Water-Data Report 2013

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT

Missouri Headwaters Basin
Madison Subbasin

LOCATION.--Lat 45°29'25", long 111°38'04" referenced to North American Datum of 1983, in SW ¼ SE ¼ NW ¼ sec.17, T.4 S., R.1 E., Madison County, MT, Hydrologic Unit 10020007, on right bank 500 ft downstream from Madison powerplant, 1.5 mi downstream from Ennis Lake, 5.7 mi northeast of McAllister, and at river mile 38.8.

DRAINAGE AREA.--2,186 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--October 1901 to December 1905, October 1906 to current year. Prior to October 1938 adjusted monthly runoff only, published in Water Supply Paper (WSP) 1309. Published as "below Madison Reservoir" 1938-49. Records published as "near Red Bluff" 1890-94 and as "near Norris" 1910 are not equivalent and are published as "near Norris" in WSP 1309.

REVISED RECORDS.--WSP 1559: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 4,689.03 ft (levels by U.S. Army Corps of Engineers), referenced to the National Geodetic Vertical Datum of 1929. Prior to May 7, 1941, nonrecording gage in wooden stilling well at present site at different elevation. May 7, 1941, to Jan. 13, 1945, nonrecording gages in concrete stilling well at present site and elevation.

REMARKS.--Records are good. Flow is regulated by Hebgen Lake (station number 06038000) and Ennis Lake (station number 06040500). Diversions for irrigation of about 23,000 acres occur upstream from the station. U.S. Army Corps of Engineers satellite telemeter is located at the station.

Suggested citation: U.S. Geological Survey, 2014, Water-resources data for the United States, Water Year 2013: U.S. Geological Survey Water-Data Report WDR-US-2013, site 06041000, accessed at http://wdr.water.usgs.gov/wy2013/pdfs/06041000.2013.pdf

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DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013
DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	1,270	1,460	1,480	1,530	1,580	1,480	1,610	1,250	1,690	1,230	1,170	1,170
2	1,310	1,450	1,510	1,520	1,620	1,490	1,610	1,210	1,550	1,230	1,160	1,160
3	1,360	1,450	1,560	1,480	1,620	1,580	1,600	1,170	1,420	1,360	1,160	1,170
4	1,390	1,460	1,600	1,470	1,620	1,620	1,580	1,170	1,510	1,480	1,260	1,170
5	1,410	1,480	1,660	1,470	1,620	1,610	1,550	1,170	1,620	1,510	1,290	1,170
6	1,430	1,590	1,640	1,430	1,650	1,590	1,510	1,180	1,620	1,460	1,280	1,150
7	1,440	1,700	1,670	1,360	1,650	1,590	1,370	1,190	1,620	1,640	1,210	1,150
8	1,450	1,760	1,690	1,420	1,610	1,540	1,310	1,310	1,700	1,440	1,160	1,150
9	1,450	1,760	1,680	1,460	1,570	1,500	1,310	e1,330	1,920	1,330	1,150	1,150
10	1,450	1,790	1,660	1,550	1,570	1,480	1,350	1,350	2,190	1,550	1,140	1,150
11	1,450	1,840	1,590	1,660	1,530	1,430	1,390	e1,450	2,350	1,390	1,140	1,160
12	1,380	1,820	1,550	1,600	1,480	1,480	1,410	e1,600	2,440	1,260	1,140	1,160
13	1,330	1,820	1,570	1,460	1,480	1,510	1,360	1,730	2,300	1,230	1,140	1,160
14	1,330	1,820	1,590	1,410	1,510	1,520	1,320	1,730	2,220	1,250	1,140	1,160
15	1,330	1,790	1,650	1,410	1,610	1,590	1,310	1,880	2,100	1,690	1,140	1,160
16	1,420	1,780	1,740	1,310	1,650	1,590	1,300	2,170	1,720	2,050	1,130	1,150
17	1,470	1,800	1,760	1,490	1,660	1,580	1,300	2,250	1,440	e2,110	1,130	1,240
18	1,470	1,800	1,760	1,510	1,650	1,560	1,300	2,250	1,340	1,770	1,130	1,170
19	1,460	1,790	1,710	1,560	1,600	1,550	1,300	2,310	1,220	1,310	1,220	1,150
20	1,460	1,770	1,570	1,570	1,560	1,540	1,310	2,380	1,230	1,470	1,160	1,150
21	1,460	1,770	1,450	1,670	1,540	1,540	1,310	2,320	1,220	1,690	1,190	1,150
22	1,460	1,760	1,360	1,730	1,530	1,510	1,310	1,920	1,250	1,720	1,150	1,150
23	1,460	1,750	1,370	1,650	1,530	1,420	1,330	1,680	1,260	1,540	1,150	1,150
24	1,460	1,670	1,370	1,580	1,530	1,370	1,340	1,780	1,250	1,420	1,150	1,230
25	1,460	1,510	1,360	1,640	1,550	1,360	1,340	1,950	e1,240	1,480	1,150	1,190
26	1,470	1,440	1,330	1,770	1,550	1,360	1,320	1,970	e1,230	1,490	1,150	1,150
27	1,490	1,440	1,320	1,960	1,520	1,360	1,320	1,900	1,220	1,490	1,150	1,150
28	1,510	1,440	1,490	2,080	1,500	1,360	1,310	1,810	1,210	1,500	e1,230	1,140
29	1,540	1,470	1,590	1,920	---	1,370	1,270	1,520	1,210	1,410	1,160	1,140
30	1,550	1,480	1,530	1,680	---	1,460	1,250	1,490	1,260	1,310	e1,160	1,200
31	1,500	---	1,530	1,570	---	1,520	---	1,660	---	1,350	1,170	---
Total	44,420	49,660	48,340	48,920	44,090	46,460	41,200	52,080	47,550	46,160	36,260	34,900
Mean	1,433	1,655	1,559	1,578	1,575	1,499	1,373	1,680	1,585	1,489	1,170	1,163
Max	1,550	1,840	1,760	2,080	1,660	1,620	1,610	2,380	2,440	2,110	1,290	1,240
Min	1,270	1,440	1,320	1,310	1,480	1,360	1,250	1,170	1,210	1,230	1,130	1,140
Ac-ft	88,110	98,500	95,880	97,030	87,450	92,150	81,720	103,300	94,320	91,560	71,920	69,220

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2013, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	1,854	1,924	1,501	1,391	1,398	1,443	1,540	2,022	2,979	1,872	1,506	1,599
Max	2,963	3,318	3,243	2,061	2,336	2,087	3,008	4,189	6,135	3,735	2,339	3,063
(WY)	(1960)	(1960)	(1960)	(1999)	(1943)	(1939)	(1948)	(1969)	(1997)	(2011)	(1971)	(2008)
Min	810	961	974	767	781	891	717	859	1,122	972	1,044	934
(WY)	(1942)	(1941)	(1940)	(1940)	(1940)	(1941)	(1941)	(1961)	(1992)	(1961)	(1961)	(1941)

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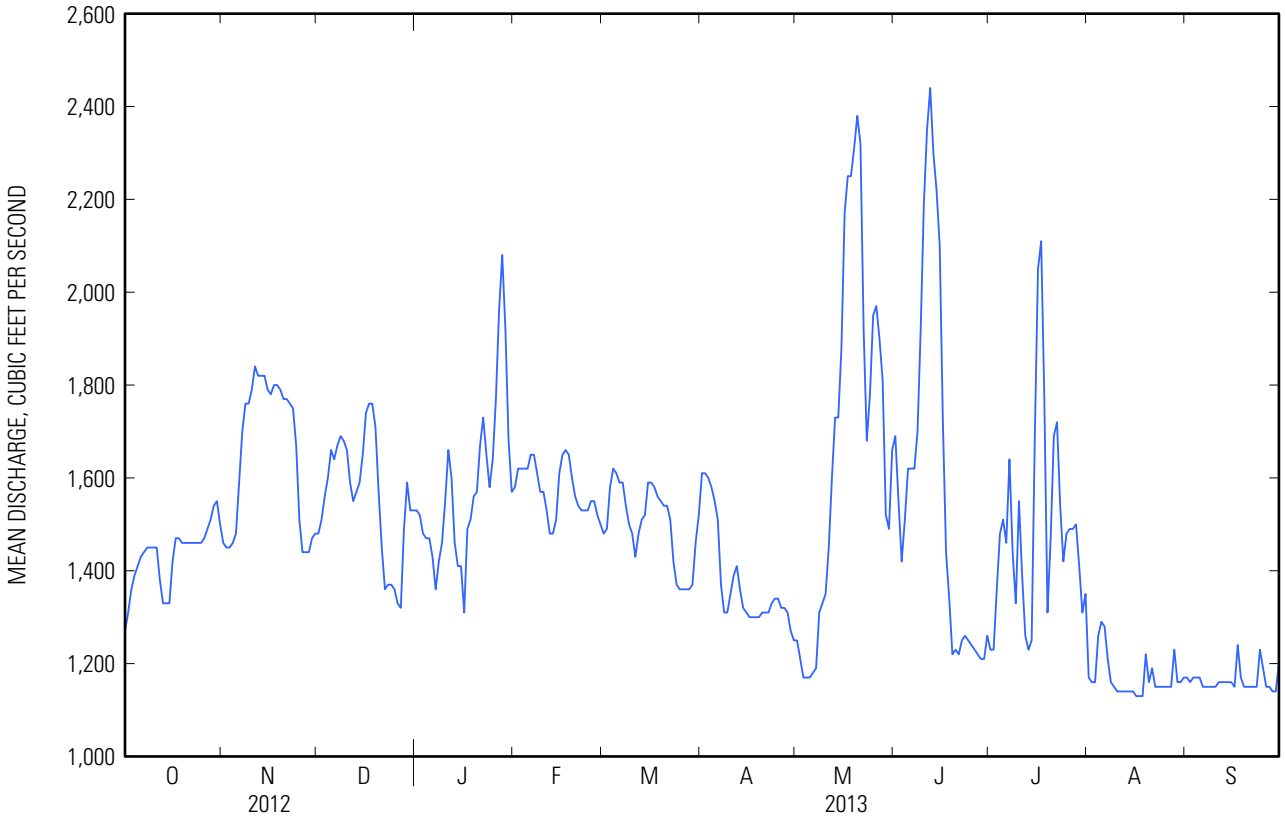
SUMMARY STATISTICS

	Calendar Year 2012		Water Year 2013		Water Years 1939 - 2013	
Annual total	642,720		540,040			
Annual mean	1,756		1,480		1,752	
Highest annual mean					2,530	1997
Lowest annual mean					1,047	1941
Highest daily mean	4,730	Jun 6	2,440	Jun 12	9,210	Jun 11, 1970
Lowest daily mean	1,150	Jan 16	1,130	Aug 16	210	Aug 25, 1959
Annual seven-day minimum	1,270	Sep 24	1,140	Aug 12	390	Aug 23, 1959
Maximum peak flow			2,850	Jul 7	9,550	Jun 12, 1970
Maximum peak stage			4.06	Jul 7	8.01	Jun 12, 1970
Annual runoff (ac-ft)	1,275,000		1,071,000		1,269,000	
10 percent exceeds	2,450		1,770		2,660	
50 percent exceeds	1,620		1,470		1,540	
90 percent exceeds	1,320		1,160		1,120	



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WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972-73, 1977 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: June 1977 to current year.

INSTRUMENTATION.--Water temperature recorder was installed June 21, 1977.

REMARKS.--Annual water temperature records were complete and rated fair except for Oct. 3, 9, 11, 22-23, Nov. 26, Dec. 26, Jan. 31, Feb. 16-17, Apr 5-6, May 9, 11-12, June 25-26, July 17, and Sept. 8-11 which are missing. Water-temperature records represent water temperature at sensor within 0.2°C.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 24.5°C, July 22 and 23, 2003 and July 28 and 29, 2006; minimum, 0.0°C several to many days during winter months most years.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum and minimum may have been exceeded during period of missing record. Maximum recorded, 24.3°C, July 5; minimum recorded, 0.1°C, January 16.

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
		October			November			December			January	
1	15.8	15.2	15.5	6.0	5.8	5.9	3.4	2.3	2.6	1.4	1.1	1.3
2	15.6	15.1	15.4	6.2	5.9	6.0	3.7	3.2	3.5	1.2	0.9	1.1
3	---	---	---	6.4	6.1	6.2	3.2	2.6	2.8	1.4	1.0	1.2
4	13.5	12.2	12.8	6.7	6.3	6.5	3.0	2.4	2.5	1.5	1.2	1.4
5	12.2	10.6	11.4	6.9	6.5	6.7	2.7	2.4	2.5	1.7	1.4	1.5
6	10.6	9.6	9.9	7.0	6.7	6.9	2.7	2.2	2.3	2.0	1.6	1.8
7	9.8	9.0	9.3	7.3	6.8	7.0	2.3	1.7	2.0	1.9	1.7	1.8
8	9.4	8.8	9.1	7.3	6.1	6.7	1.7	1.1	1.4	1.9	1.7	1.8
9	---	---	---	6.1	4.8	5.5	1.1	0.4	0.7	1.8	1.7	1.8
10	8.5	8.0	8.3	4.8	2.3	3.4	1.0	0.7	0.9	1.7	1.1	1.5
11	---	---	---	2.3	1.4	1.7	1.1	1.0	1.1	1.1	0.8	0.9
12	9.0	8.0	8.5	1.9	1.5	1.7	1.3	1.1	1.2	1.0	0.8	0.9
13	9.2	8.9	9.0	1.7	1.2	1.4	1.3	1.1	1.2	0.9	0.7	0.8
14	9.3	8.8	9.1	1.6	1.1	1.3	1.2	1.1	1.2	0.7	0.6	0.7
15	9.3	9.1	9.2	1.7	1.4	1.5	1.2	0.8	1.1	0.9	0.7	0.8
16	9.3	9.1	9.2	1.5	1.2	1.3	1.0	0.8	0.9	0.9	0.1	0.7
17	9.1	8.6	8.9	1.8	1.4	1.6	1.1	0.8	1.0	1.1	0.7	0.9
18	8.6	8.1	8.3	1.7	1.4	1.5	1.0	0.8	0.9	1.0	0.8	0.9
19	8.3	7.9	8.1	2.7	1.4	1.9	1.0	0.8	0.9	1.1	0.8	0.9
20	8.3	8.1	8.2	3.7	2.7	3.1	1.0	0.7	0.9	1.1	0.9	1.0
21	8.1	7.7	7.9	4.1	3.6	3.8	1.4	1.0	1.2	1.1	0.8	1.0
22	---	---	---	3.7	3.1	3.3	1.6	1.3	1.5	1.1	0.7	0.9
23	---	---	---	3.2	2.5	2.7	1.5	1.4	1.5	1.3	0.9	1.1
24	6.7	6.1	6.3	2.5	2.1	2.2	1.6	1.2	1.4	1.3	1.1	1.2
25	6.2	5.6	5.9	2.3	1.9	2.2	1.4	1.3	1.3	1.4	1.0	1.2
26	5.6	4.6	5.1	---	---	---	---	---	---	1.6	1.3	1.4
27	4.6	4.1	4.3	1.1	0.8	0.9	1.5	1.4	1.5	1.5	1.3	1.4
28	4.5	4.2	4.3	1.2	0.9	1.0	1.4	1.1	1.3	1.3	1.0	1.2
29	5.2	4.5	4.9	2.0	1.2	1.4	1.3	0.9	1.1	1.2	0.9	1.0
30	5.4	5.1	5.2	2.3	1.8	2.0	1.4	1.2	1.3	1.2	0.9	1.0
31	5.8	5.3	5.5	---	---	---	1.3	1.1	1.2	---	---	---
Month	---	---	---	---	---	---	---	---	---	---	---	---

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
		February			March			April			May	
1	1.2	0.9	1.0	1.9	1.4	1.6	4.9	3.8	4.3	10.1	9.1	9.4
2	1.1	0.7	0.9	2.1	1.5	1.8	6.6	4.6	5.4	9.7	8.7	9.2
3	1.3	0.9	1.1	2.2	1.9	2.0	9.0	6.6	7.5	10.0	9.4	9.8
4	1.3	1.1	1.2	2.3	1.8	2.0	9.5	8.7	9.1	9.9	9.5	9.6
5	1.4	1.1	1.3	2.4	1.7	2.1	---	---	---	10.2	9.1	9.6
6	1.5	1.3	1.4	2.6	2.4	2.5	---	---	---	11.0	9.9	10.5
7	1.6	1.2	1.4	3.1	2.4	2.7	8.9	7.9	8.5	11.7	10.3	11.0
8	1.7	1.5	1.6	3.3	2.8	3.1	7.9	6.5	7.3	12.4	11.0	11.7
9	1.9	1.5	1.6	3.6	3.0	3.3	6.5	4.8	5.4	---	---	---
10	1.8	1.5	1.6	3.7	3.1	3.4	4.8	3.4	3.9	14.7	13.4	14.0
11	1.7	1.2	1.5	4.2	3.7	3.9	5.0	3.6	4.1	---	---	---
12	1.6	1.3	1.4	4.5	4.0	4.2	5.5	4.7	5.0	---	---	---
13	1.6	1.3	1.4	5.0	4.4	4.7	5.7	5.3	5.5	17.0	16.3	16.7
14	1.5	1.2	1.3	5.1	4.6	4.8	5.6	5.2	5.5	17.0	16.2	16.7
15	1.4	1.0	1.2	5.1	4.7	4.9	5.2	4.5	4.8	16.8	16.2	16.4
16	---	---	---	5.2	4.7	5.0	4.5	3.2	3.9	16.2	15.5	15.7
17	---	---	---	5.2	4.7	4.9	3.2	2.2	2.7	15.6	15.1	15.3
18	1.2	0.8	1.0	5.1	4.5	4.8	3.1	2.4	2.8	15.2	14.7	14.9
19	1.3	0.8	1.1	5.0	4.0	4.7	3.9	3.0	3.3	14.8	13.8	14.3
20	1.4	1.1	1.3	4.0	2.6	3.4	4.8	3.9	4.2	13.8	12.9	13.2
21	1.5	1.2	1.4	3.8	2.2	3.0	5.2	4.7	4.9	14.3	12.4	13.1
22	1.4	1.2	1.3	3.7	2.0	2.5	6.2	5.0	5.6	14.5	13.2	13.6
23	1.5	1.1	1.3	3.2	2.3	2.8	5.4	3.5	4.3	13.2	12.2	12.6
24	1.4	1.1	1.2	3.2	2.5	2.8	5.2	4.2	4.7	12.7	12.1	12.4
25	1.2	0.8	1.0	3.0	2.1	2.5	6.8	5.2	5.9	12.7	12.1	12.3
26	1.4	0.9	1.1	3.5	2.4	3.0	9.0	6.4	7.4	12.9	11.9	12.3
27	1.4	0.8	1.1	4.1	3.1	3.5	10.7	8.8	9.6	13.4	12.5	12.9
28	1.5	1.0	1.3	4.6	3.6	4.1	11.1	10.6	10.8	13.4	12.9	13.2
29	---	---	---	4.7	4.2	4.5	11.1	9.7	10.5	13.6	13.1	13.3
30	---	---	---	4.8	4.0	4.4	10.8	9.7	10.3	13.4	13.2	13.3
31	---	---	---	5.1	4.2	4.7	---	---	---	13.5	12.8	13.2
Month	---	---	---	5.2	1.4	3.5	---	---	---	---	---	---

06041000 MADISON RIVER BELOW ENNIS LAKE, NEAR MCALLISTER, MT—Continued

TEMPERATURE, WATER, DEGREES CELSIUS
WATER YEAR OCTOBER 2012 TO SEPTEMBER 2013

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
		June			July			August			September	
1	13.7	12.5	13.0	21.0	19.2	20.0	21.8	20.9	21.4	20.5	19.7	20.1
2	14.1	13.1	13.7	22.6	20.3	21.4	21.0	20.5	20.7	20.3	19.9	20.0
3	13.5	12.9	13.3	23.2	21.5	22.4	21.3	20.5	20.8	20.3	19.7	20.0
4	13.1	12.6	12.8	23.8	22.1	23.0	20.7	19.9	20.4	20.5	19.7	20.1
5	13.8	12.4	13.0	24.3	23.6	24.0	20.7	20.0	20.4	20.8	20.3	20.4
6	14.7	13.3	13.9	24.2	23.7	23.9	20.9	20.1	20.5	20.5	20.2	20.4
7	16.5	13.8	15.0	23.8	23.0	23.4	21.4	20.1	20.8	20.6	20.3	20.4
8	17.6	15.4	16.5	23.0	22.2	22.5	21.0	20.2	20.6	---	---	---
9	18.7	17.1	17.8	22.6	21.7	22.2	21.0	20.3	20.6	---	---	---
10	19.1	17.9	18.4	23.2	22.3	22.8	21.0	20.3	20.6	---	---	---
11	18.8	18.0	18.4	23.1	21.9	22.5	20.5	20.0	20.2	---	---	---
12	18.3	17.5	17.9	21.9	21.3	21.5	20.0	19.5	19.8	19.0	18.7	18.8
13	18.1	17.1	17.5	21.4	20.9	21.1	20.1	19.4	19.7	19.3	18.7	18.9
14	17.1	16.3	16.6	21.3	20.4	20.8	20.1	19.2	19.6	19.0	18.6	18.8
15	17.5	15.8	16.4	21.5	20.5	21.0	20.1	19.1	19.6	18.7	18.1	18.5
16	17.5	16.5	17.1	21.5	20.3	20.7	20.7	19.4	20.0	18.7	18.1	18.4
17	17.5	15.9	16.8	---	---	---	21.2	20.2	20.7	18.1	17.3	17.8
18	18.9	16.5	17.8	21.4	20.2	20.7	20.9	19.9	20.5	17.4	16.4	17.0
19	18.8	17.7	18.4	22.2	20.9	21.5	21.6	20.7	21.1	16.4	15.9	16.2
20	17.8	16.2	16.9	21.9	20.7	21.4	21.9	21.1	21.6	16.4	15.8	16.1
21	16.2	15.9	16.0	22.9	21.6	22.2	21.8	21.2	21.6	16.1	15.6	15.8
22	16.3	15.8	16.0	23.0	22.3	22.7	21.5	20.8	21.1	16.0	15.5	15.7
23	16.4	15.6	16.0	22.9	22.3	22.6	21.3	20.8	21.0	15.6	15.0	15.3
24	16.8	15.9	16.3	23.1	22.2	22.7	21.0	20.3	20.6	15.0	13.9	14.6
25	---	---	---	23.1	22.4	22.8	20.7	20.0	20.3	13.9	12.9	13.4
26	---	---	---	23.1	22.2	22.8	20.5	20.1	20.3	12.9	12.0	12.3
27	17.9	16.5	17.2	23.1	22.3	22.7	20.4	20.0	20.2	12.0	11.1	11.4
28	19.3	17.4	18.2	22.3	21.8	22.0	20.2	19.8	20.0	11.3	10.5	11.0
29	19.6	18.5	19.0	22.3	21.6	22.0	20.2	19.6	19.9	10.5	9.4	10
30	20.2	19.4	19.8	22.2	21.4	21.7	20.6	20.0	20.3	9.5	8.9	9.2
31	---	---	---	21.6	20.9	21.3	20.6	19.8	20.1	---	---	---
Month	---	---	---	---	---	---	21.9	19.1	20.5	---	---	---