22 10	4	4 56.8 19 28	6.7
Sun May 12/Mon May 13	13 50	20 30	22 10	4 51 6 30	12 00 18 42	.....	22 58	9	5 47.0 19 21	6.7
Mon May 13/Tue May 14	13 54	20 31	22 11	4 49 6 29	12 05 18 45	.....	23 42	15	6 36.7 18 21	6.6
Tue May 14/Wed May 15	13 58	20 32	22 12	4 48 6 29	12 10 18 47	.....	0 22	22	7 25.7 16 31	6.6
Wed May 15/Thu May 16	14 02	20 33	22 13	4 47 6 28	12 15 18 50	.....	0 59	31	8 14.0 13 56	6.6
Thu May 16/Fri May 17	14 06	20 33	22 15	4 46 6 27	12 20 18 53	.....	1 33	40	9 01.7 10 42	6.5
Fri May 17/Sat May 18	14 10	20 34	22 16	4 45 6 26	12 26 18 56	.....	2 06	50	9 49.3 6 55	6.5
Sat May 18/Sun May 19	14 14	20 35	22 17	4 44 6 26	12 31 18 59	.....	2 38	60	10 37.3 2 42	6.4
Sun May 19/Mon May 20	14 18	20 36	22 18	4 43 6 25	12 36 19 02	.....	3 11	70	11 26.5 - 1 49	6.4
Mon May 20/Tue May 21	14 22	20 37	22 19	4 42 6 24	12 41 19 05	.....	3 45	79	12 17.5 - 6 25	6.4
Tue May 21/Wed May 22	14 26	20 37	22 20	4 41 6 24	12 46 19 08	.....	4 23	88	13 11.3 -10 54	6.3
Wed May 22/Thu May 23	14 30	20 38	22 21	4 40 6 23	12 51 19 11	18 06	5 05	94	14 08.5 -14 57	6.3
Thu May 23/Fri May 24	14 34	20 39	22 22	4 39 6 23	12 56 19 14	19 15	5 54	99	15 09.2 -18 11	6.3
Fri May 24/Sat May 25	14 38	20 40	22 24	4 38 6 22	13 01 19 17	20 24	.....	100	16 12.8 -20 17	6.2
Sat May 25/Sun May 26	14 42	20 40	22 25	4 37 6 22	13 06 19 20	21 30	.....	98	17 18.0 -20 58	6.2
Sun May 26/Mon May 27	14 46	20 41	22 26	4 37 6 21	13 11 19 23	22 31	.....	94	18 22.9 -20 10	6.2
Mon May 27/Tue May 28	14 50	20 42	22 27	4 36 6 21	13 16 19 26	23 25	.....	86	19 25.6 -18 01	6.2
Tue May 28/Wed May 29	14 53	20 42	22 28	4 35 6 20	13 21 19 29	0 11	.....	77	20 25.1 -14 46	6.1
Wed May 29/Thu May 30	14 57	20 43	22 29	4 34 6 20	13 26 19 33	0 52	.....	67	21 21.0 -10 47	6.1
Thu May 30/Fri May 31	15 01	20 44	22 30	4 34 6 20	13 31 19 36	1 29	.....	56	22 13.9 - 6 22	6.1
Fri May 31/Sat Jun 01	15 05	20 44	22 31	4 33 6 19	13 36 19 39	2 03	.....	45	23 04.3 - 1 49	6.0

***** 2013 JUNE *****

Date (eve/morn)	LMST midn	----- set	Sun: ----- twi.end twi.beg	rise	LST twilight: eve morn	----- rise	Moon: ----- set %illum	RA	Dec	Twi-Twi hours
Sat Jun 01/Sun Jun 02	15 09	20 45	22 31	4 32 6 19	13 40 19 42	2 36	.....	35	23 53.1 2 39	6.0
Sun Jun 02/Mon Jun 03	15 13	20 46	22 32	4 32 6 19	13 45 19 46	3 09	.....	26	0 41.0 6 52	6.0
Mon Jun 03/Tue Jun 04	15 17	20 46	22 33	4 31 6 18	13 50 19 49	3 43	.....	17	1 28.8 10 40	6.0
Tue Jun 04/Wed Jun 05	15 21	20 47	22 34	4 31 6 18	13 55 19 53	4 19	.....	11	2 17.0 13 55	5.9
Wed Jun 05/Thu Jun 06	15 25	20 47	22 35	4 31 6 18	14 00 19 56	4 57	18 19	5	3 05.7 16 31	5.9
Thu Jun 06/Fri Jun 07	15 29	20 48	22 36	4 30 6 18	14 04 20 00	5 39	19 14	2	3 55.1 18 20	5.9
Fri Jun 07/Sat Jun 08	15 33	20 48	22 36	4 30 6 18	14 09 20 03	6 24	20 06	0	4 44.9 19 19	5.9
Sat Jun 08/Sun Jun 09	15 37	20 49	22 37	4 30 6 18	14 14 20 07	.....	20 54	0	5 34.9 19 25	5.9
Sun Jun 09/Mon Jun 10	15 41	20 49	22 38	4 29 6 17	14 18 20 11	.....	21 40	2	6 24.5 18 39	5.9
Mon Jun 10/Tue Jun 11	15 45	20 50	22 38	4 29 6 17	14 23 20 15	.....	22 21	6	7 13.5 17 03	5.8
Tue Jun 11/Wed Jun 12	15 49	20 50	22 39	4 29 6 17	14 27 20 18	.....	22 59	11	8 01.7 14 41	5.8
Wed Jun 12/Thu Jun 13	15 53	20 51	22 39	4 29 6 17	14 32 20 22	.....	23 34	17	8 49.1 11 40	5.8
Thu Jun 13/Fri Jun 14	15 57	20 51	22 40	4 29 6 17	14 36 20 26	.....	0 07	25	9 36.0 8 05	5.8
Fri Jun 14/Sat Jun 15	16 01	20 52	22 40	4 29 6 18	14 41 20 30	.....	0 39	34	10 22.8 4 05	5.8
Sat Jun 15/Sun Jun 16	16 04	20 52	22 41	4 29 6 18	14 45 20 34	.....	1 11	44	11 10.1 - 0 14	5.8
Sun Jun 16/Mon Jun 17	16 08	20 52	22 41	4 29 6 18	14 49 20 38	.....	1 43	55	11 58.9 - 4 42	5.8
Mon Jun 17/Tue Jun 18	16 12	20 53	22 42	4 29 6 18	14 54 20 42	.....	2 18	65	12 49.8 - 9 07	5.8
Tue Jun 18/Wed Jun 19	16 16	20 53	22 42	4 29 6 18	14 58 20 46	.....	2 57	76	13 43.8 -13 15	5.8
Wed Jun 19/Thu Jun 20	16 20	20 53	22 42	4 29 6 18	15 02 20 50	.....	3 41	85	14 41.3 -16 49	5.8
Thu Jun 20/Fri Jun 21	16 24	20 53	22 42	4 29 6 18	15 06 20 54	18 00	4 32	92	15 42.6 -19 28	5.8
Fri Jun 21/Sat Jun 22	16 28	20 54	22 43	4 29 6 19	15 11 20 58	19 08	5 30	98	16 46.9 -20 52	5.8
Sat Jun 22/Sun Jun 23	16 32	20 54	22 43	4 30 6 19	15 15 21 03	20 12	.....	100	17 52.7 -20 49	5.8
Sun Jun 23/Mon Jun 24	16 36	20 54	22 43	4 30 6 19	15 19 21 07	21 10	.....	99	18 57.9 -19 15	5.8
Mon Jun 24/Tue Jun 25	16 40	20 54	22 43	4 30 6 19	15 23 21 11	22 02	.....	95	20 00.8 -16 23	5.8
Tue Jun 25/Wed Jun 26	16 44	20 54	22 43	4 31 6 20	15 27 21 15	22 47	.....	89	21 00.4 -12 32	5.8
Wed Jun 26/Thu Jun 27	16 48	20 54	22 43	4 31 6 20	15 31 21 20	23 27	.....	80	21 56.5 - 8 05	5.8
Thu Jun 27/Fri Jun 28	16 52	20 54	22 43	4 32 6 21	15 35 21 24	0 04	.....	70	22 49.6 - 3 23	5.8
Fri Jun 28/Sat Jun 29	16 56	20 54	22 43	4 32 6 21	15 38 21 29	0 38	.....	60	23 40.4 1 16	5.8
Sat Jun 29/Sun Jun 30	17 00	20 54	22 43	4 33 6 21	15 42 21 33	1 11	.....	50	0 29.7 5 41	5.8
Sun Jun 30/Mon Jul 01	17 04	20 54	22 43	4 33 6 22	15 46 21 38	1 45	.....	39	1 18.3 9 40	5.8

Calendar for Cheddar Ranch, west longitude (h.m.s) = 6 34 04, latitude (d.m) = 35 46.0
 Rise/set times in Central time (6 hr W), uncorrected for elevation, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 JULY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Mon Jul 01/Tue Jul 02	17 08	20 54	22 42	4 34	6 22	15 50	21 42	2 20	.....	30	2 06.7	13 06	5.9
Tue Jul 02/Wed Jul 03	17 11	20 54	22 42	4 35	6 23	15 53	21 47	2 58	.....	22	2 55.4	15 53	5.9
Wed Jul 03/Thu Jul 04	17 15	20 54	22 42	4 35	6 23	15 57	21 52	3 38	.....	14	3 44.5	17 54	5.9
Thu Jul 04/Fri Jul 05	17 19	20 54	22 41	4 36	6 24	16 01	21 56	4 22	18 02	8	4 34.1	19 06	5.9
Fri Jul 05/Sat Jul 06	17 23	20 54	22 41	4 37	6 24	16 04	22 01	5 10	18 52	4	5 23.9	19 26	5.9
Sat Jul 06/Sun Jul 07	17 27	20 53	22 41	4 38	6 25	16 08	22 06	6 00	19 38	1	6 13.5	18 53	6.0
Sun Jul 07/Mon Jul 08	17 31	20 53	22 40	4 38	6 25	16 11	22 10	.....	20 21	0	7 02.6	17 30	6.0
Mon Jul 08/Tue Jul 09	17 35	20 53	22 40	4 39	6 26	16 14	22 15	.....	21 00	1	7 51.0	15 21	6.0
Tue Jul 09/Wed Jul 10	17 39	20 53	22 39	4 40	6 27	16 18	22 20	.....	21 37	3	8 38.6	12 30	6.0
Wed Jul 10/Thu Jul 11	17 43	20 52	22 38	4 41	6 27	16 21	22 25	.....	22 10	8	9 25.5	9 05	6.0
Thu Jul 11/Fri Jul 12	17 47	20 52	22 38	4 42	6 28	16 24	22 30	.....	22 42	14	10 11.9	5 13	6.1
Fri Jul 12/Sat Jul 13	17 51	20 51	22 37	4 43	6 28	16 28	22 35	.....	23 14	21	10 58.6	1 02	6.1
Sat Jul 13/Sun Jul 14	17 55	20 51	22 36	4 44	6 29	16 31	22 39	.....	23 45	30	11 45.9	- 3 18	6.1
Sun Jul 14/Mon Jul 15	17 59	20 51	22 36	4 45	6 30	16 34	22 44	.....	0 19	40	12 34.9	- 7 37	6.2
Mon Jul 15/Tue Jul 16	18 03	20 50	22 35	4 46	6 30	16 37	22 49	.....	0 54	50	13 26.1	-11 45	6.2
Tue Jul 16/Wed Jul 17	18 07	20 50	22 34	4 47	6 31	16 40	22 54	.....	1 35	61	14 20.3	-15 25	6.2
Wed Jul 17/Thu Jul 18	18 11	20 49	22 33	4 48	6 32	16 43	22 59	.....	2 21	72	15 18.0	-18 22	6.2
Thu Jul 18/Fri Jul 19	18 15	20 49	22 32	4 49	6 32	16 47	23 04	.....	3 13	82	16 19.2	-20 18	6.3
Fri Jul 19/Sat Jul 20	18 19	20 48	22 31	4 50	6 33	16 50	23 09	17 52	4 14	90	17 22.9	-20 56	6.3
Sat Jul 20/Sun Jul 21	18 22	20 47	22 30	4 51	6 34	16 53	23 14	18 53	5 20	96	18 27.6	-20 07	6.3
Sun Jul 21/Mon Jul 22	18 26	20 47	22 29	4 52	6 35	16 55	23 19	19 48	.....	99	19 31.7	-17 54	6.4
Mon Jul 22/Tue Jul 23	18 30	20 46	22 28	4 53	6 35	16 58	23 24	20 37	.....	100	20 33.6	-14 28	6.4
Tue Jul 23/Wed Jul 24	18 34	20 45	22 27	4 54	6 36	17 01	23 29	21 20	.....	97	21 32.6	-10 12	6.4
Wed Jul 24/Thu Jul 25	18 38	20 45	22 26	4 55	6 37	17 04	23 34	21 59	.....	91	22 28.6	- 5 28	6.5
Thu Jul 25/Fri Jul 26	18 42	20 44	22 25	4 56	6 38	17 07	23 39	22 36	.....	84	23 22.0	- 0 38	6.5
Fri Jul 26/Sat Jul 27	18 46	20 43	22 24	4 58	6 38	17 10	23 44	23 11	.....	75	0 13.6	4 02	6.6
Sat Jul 27/Sun Jul 28	18 50	20 42	22 23	4 59	6 39	17 13	23 50	23 45	.....	65	1 03.9	8 18	6.6
Sun Jul 28/Mon Jul 29	18 54	20 42	22 22	5 00	6 40	17 15	23 55	0 21	.....	55	1 53.6	12 00	6.6
Mon Jul 29/Tue Jul 30	18 58	20 41	22 20	5 01	6 41	17 18	24 00	0 58	.....	45	2 43.1	15 02	6.7
Tue Jul 30/Wed Jul 31	19 02	20 40	22 19	5 02	6 41	17 21	0 05	1 38	.....	35	3 32.7	17 18	6.7
Wed Jul 31/Thu Aug 01	19 06	20 39	22 18	5 03	6 42	17 23	0 10	2 20	.....	27	4 22.5	18 44	6.8

***** 2013 AUGUST *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Thu Aug 01/Fri Aug 02	19 10	20 38	22 17	5 04	6 43	17 26	0 15	3 07	.....	19	5 12.3	19 19	6.8
Fri Aug 02/Sat Aug 03	19 14	20 37	22 15	5 06	6 44	17 29	0 20	3 56	17 35	12	6 02.0	19 01	6.8
Sat Aug 03/Sun Aug 04	19 18	20 36	22 14	5 07	6 44	17 31	0 25	4 48	18 19	7	6 51.3	17 52	6.9
Sun Aug 04/Mon Aug 05	19 22	20 35	22 13	5 08	6 45	17 34	0 30	5 42	19 00	3	7 39.9	15 55	6.9
Mon Aug 05/Tue Aug 06	19 26	20 34	22 11	5 09	6 46	17 37	0 35	.....	19 38	1	8 27.8	13 16	7.0
Tue Aug 06/Wed Aug 07	19 29	20 33	22 10	5 10	6 47	17 39	0 40	.....	20 12	0	9 15.1	10 00	7.0
Wed Aug 07/Thu Aug 08	19 33	20 32	22 09	5 11	6 48	17 42	0 46	.....	20 45	2	10 01.9	6 15	7.0
Thu Aug 08/Fri Aug 09	19 37	20 31	22 07	5 12	6 48	17 44	0 51	.....	21 17	5	10 48.6	2 10	7.1
Fri Aug 09/Sat Aug 10	19 41	20 30	22 06	5 14	6 49	17 47	0 56	.....	21 49	10	11 35.8	- 2 07	7.1
Sat Aug 10/Sun Aug 11	19 45	20 29	22 04	5 15	6 50	17 49	1 01	.....	22 22	17	12 24.0	- 6 24	7.2
Sun Aug 11/Mon Aug 12	19 49	20 28	22 03	5 16	6 51	17 52	1 06	.....	22 57	26	13 14.0	-10 30	7.2
Mon Aug 12/Tue Aug 13	19 53	20 27	22 01	5 17	6 52	17 54	1 11	.....	23 35	36	14 06.3	-14 13	7.3
Tue Aug 13/Wed Aug 14	19 57	20 26	22 00	5 18	6 52	17 57	1 16	.....	0 17	47	15 01.4	-17 18	7.3
Wed Aug 14/Thu Aug 15	20 01	20 24	21 58	5 19	6 53	17 59	1 21	.....	1 06	58	15 59.4	-19 30	7.3
Thu Aug 15/Fri Aug 16	20 05	20 23	21 57	5 20	6 54	18 01	1 26	.....	2 01	69	17 00.0	-20 35	7.4
Fri Aug 16/Sat Aug 17	20 09	20 22	21 55	5 21	6 55	18 04	1 31	.....	3 03	79	18 02.3	-20 22	7.4
Sat Aug 17/Sun Aug 18	20 13	20 21	21 54	5 23	6 55	18 06	1 36	17 34	4 09	88	19 04.8	-18 48	7.5
Sun Aug 18/Mon Aug 19	20 17	20 20	21 52	5 24	6 56	18 09	1 41	18 25	5 19	95	20 06.5	-15 59	7.5
Mon Aug 19/Tue Aug 20	20 21	20 18	21 51	5 25	6 57	18 11	1 46	19 11	6 28	99	21 06.2	-12 09	7.6
Tue Aug 20/Wed Aug 21	20 25	20 17	21 49	5 26	6 58	18 13	1 51	19 52	.....	100	22 03.6	- 7 39	7.6
Wed Aug 21/Thu Aug 22	20 29	20 16	21 47	5 27	6 59	18 16	1 56	20 30	.....	98	22 58.9	- 2 49	7.7
Thu Aug 22/Fri Aug 23	20 33	20 15	21 46	5 28	6 59	18 18	2 01	21 07	.....	94	23 52.4	2 01	7.7
Fri Aug 23/Sat Aug 24	20 36	20 13	21 44	5 29	7 00	18 20	2 06	21 42	.....	87	0 44.6	6 33	7.7
Sat Aug 24/Sun Aug 25	20 40	20 12	21 43	5 30	7 01	18 23	2 11	22 18	.....	79	1 35.9	10 34	7.8
Sun Aug 25/Mon Aug 26	20 44	20 11	21 41	5 31	7 02	18 25	2 16	22 55	.....	71	2 26.9	13 55	7.8
Mon Aug 26/Tue Aug 27	20 48	20 09	21 39	5 32	7 02	18 27	2 21	23 35	.....	61	3 17.6	16 30	7.9
Tue Aug 27/Wed Aug 28	20 52	20 08	21 38	5 33	7 03	18 30	2 26	0 17	.....	51	4 08.2	18 14	7.9
Wed Aug 28/Thu Aug 29	20 56	20 07	21 36	5 34	7 04	18 32	2 31	1 02	.....	42	4 58.6	19 04	8.0
Thu Aug 29/Fri Aug 30	21 00	20 05	21 35	5 35	7 05	18 34	2 36	1 50	.....	33	5 48.6	19 02	8.0
Fri Aug 30/Sat Aug 31	21 04	20 04	21 33	5 36	7 06	18 37	2 41	2 41	.....	24	6 38.1	18 09	8.1
Sat Aug 31/Sun Sep 01	21 08	20 02	21 31	5 37	7 06	18 39	2 46	3 34	.....	17	7 27.0	16 27	8.1

Calendar for Cheddar Ranch, west longitude (h.m.s) = 6 34 04, latitude (d.m) = 35 46.0
 Rise/set times in Central time (6 hr W), uncorrected for elevation, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 SEPTEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sun Sep 01/Mon Sep 02	21 12	20 01	21 30	5 38	7 07	18 41	2 51	4 29	17 36	10	8 15.2	14 01	8.1
Mon Sep 02/Tue Sep 03	21 16	20 00	21 28	5 39	7 08	18 44	2 56	5 25	18 12	5	9 02.7	10 56	8.2
Tue Sep 03/Wed Sep 04	21 20	19 58	21 26	5 40	7 09	18 46	3 01	6 22	18 46	2	9 49.9	7 20	8.2
Wed Sep 04/Thu Sep 05	21 24	19 57	21 25	5 41	7 09	18 48	3 06	.....	19 19	0	10 37.0	3 20	8.3
Thu Sep 05/Fri Sep 06	21 28	19 55	21 23	5 42	7 10	18 50	3 11	.....	19 51	1	11 24.5	- 0 54	8.3
Fri Sep 06/Sat Sep 07	21 32	19 54	21 22	5 43	7 11	18 53	3 16	.....	20 24	3	12 13.0	- 5 12	8.4
Sat Sep 07/Sun Sep 08	21 36	19 52	21 20	5 44	7 12	18 55	3 21	.....	20 59	8	13 03.0	- 9 22	8.4
Sun Sep 08/Mon Sep 09	21 40	19 51	21 18	5 45	7 12	18 57	3 26	.....	21 36	14	13 54.9	-13 10	8.4
Mon Sep 09/Tue Sep 10	21 44	19 50	21 17	5 46	7 13	19 00	3 30	.....	22 18	23	14 49.1	-16 22	8.5
Tue Sep 10/Wed Sep 11	21 47	19 48	21 15	5 47	7 14	19 02	3 35	.....	23 04	33	15 45.7	-18 45	8.5
Wed Sep 11/Thu Sep 12	21 51	19 47	21 13	5 48	7 15	19 04	3 40	.....	23 56	44	16 44.5	-20 05	8.6
Thu Sep 12/Fri Sep 13	21 55	19 45	21 12	5 49	7 15	19 07	3 45	.....	0 54	55	17 44.6	-20 14	8.6
Fri Sep 13/Sat Sep 14	21 59	19 44	21 10	5 50	7 16	19 09	3 50	.....	1 57	66	18 45.2	-19 08	8.7
Sat Sep 14/Sun Sep 15	22 03	19 42	21 09	5 51	7 17	19 11	3 55	.....	3 03	77	19 45.1	-16 49	8.7
Sun Sep 15/Mon Sep 16	22 07	19 41	21 07	5 51	7 18	19 14	4 00	17 04	4 11	86	20 43.7	-13 29	8.7
Mon Sep 16/Tue Sep 17	22 11	19 39	21 05	5 52	7 18	19 16	4 04	17 46	5 18	93	21 40.6	- 9 21	8.8
Tue Sep 17/Wed Sep 18	22 15	19 38	21 04	5 53	7 19	19 18	4 09	18 25	6 25	98	22 35.8	- 4 44	8.8
Wed Sep 18/Thu Sep 19	22 19	19 36	21 02	5 54	7 20	19 21	4 14	19 01	.....	100	23 29.7	0 03	8.9
Thu Sep 19/Fri Sep 20	22 23	19 35	21 01	5 55	7 21	19 23	4 19	19 37	.....	99	0 22.6	4 42	8.9
Fri Sep 20/Sat Sep 21	22 27	19 33	20 59	5 56	7 21	19 25	4 24	20 13	.....	96	1 14.9	8 58	8.9
Sat Sep 21/Sun Sep 22	22 31	19 32	20 57	5 57	7 22	19 28	4 28	20 51	.....	91	2 07.0	12 39	9.0
Sun Sep 22/Mon Sep 23	22 35	19 30	20 56	5 58	7 23	19 30	4 33	21 30	.....	84	2 58.9	15 34	9.0
Mon Sep 23/Tue Sep 24	22 39	19 29	20 54	5 58	7 24	19 32	4 38	22 12	.....	76	3 50.6	17 37	9.1
Tue Sep 24/Wed Sep 25	22 43	19 28	20 53	5 59	7 25	19 35	4 43	22 56	.....	68	4 41.9	18 47	9.1
Wed Sep 25/Thu Sep 26	22 47	19 26	20 51	6 00	7 25	19 37	4 48	23 44	.....	58	5 32.8	19 03	9.1
Thu Sep 26/Fri Sep 27	22 51	19 25	20 50	6 01	7 26	19 40	4 52	0 34	.....	49	6 22.9	18 25	9.2
Fri Sep 27/Sat Sep 28	22 54	19 23	20 48	6 02	7 27	19 42	4 57	1 26	.....	40	7 12.1	16 59	9.2
Sat Sep 28/Sun Sep 29	22 58	19 22	20 47	6 03	7 28	19 44	5 02	2 19	.....	31	8 00.4	14 47	9.3
Sun Sep 29/Mon Sep 30	23 02	19 20	20 45	6 03	7 28	19 47	5 07	3 15	.....	22	8 48.0	11 56	9.3
Mon Sep 30/Tue Oct 01	23 06	19 19	20 44	6 04	7 29	19 49	5 12	4 11	16 44	15	9 35.2	8 31	9.3

***** 2013 OCTOBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Tue Oct 01/Wed Oct 02	23 10	19 17	20 42	6 05	7 30	19 52	5 16	5 09	17 17	8	10 22.3	4 39	9.4
Wed Oct 02/Thu Oct 03	23 14	19 16	20 41	6 06	7 31	19 54	5 21	6 08	17 50	4	11 09.9	0 29	9.4
Thu Oct 03/Fri Oct 04	23 18	19 14	20 39	6 07	7 32	19 57	5 26	7 09	18 23	1	11 58.5	- 3 49	9.5
Fri Oct 04/Sat Oct 05	23 22	19 13	20 38	6 08	7 32	19 59	5 31	.....	18 58	0	12 48.7	- 8 03	9.5
Sat Oct 05/Sun Oct 06	23 26	19 12	20 36	6 08	7 33	20 02	5 35	.....	19 35	2	13 40.8	-12 00	9.5
Sun Oct 06/Mon Oct 07	23 30	19 10	20 35	6 09	7 34	20 04	5 40	.....	20 16	6	14 35.4	-15 25	9.6
Mon Oct 07/Tue Oct 08	23 34	19 09	20 34	6 10	7 35	20 07	5 45	.....	21 02	12	15 32.2	-18 02	9.6
Tue Oct 08/Wed Oct 09	23 38	19 07	20 32	6 11	7 36	20 09	5 50	.....	21 53	20	16 30.9	-19 37	9.6
Wed Oct 09/Thu Oct 10	23 42	19 06	20 31	6 12	7 37	20 12	5 55	.....	22 50	30	17 30.8	-20 02	9.7
Thu Oct 10/Fri Oct 11	23 46	19 05	20 29	6 13	7 37	20 15	5 59	.....	23 51	41	18 30.8	-19 13	9.7
Fri Oct 11/Sat Oct 12	23 50	19 03	20 28	6 13	7 38	20 17	6 04	.....	0 55	52	19 29.9	-17 14	9.8
Sat Oct 12/Sun Oct 13	23 54	19 02	20 27	6 14	7 39	20 20	6 09	.....	2 01	63	20 27.5	-14 14	9.8
Sun Oct 13/Mon Oct 14	23 58	19 01	20 26	6 15	7 40	20 23	6 14	.....	3 07	74	21 23.3	-10 26	9.8
Mon Oct 14/Tue Oct 15	0 02	18 59	20 24	6 16	7 41	20 25	6 18	16 22	4 12	83	22 17.5	- 6 05	9.9
Tue Oct 15/Wed Oct 16	0 05	18 58	20 23	6 17	7 42	20 28	6 23	16 59	5 16	91	23 10.5	- 1 29	9.9
Wed Oct 16/Thu Oct 17	0 09	18 57	20 22	6 18	7 43	20 31	6 28	17 34	6 19	96	0 02.7	3 08	9.9
Thu Oct 17/Fri Oct 18	0 13	18 55	20 21	6 18	7 44	20 33	6 33	18 10	7 21	99	0 54.6	7 30	10.0
Fri Oct 18/Sat Oct 19	0 17	18 54	20 19	6 19	7 44	20 36	6 37	18 46	.....	100	1 46.6	11 23	10.0
Sat Oct 19/Sun Oct 20	0 21	18 53	20 18	6 20	7 45	20 39	6 42	19 25	.....	98	2 38.7	14 36	10.0
Sun Oct 20/Mon Oct 21	0 25	18 52	20 17	6 21	7 46	20 42	6 47	20 05	.....	95	3 31.1	17 00	10.1
Mon Oct 21/Tue Oct 22	0 29	18 51	20 16	6 22	7 47	20 44	6 52	20 49	.....	89	4 23.3	18 30	10.1
Tue Oct 22/Wed Oct 23	0 33	18 49	20 15	6 22	7 48	20 47	6 57	21 36	.....	82	5 15.1	19 05	10.1
Wed Oct 23/Thu Oct 24	0 37	18 48	20 14	6 23	7 49	20 50	7 01	22 25	.....	75	6 06.0	18 45	10.2
Thu Oct 24/Fri Oct 25	0 41	18 47	20 13	6 24	7 50	20 53	7 06	23 16	.....	66	6 55.9	17 34	10.2
Fri Oct 25/Sat Oct 26	0 45	18 46	20 12	6 25	7 51	20 56	7 11	0 09	.....	57	7 44.6	15 36	10.2
Sat Oct 26/Sun Oct 27	0 49	18 45	20 10	6 26	7 52	20 59	7 16	1 03	.....	47	8 32.3	12 58	10.3
Sun Oct 27/Mon Oct 28	0 53	18 44	20 09	6 27	7 53	21 02	7 20	1 59	.....	38	9 19.3	9 46	10.3
Mon Oct 28/Tue Oct 29	0 57	18 42	20 08	6 27	7 54	21 05	7 25	2 55	.....	29	10 05.9	6 05	10.3
Tue Oct 29/Wed Oct 30	1 01	18 41	20 08	6 28	7 55	21 08	7 30	3 53	.....	20	10 52.9	2 04	10.3
Wed Oct 30/Thu Oct 31	1 05	18 40	20 07	6 29	7 56	21 11	7 35	4 52	16 19	13	11 40.8	- 2 10	10.4
Thu Oct 31/Fri Nov 01	1 09	18 39	20 06	6 30	7 57	21 14	7 40	5 54	16 53	7	12 30.3	- 6 26	10.4

Calendar for Cheddar Ranch, west longitude (h.m.s) = 6 34 04, latitude (d.m) = 35 46.0
 Rise/set times in Central time (6 hr W), uncorrected for elevation, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2013 NOVEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twi-Twi hours		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Fri Nov 01/Sat Nov 02	1 12	18 38	20 05	6 31	7 58	21 17	7 44	6 58	17 29	2	13 22.0	-10 32	10.4
Sat Nov 02/Sun Nov 03*	1 16	18 37	20 04	5 32	6 58	21 20	7 49	7 04	18 09	0	14 16.3	-14 12	10.5
Sun Nov 03/Mon Nov 04	2 21	17 36	19 03	5 33	6 59	21 23	7 54	8 10	17 54	1	15 16.7	-17 14	10.5
Mon Nov 04/Tue Nov 05	2 24	17 35	19 02	5 33	7 00	21 26	7 59	.....	18 44	4	16 16.2	-19 09	10.5
Tue Nov 05/Wed Nov 06	2 28	17 34	19 01	5 34	7 01	21 29	8 04	.....	19 41	10	17 17.2	-19 51	10.5
Wed Nov 06/Thu Nov 07	2 32	17 34	19 01	5 35	7 02	21 32	8 08	.....	20 42	18	18 18.3	-19 18	10.6
Thu Nov 07/Fri Nov 08	2 36	17 33	19 00	5 36	7 03	21 35	8 13	.....	21 47	27	19 18.3	-17 31	10.6
Fri Nov 08/Sat Nov 09	2 40	17 32	18 59	5 37	7 04	21 39	8 18	.....	22 54	38	20 16.4	-14 42	10.6
Sat Nov 09/Sun Nov 10	2 44	17 31	18 59	5 38	7 05	21 42	8 23	.....	24 00	49	21 12.2	-11 03	10.7
Sun Nov 10/Mon Nov 11	2 48	17 30	18 58	5 39	7 06	21 45	8 28	.....	1 05	60	22 05.9	- 6 52	10.7
Mon Nov 11/Tue Nov 12	2 52	17 30	18 57	5 39	7 07	21 49	8 32	.....	2 08	71	22 58.0	- 2 24	10.7
Tue Nov 12/Wed Nov 13	2 56	17 29	18 57	5 40	7 08	21 52	8 37	.....	3 10	80	23 49.1	2 08	10.7
Wed Nov 13/Thu Nov 14	3 00	17 28	18 56	5 41	7 09	21 55	8 42	.....	4 11	88	0 39.9	6 28	10.7
Thu Nov 14/Fri Nov 15	3 04	17 27	18 56	5 42	7 10	21 59	8 47	15 45	5 12	94	1 30.8	10 26	10.8
Fri Nov 15/Sat Nov 16	3 08	17 27	18 55	5 43	7 11	22 02	8 52	16 22	6 11	98	2 22.2	13 49	10.8
Sat Nov 16/Sun Nov 17	3 12	17 26	18 55	5 44	7 12	22 06	8 56	17 01	7 08	100	3 14.1	16 28	10.8
Sun Nov 17/Mon Nov 18	3 16	17 26	18 54	5 45	7 13	22 09	9 01	17 43	8 03	100	4 06.4	18 17	10.8
Mon Nov 18/Tue Nov 19	3 20	17 25	18 54	5 45	7 14	22 13	9 06	18 29	.....	97	4 58.7	19 09	10.9
Tue Nov 19/Wed Nov 20	3 24	17 24	18 53	5 46	7 15	22 16	9 11	19 17	.....	93	5 50.5	19 06	10.9
Wed Nov 20/Thu Nov 21	3 28	17 24	18 53	5 47	7 16	22 20	9 16	20 08	.....	88	6 41.3	18 10	10.9
Thu Nov 21/Fri Nov 22	3 31	17 23	18 53	5 48	7 17	22 23	9 20	21 00	.....	81	7 30.8	16 25	10.9
Fri Nov 22/Sat Nov 23	3 35	17 23	18 52	5 49	7 18	22 27	9 25	21 54	.....	73	8 19.0	13 57	10.9
Sat Nov 23/Sun Nov 24	3 39	17 23	18 52	5 50	7 19	22 31	9 30	22 48	.....	64	9 06.2	10 54	11.0
Sun Nov 24/Mon Nov 25	3 43	17 22	18 52	5 50	7 20	22 34	9 35	23 43	.....	55	9 52.6	7 23	11.0
Mon Nov 25/Tue Nov 26	3 47	17 22	18 52	5 51	7 21	22 38	9 39	0 39	.....	45	10 38.9	3 29	11.0
Tue Nov 26/Wed Nov 27	3 51	17 22	18 51	5 52	7 22	22 42	9 44	1 36	.....	35	11 25.7	- 0 38	11.0
Wed Nov 27/Thu Nov 28	3 55	17 21	18 51	5 53	7 23	22 46	9 49	2 35	.....	26	12 13.8	- 4 51	11.0
Thu Nov 28/Fri Nov 29	3 59	17 21	18 51	5 54	7 24	22 49	9 54	3 37	.....	17	13 03.9	- 8 59	11.0
Fri Nov 29/Sat Nov 30	4 03	17 21	18 51	5 55	7 25	22 53	9 59	4 41	.....	10	13 56.8	-12 49	11.1
Sat Nov 30/Sun Dec 01	4 07	17 21	18 51	5 55	7 26	22 57	10 03	5 48	15 42	4	14 52.8	-16 04	11.1

***** 2013 DECEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----				Twi-Twi hours		
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Sun Dec 01/Mon Dec 02	4 11	17 20	18 51	5 56	7 27	23 01	10 08	6 55	16 30	1	15 52.0	-18 27	11.1
Mon Dec 02/Tue Dec 03	4 15	17 20	18 51	5 57	7 28	23 05	10 13	7 59	17 24	0	16 53.6	-19 42	11.1
Tue Dec 03/Wed Dec 04	4 19	17 20	18 51	5 58	7 28	23 09	10 17	.....	18 25	2	17 56.4	-19 39	11.1
Wed Dec 04/Thu Dec 05	4 23	17 20	18 51	5 58	7 29	23 13	10 22	.....	19 31	7	18 58.7	-18 15	11.1
Thu Dec 05/Fri Dec 06	4 27	17 20	18 51	5 59	7 30	23 17	10 27	.....	20 40	14	19 59.3	-15 41	11.1
Fri Dec 06/Sat Dec 07	4 31	17 20	18 51	6 00	7 31	23 21	10 31	.....	21 49	24	20 57.3	-12 10	11.1
Sat Dec 07/Sun Dec 08	4 35	17 20	18 51	6 01	7 32	23 25	10 36	.....	22 56	34	21 52.6	- 8 01	11.2
Sun Dec 08/Mon Dec 09	4 39	17 20	18 52	6 01	7 33	23 29	10 41	.....	0 01	45	22 45.7	- 3 33	11.2
Mon Dec 09/Tue Dec 10	4 42	17 20	18 52	6 02	7 33	23 33	10 45	.....	1 04	56	23 37.1	1 00	11.2
Tue Dec 10/Wed Dec 11	4 46	17 21	18 52	6 03	7 34	23 38	10 50	.....	2 05	66	0 27.5	5 23	11.2
Wed Dec 11/Thu Dec 12	4 50	17 21	18 52	6 03	7 35	23 42	10 55	.....	3 05	76	1 17.7	9 25	11.2
Thu Dec 12/Fri Dec 13	4 54	17 21	18 53	6 04	7 36	23 46	10 59	.....	4 04	84	2 08.1	12 56	11.2
Fri Dec 13/Sat Dec 14	4 58	17 21	18 53	6 05	7 36	23 50	11 04	.....	5 01	91	2 59.1	15 47	11.2
Sat Dec 14/Sun Dec 15	5 02	17 22	18 53	6 05	7 37	23 54	11 08	15 41	5 56	96	3 50.7	17 51	11.2
Sun Dec 15/Mon Dec 16	5 06	17 22	18 53	6 06	7 38	23 59	11 13	16 25	6 49	99	4 42.5	19 02	11.2
Mon Dec 16/Tue Dec 17	5 10	17 22	18 54	6 06	7 38	0 03	11 18	17 12	7 37	100	5 34.3	19 18	11.2
Tue Dec 17/Wed Dec 18	5 14	17 23	18 54	6 07	7 39	0 07	11 22	18 01	8 22	99	6 25.6	18 39	11.2
Wed Dec 18/Thu Dec 19	5 18	17 23	18 55	6 08	7 39	0 12	11 27	18 53	.....	97	7 15.7	17 10	11.2
Thu Dec 19/Fri Dec 20	5 22	17 23	18 55	6 08	7 40	0 16	11 31	19 47	.....	92	8 04.7	14 55	11.2
Fri Dec 20/Sat Dec 21	5 26	17 24	18 56	6 09	7 40	0 21	11 35	20 41	.....	87	8 52.3	12 03	11.2
Sat Dec 21/Sun Dec 22	5 30	17 24	18 56	6 09	7 41	0 25	11 40	21 35	.....	80	9 38.9	8 40	11.2
Sun Dec 22/Mon Dec 23	5 34	17 25	18 57	6 10	7 41	0 30	11 44	22 30	.....	71	10 25.0	4 54	11.2
Mon Dec 23/Tue Dec 24	5 38	17 25	18 57	6 10	7 42	0 34	11 49	23 25	.....	62	11 11.0	0 54	11.2
Tue Dec 24/Wed Dec 25	5 42	17 26	18 58	6 10	7 42	0 38	11 53	0 22	.....	52	11 57.7	- 3 14	11.2
Wed Dec 25/Thu Dec 26	5 46	17 27	18 58	6 11	7 43	0 43	11 57	1 21	.....	42	12 45.9	- 7 20	11.2
Thu Dec 26/Fri Dec 27	5 49	17 27	18 59	6 11	7 43	0 48	12 02	2 22	.....	32	13 36.3	-11 13	11.2
Fri Dec 27/Sat Dec 28	5 53	17 28	19 00	6 12	7 43	0 52	12 06	3 25	.....	23	14 29.6	-14 40	11.2
Sat Dec 28/Sun Dec 29	5 57	17 29	19 00	6 12	7 43	0 57	12 10	4 31	.....	14	15 26.3	-17 26	11.2
Sun Dec 29/Mon Dec 30	6 01	17 29	19 01	6 12	7 44	1 01	12 15	5 36	.....	7	16 26.1	-19 14	11.2
Mon Dec 30/Tue Dec 31	6 05	17 30	19 01	6 13	7 44	1 06	12 19	6 39	16 03	2	17 28.4	-19 49	11.2
Tue Dec 31/Wed Jan 01	6 09	17 31	19 02	6 13	7 44	1 11	12 23	7 38	17 07	0	18 31.7	-19 03	11.2