

Submission Cover Sheet

Fingerboards Mineral Sands Project Inquiry and Advisory
Committee - EES

787

Request to be heard?: Yes

Full Name: Robert Neil Barraclough

Organisation:

Affected property:

Attachment 1:

Attachment 2:

Attachment 3:

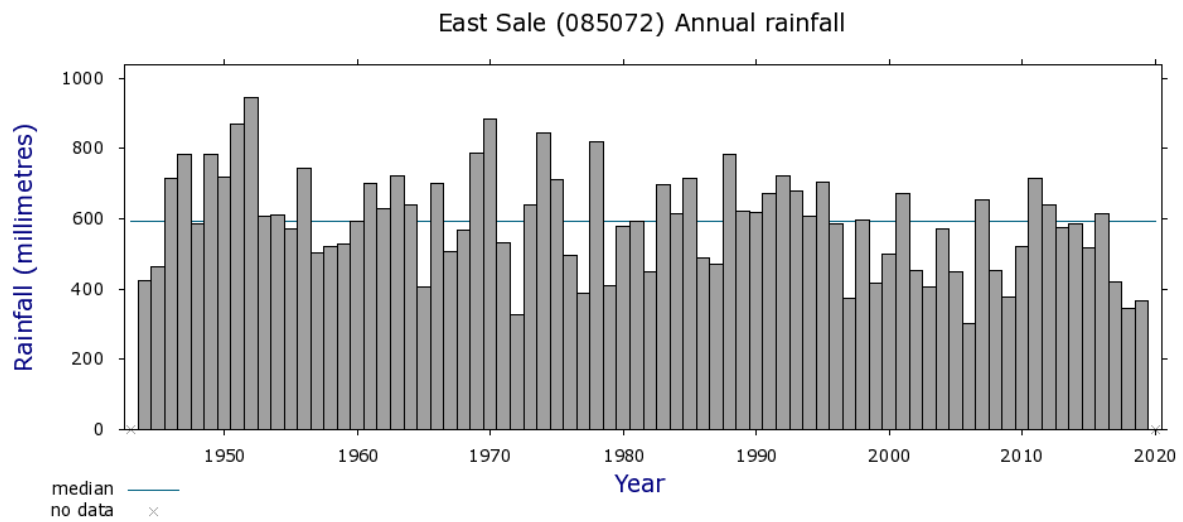
Comments: See attached submission.

Rainfall decline and the intention to allocate water to the Glenaladale Sandmine.

The best rainfall record for East Gippsland I can find is the East Sale record from April 1943 to the present.

http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_stn_num=085072

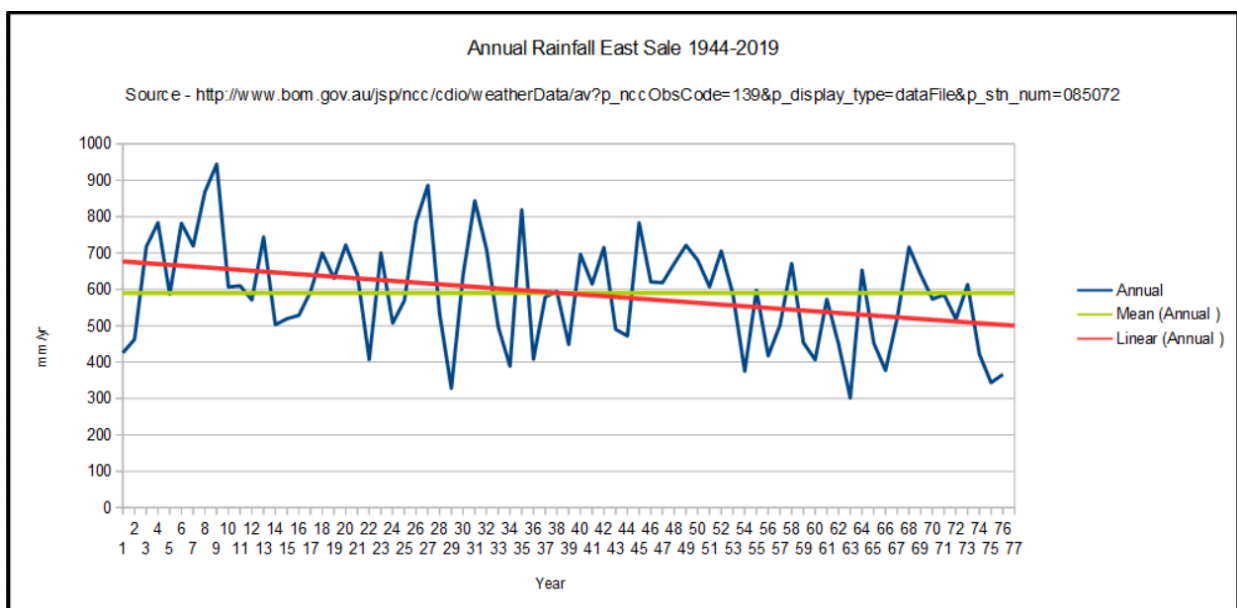
Graph 1.



Climate Data Online, Bureau of Meteorology
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Graph 2.

There is a clear long term decline in rainfall over the period of the record, particularly from 1996 to the present.



The decline in the rainfall record has been predominately since 1996 and the rainfall decline has been evident in the reduced number of high rainfall events. Appendix 1 has the months and years in the rainfall record 95% decile (highest) highlighted.

From 1945-1995 there were 41 years in the 95% decile, from 1996-2019 there were 6 years in the 1996 to 2019. The last time East Sale had a month in the 95% decile was July 2016.

To raise a few consequences of this aspect of the rainfall decline-

- 1. It is these rainfall events that fill farm dams.**
- 2. It is these rainfall events that recharge the aquifers.**
- 3. It is these events that give us the floods to flush the salt out of the Gippsland Lakes.**

Lets look at farm dams, Louie Maher of Meerlieu standing in a near dry dam on the 28th October 2020 after the farm has received 87.5mm of rain so far in October, Meerlieu averages 57.5mm of rain in October.



Another farm dam, Allen Sheridan standing in his near dry dam on 28th October 2020



We are not getting the rainfall events to recharge the aquifers that we have got in the past and dryland and cattle farming across Gippsland is becoming totally dependent on bore water for livestock.

Allocations of water from any aquifer cannot be even considered for the proposed sandmine at Glenaladale because of the potential for it to deplete the aquifers that will be needed for stock and domestic water.

It has been suggested that the mine extract water from the Latrobe aquifer which Sale draws its water supply from, it simply can't even be considered.

Environmental flows into the Gippsland Lakes.

The catchment of the Gippsland Lakes has been subject to similar rainfall decline, particularly since 1996, the next thing we need to understand is that we have an altered catchment to the detriment of stream flows.

To understand issues affecting the Mitchell River Catchment start with Alfred Howitt's observations of changes in the Gippsland environment with the disposition of the Aborigines and the end of their management with regular low intensity fire.

[https://www.parliament.vic.gov.au/images/stories/committees/SCEP/Fire_Season_Preparedness/Submissions/Submission_45 - The Gippsland Apiarists Association-Attachment_1.pdf?fbclid=IwAR0bwJuHPjyi2aoRI9cXch0lC70ispJD99UHAI_hb-CfMI7eKjJoHI02NY](https://www.parliament.vic.gov.au/images/stories/committees/SCEP/Fire_Season_Preparedness/Submissions/Submission_45_-_The_Gippsland_Apiarists_Association-Attachment_1.pdf?fbclid=IwAR0bwJuHPjyi2aoRI9cXch0lC70ispJD99UHAI_hb-CfMI7eKjJoHI02NY)

The forested country largely changed from widely spaced eucalypts with an open grassy understorey to a far greater density of eucalypts with increasing amounts of scrub in the understorey, these

changes would have significantly reduced the amount of water seeping into the sub soil and stream flow. The highest rainfall areas in the catchment are in the high elevation parts of the catchment and early cattlemen managed their high country leases with regular low intensity burns, I am not in a position to say the degree that it replicated Aboriginal burning but it kept the high country open and helped maintain stream flows.

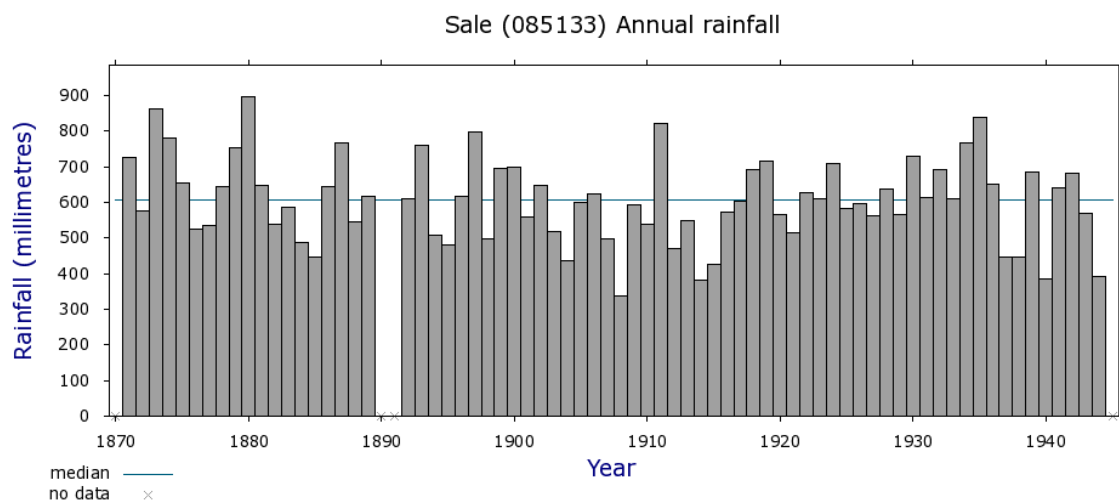
The cattlemen were largely prevented from burning across many parts of Gippsland from the start of last century up till the fires of 1939, from then onwards there was very little protective burning done and the high elevation catchment has suffered many intense environmentally damaging fires, particularly since the Caledonia fire of 1998. Hot fires since 1978 have either left a barren moonscape in some instances or germinated a thick scrubby understorey with a massive germination of eucalypts in over the vast majority of the area. The germination of scrub and eucalypts after these fires will significantly reduce water flowing into the Mitchell which will reduce the availability of water available for irrigation on the Lindenow flats, this will be extremely detrimental to local employment and Victorian food production.

There will be no future water available for the Glenaladale sand mine without a massive impact on vegetable growing on the Lindenow flats and a massive impact on the health of the Gippsland Lakes.

High rainfall parts of the Latrobe River catchment have also been subject to hot fires in the last decade and much of all the other river catchments flowing into the Gippsland Lakes have been subject to one or more fires since 1998. The necessary environmental flows will very likely not be there even without the Glenaladale Sand Mine taking water out of the Mitchell with a further rainfall decline which is to be expected.

Understanding the rainfall decline. East Sale’s rainfall record is particularly valuable as there is an archived record from Sale 5km away from August 1870 to July 1945 http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=ataFile&p_stn_num=085133

Graph 3.



Appendix 2 was written as a submission in 2008 in relation link between solar activity and rainfall in Eastern Australia, the higher the solar activity the higher the rainfall. There appears to be a number of factors influencing rainfall in Eastern Australia including cycles in volcanic activity as described in the submission of 2008.

Lets look at the rainfall from 1945 to the present in 10 year averages

1945-1954 av 703mm

1955-1964 av 613mm

1965-1974 av 619mm

1975-1984 av 570mm

1985-1994 av 637mm

1995-2004 av 573mm

Now the earlier record back to 1895

1895-1904 av 594mm

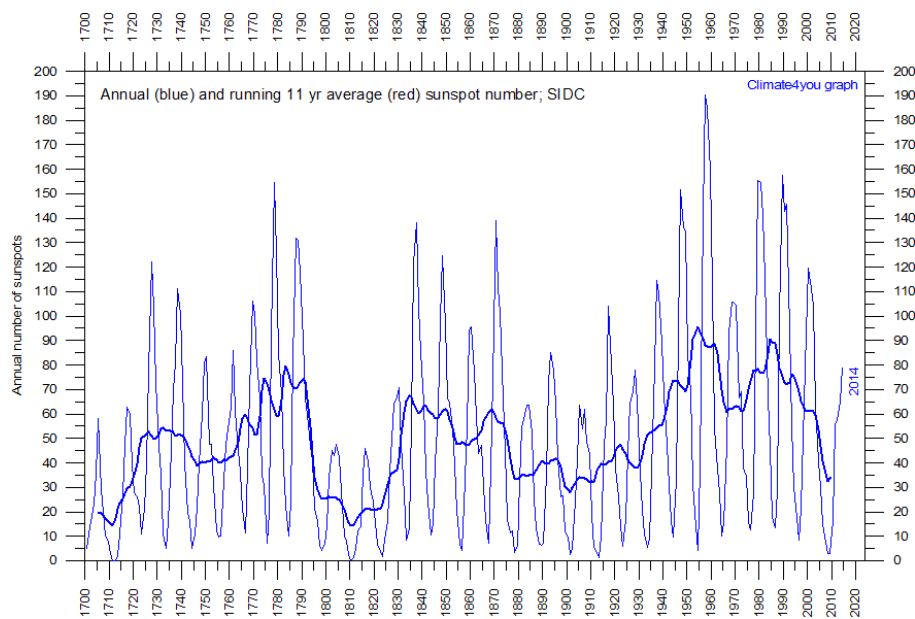
1905-1914 av 590mm

1915-1924 av 603mm

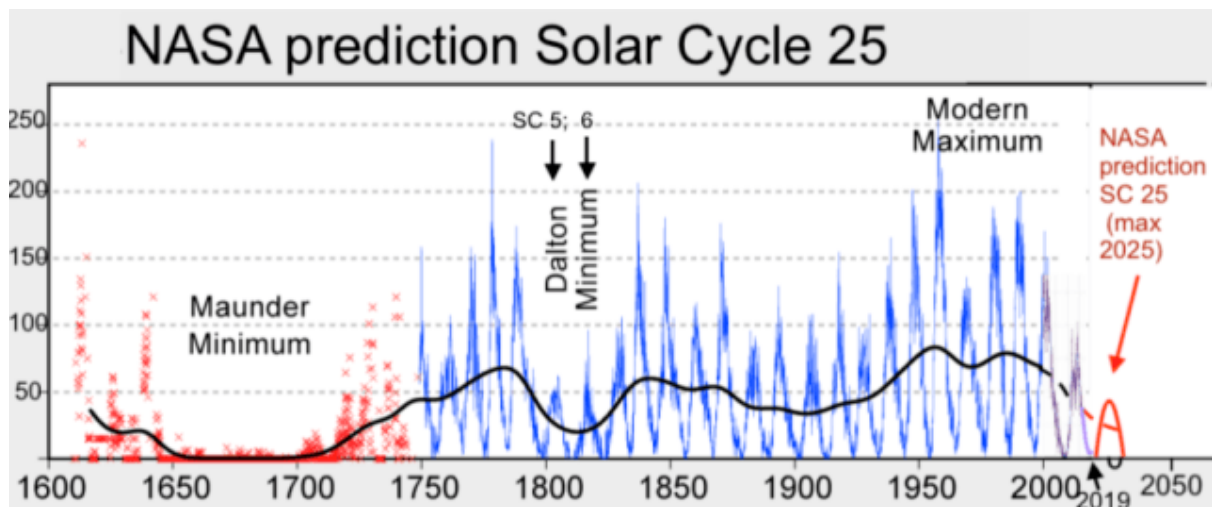
1925-1934 av 636mm

1935-1944 av 573mm

Graph 4



Graph 5



There appears to be no other explanation for the evidence of megadroughts described in the than that they occurred during the period of the Maunder Minimum as shown in Graph 5 above and these are the conditions that the worlds solar scientists are predicting for the coming several decades.

There appears to be a relationship between solar activity and rainfall in the combination of the two Sale rainfall records and solar activity is predicted to decline significantly over the coming decades.

Taken from the attached submission-

Max Leitch, in his book "A Recipe for Disaster" gives an observation

from his property on the Murrumbidgee that suggests that eastern

Australia may have had some very long dry periods in the recent past.

"There is ample evidence to suggest that dry cycles can last half a century or more. On my property there is a large lagoon about one hundred acres in area and some 30-odd feet deep. It has been the main river channel at some bygone age, set in the middle of a flood plain that fills from the river when the river reaches 23 feet. It has been suggested that the mouth silted up but this is not possible because the water from the river runs in from both sides and both ends at

once. This lagoon has been dry twice since white men took up the country in 1840- once in 1914 when it was dry for a few months, and in 1945 to 1950. It has a local catchment that puts some water in it every year and it normally takes ten years to go dry if it is not filled by the river. The amazing thing about this lagoon is that right in the bottom there were quite large dead trees that must have taken at least 50 years to grow, so it must have been bone dry for that length of time."

I have been told of an instance of what were said to be around 50 year old dead trees in a in a swamp at Longford that dried up for the first time in 1915 and a similar instance in a pool of Carr's Creek near Seaspray when the water level dropped around 2m in 1944. The predictions of several decades of very low solar activity suggest that we are returning to the megadrought conditions indicated by the description of the dead trees in the billabong on the Murrumbidge and the accounts of similar here in Gippsland.

An allocation of the amount of water needed for the Glenaladale Sandmine would be lunacy.

I would welcome the opportunity to address any public hearings.

Neil Barraclough

http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_stn_num=085072

Details

Station: East Sale

Number: 85072

Opened: 1943

Now: Open

Lat: 38.12° S

Lon: 147.13° E

Elevation: 5 m

No highlight

Key: Units are millimetres. 12.3 = Not quality controlled.

Period for calculating statistics: All years 1961-1990

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Graph													
1943				2.8	36.4	54.9	23.3	87.4	57.0	27.4	30.0	43.9	
1944	13.3	1.6	39.6	65.5	122.8	16.3	14.0	27.8	29.7	34.9	26.3	33.7	425.5
1945	53.2	22.9	26.8	60.4	31.5	24.9	37.7	33.6	43.9	49.5	68.3	9.9	462.6
1946	84.3	110.7	62.3	69.9	15.5	56.8	27.7	45.3	45.8	46.2	99.2	53.2	716.9
1947	10.3	46.6	132.9	145.0	18.6	50.4	60.8	47.3	47.7	67.1	39.9	116.6	783.2
1948	52.9	33.4	12.7	49.1	141.6	28.6	19.8	25.5	30.8	119.6	26.4	46.2	586.6
1949	92.6	55.5	91.8	22.3	72.4	60.5	72.6	20.6	23.3	108.4	139.3	22.5	781.8
1950	14.6	80.9	176.0	48.5	35.2	20.5	19.7	37.3	52.8	156.9	26.6	50.3	719.3
1951	29.4	199.7	2.8	57.6	34.6	79.2	67.8	175.9	41.4	75.6	59.8	44.3	868.1
1952	22.6	27.8	120.2	94.4	71.2	170.3	49.8	65.4	37.0	74.2	93.3	118.0	944.2

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1953	55.3	39.5	2.2	22.4	38.1	44.3	44.9	63.1	52.2	141.3	80.5	22.8	606.6
1954	81.0	30.9	9.5	16.1	17.0	85.9	22.5	42.9	23.0	43.9	168.8	68.3	609.8
1955	11.4	58.2	45.5	14.9	67.3	33.0	31.5	36.9	69.6	76.5	24.4	101.8	571.0
1956	154.5	30.3	83.2	37.1	87.1	63.9	31.4	53.2	54.6	67.7	56.1	24.7	743.8
1957	10.7	40.4	37.2	16.9	30.2	40.8	74.2	46.5	46.3	71.6	52.4	35.9	503.1
1958	7.4	81.7	21.3	10.7	46.0	49.1	39.0	54.0	38.9	81.0	56.7	33.6	519.4
1959	21.5	17.9	33.2	30.5	9.9	46.5	13.7	42.5	112.9	76.2	54.1	69.7	528.6
1960	9.7	15.0	14.6	41.5	85.0	39.8	57.1	44.2	75.4	37.9	110.3	63.3	593.8
1961	64.4	17.7	133.4	43.8	41.8	42.1	106.3	69.9	54.2	72.0	25.9	28.5	700.0
1962	124.9	24.8	11.4	34.8	105.1	31.3	23.8	46.7	53.8	71.5	23.3	78.8	630.2
1963	90.6	33.6	41.2	27.9	189.7	31.5	58.5	70.2	58.4	38.2	32.7	49.4	721.9
1964	8.8	40.6	37.3	75.1	34.4	60.2	57.6	66.6	65.6	84.0	20.8	88.2	639.2
1965	13.0	3.1	22.5	72.1	17.7	17.5	18.7	55.7	32.8	26.2	99.0	29.0	407.3
1966	30.8	56.9	65.7	56.5	31.3	42.6	41.1	42.6	72.2	69.0	71.5	120.1	700.3
1967	22.6	17.5	68.1	20.3	78.1	51.0	28.5	58.9	50.1	23.7	50.9	37.5	507.2

[top](#)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1968	34.4	0.0	45.8	44.2	68.6	35.1	40.3	48.5	30.0	53.3	57.0	112.1	569.3
1969	31.3	101.1	73.8	49.3	84.2	77.3	29.8	36.0	53.1	47.6	140.4	62.3	786.2
1970	83.2	14.6	153.9	68.8	105.2	19.4	17.7	74.7	74.2	27.9	93.3	152.9	885.8
1971	91.1	36.4	63.1	25.2	35.0	28.0	7.9	12.9	56.0	59.0	65.9	52.7	533.2
1972	34.5	28.0	12.5	22.7	24.8	4.1	14.4	63.0	40.6	46.8	34.9	1.8	328.1
1973	49.4	126.9	59.1	40.1	13.3	40.3	23.8	61.0	32.0	58.7	82.6	52.0	639.2
1974	58.8	30.6	6.6	63.5	86.4	46.2	167.4	111.8	53.2	72.8	107.8	38.6	843.7
1975	30.8	45.2	23.4	70.2	29.0	72.6	33.6	80.6	49.6	110.8	40.2	124.0	710.0

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1976	22.6	20.8	34.2	13.2	10.0	37.4	6.8	77.0	63.8	80.0	98.0	33.0	496.8
1977	17.4	41.6	36.0	67.6	15.6	56.6	46.0	19.0	53.2	10.8	19.6	5.4	388.8
1978	44.8	31.6	60.4	30.6	168.0	195.2	51.6	25.8	61.0	41.0	35.2	73.6	818.8
1979	48.8	18.4	74.2	32.0	36.6	6.8	7.4	47.8	39.8	52.6	35.0	8.8	408.2
1980	118.3	2.4	38.6	37.2	40.8	28.6	26.4	23.6	49.2	59.0	60.6	94.8	579.5
1981	55.0	32.2	56.4	6.8	150.2	39.0	34.4	58.2	25.6	45.4	51.2	39.6	594.0
1982	99.8	2.6	141.6	17.2	26.6	12.6	14.2	11.2	47.0	24.0	16.0	35.8	448.6
1983	31.2	4.4	86.8	82.4	156.8	30.8	41.0	37.2	93.2	76.8	29.8	25.8	696.2
1984	66.2	38.4	31.6	131.4	20.6	22.2	88.2	41.6	63.4	29.4	37.4	44.6	615.0
1985	27.2	7.4	74.4	92.4	32.8	67.4	36.4	50.6	30.6	62.8	105.0	128.2	715.2
1986	65.2	14.8	5.0	34.4	37.4	26.8	47.8	31.6	39.0	71.8	71.0	45.6	490.4
1987	42.2	46.2	41.2	17.4	27.0	37.2	75.8	23.8	30.8	28.2	35.0	67.2	472.0
1988	34.6	11.2	34.8	133.0	158.4	15.8	48.4	38.6	84.0	36.2	137.4	51.0	783.4
1989	15.2	16.8	101.8	56.4	50.4	68.2	80.2	35.6	47.0	90.0	34.0	24.8	620.4
1990	1.4	46.4	76.8	120.8	37.6	12.2	28.2	61.6	79.4	86.0	42.4	25.8	618.6
1991	120.4	7.8	61.4	34.0	16.6	93.6	89.8	55.4	76.6	30.6	18.6	66.6	671.4
1992	42.0	45.8	44.8	40.8	40.2	74.6	14.8	35.2	97.4	35.4	103.0	147.2	721.2

[top](#)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1993	44.2	46.8	56.6	19.2	15.6	46.4	78.4	14.8	204.6	42.2	46.4	64.6	679.8
1994	39.0	165.8	28.8	34.0	51.6	33.8	13.8	16.8	39.6	32.4	116.6	35.0	607.2
1995	79.6	69.4	10.8	38.2	66.6	56.6	47.2	26.4	38.0	129.6	101.4	41.6	705.4
1996	74.0	62.2	38.4	82.0	33.2	33.2	64.6	43.8	53.8	17.6	63.2	20.2	586.2
1997	29.2	11.8	41.8	8.6	31.4	51.2	24.2	22.2	49.2	35.4	44.4	25.4	374.8
1998	33.2	40.8	15.2	16.2	12.2	134.2	20.0	30.0	45.4	89.4	94.0	66.6	597.2

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1999	65.0	33.8	43.2	19.2	34.6	14.2	19.8	29.4	21.4	47.6	16.8	72.4	417.4
2000	40.4	19.4	26.4	27.0	84.4	15.0	30.8	33.2	65.8	87.8	55.0	15.8	501.0
2001	41.6	25.0	46.8	97.8	32.2	36.2	60.8	65.8	43.6	77.8	76.6	67.2	671.4
2002	29.8	75.6	33.2	100.6	25.2	40.0	20.6	4.2	36.8	28.0	36.6	23.2	453.8
2003	6.4	17.8	27.6	31.0	10.0	43.2	31.2	54.2	32.6	85.6	32.4	34.6	406.6
2004	44.0	32.6	9.2	136.6	33.0	24.6	31.2	40.8	59.2	39.4	75.2	47.0	572.8
2005	33.4	57.4	16.4	25.4	14.2	20.0	76.0	35.0	38.0	22.8	64.0	46.8	449.4
2006	40.8	13.2	12.2	40.6	32.8	12.2	29.8	37.0	39.6	8.6	21.0	13.8	301.6
2007	7.0	109.8	57.0	50.8	15.4	122.2	57.8	31.0	16.4	21.6	113.4	50.4	652.8
2008	58.0	58.4	7.6	15.2	43.8	9.8	33.2	42.2	11.6	7.0	116.6	49.2	452.6
2009	3.2	26.8	19.0	39.0	23.8	15.8	25.6	40.2	63.8	43.8	39.4	37.0	377.4
2010	32.2	70.0	47.2	24.8	42.0	32.2	10.4	40.0	15.6	60.4	64.0	83.0	521.8
2011	39.4	96.8	60.8	50.4	33.4	23.0	70.2	47.8	53.4	54.8	134.8	51.2	716.0
2012	45.4	83.0	96.4	21.8	81.4	90.6	14.0	45.8	41.4	33.2	55.6	32.0	640.6
2013	4.4	56.0	38.6	52.5	12.6	169.4	23.2	38.0	60.0	49.6	37.0	32.0	573.3
2014	22.0	14.2	44.4	62.0	27.6	52.2	24.2	41.6	49.8	57.4	65.6	124.4	585.4
2015	38.2	57.8	24.4	100.8	24.2	30.8	26.2	90.0	13.6	21.0	44.2	46.6	517.8
2016	104.8	6.2	60.6	26.0	37.8	73.0	102.4	26.2	36.0	63.4	53.4	23.6	613.4
2017	11.6	29.4	22.6	51.0	15.0	10.0	16.4	44.8	31.2	51.0	20.2	118.6	421.8
2018	44.0	15.4	18.4	10.4	28.4	15.8	35.2	23.0	26.8	33.8	68.8	23.6	343.6
2019	18.4	41.4	21.2	8.0	52.8	30.4	41.0	34.4	36.6	18.6	55.6	7.8	366.2
2020	82.2	53.2	33.0	93.2	29.4	17.8	72.4	27.4	12.6				

View a year of daily data



Summary statistics for all years

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	44.9	42.2	47.9	48.1	49.7	46.7	41.2	45.5	49.7	56.3	62.3	54.0	589.6
Lowest	1.4	0.0	2.2	2.8	9.9	4.1	6.8	4.2	11.6	7.0	16.0	1.8	301.6
5th %ile	6.9	3.0	7.4	10.1	12.5	11.9	13.2	16.5	16.3	18.4	20.1	9.7	372.6
10th %ile	10.1	7.6	11.2	15.1	15.3	14.8	14.1	22.8	24.9	23.3	24.0	21.6	407.0
Median	39.0	33.4	38.6	39.5	34.6	38.2	32.3	41.9	47.0	51.0	55.6	46.2	593.9
90th %ile	90.8	82.2	93.6	95.4	105.1	81.2	75.9	70.0	74.6	88.4	111.5	117.2	782.5
95th %ile	107.5	110.0	133.0	122.4	151.2	124.0	88.4	81.6	85.4	112.6	135.3	124.1	825.0
Highest	154.5	199.7	176.0	145.0	189.7	195.2	167.4	175.9	204.6	156.9	168.8	152.9	944.2