

Heatwave and maximum temperature probabilities

TEMPERATURE extremes are of major significance to agriculture in Queensland. Both frosts and heatwaves are a regular part of the Queensland climate.

To enable sound planning of production, it is necessary to be aware of the risk of occurrence of either of these climatic hazards. A previous article (*Queensland Agricultural Journal*, March–April 1978) discussed frost and minimum temperature probabilities.

Heatwaves and high maximum temperatures can also cause significant losses although in practice they frequently occur in association with moisture stress and low relative humidity and it can be difficult to isolate the effects of individual factors. Heatwave is taken here to mean a succession of days with the maximum temperature exceeding a specified

critical level. The critical level employed will depend on the susceptibility of the plant or animal under consideration.

Effects of high temperatures

Temperature has a direct effect on the growth rates of plants and high temperatures above the optimum for growth result in reduced growth rates. However, perhaps more serious are the damaging effects of high temperatures and heatwaves when they occur at critical stages of development.

For example, in a sorghum crop, significant yield reduction can result if a heatwave (with a maximum temperature of 38°C or greater) occurs at the time of head emergence as the flowers enclosed in that section of the head not yet emerged are killed.

In sunflowers, the temperature during the seed-filling stage is important in the determination of oil quality; high temperatures being associated with reduced quality. In a

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number of crops, high temperatures immediately after flowering may interfere with pollination and this will decrease yields. However, low humidities generally associated with days of high temperature are also known to reduce pollen viability. The seasonal growth pattern and composition of pasture communities is also known to be influenced by the occurrence of heatwaves.

High temperatures also have direct effects on livestock. Cattle are known to suffer loss of appetite and decreased feed intake and bulls subjected to temperature stress incur seminal degradation. Prolonged heat stress can cause death and in some regions is a major factor in calf losses.

With sheep, heat-induced seminal degradation in rams is one factor causing high incidence of fertilization failure and heat stress on ewes during pregnancy is a factor causing embryo mortality and low birth weight with subsequent poor lamb survival. In the poultry industry, heat stress associated with temperatures above 35°C can cause death of birds and serious losses.

In most of these cases, the farmer must take preventative measures as little can be done when the heatwave occurs. With crops, it is necessary to adjust the time of planting and the variety used so that the risk of encountering a heatwave at the critical stage of development is kept at an acceptable level. With livestock, heat stress and its effects can be avoided by handling animals in the cool part of the day, providing shade, avoiding overcrowding, manipulating the mating period and breeding for better adapted animals.

With poultry in areas that experience heatwaves, the avoidance of losses due to heat stress is best achieved in the design and siting of the shed. Good ventilation and orientation to make best use of natural breezes and existing shade as well as an adequate supply of cool water are the most important factors.

Explanation of tables

This article presents tables of probabilities associated with occurrences of heatwaves and maximum temperatures. This provides a basis for planning for avoidance of heat stress.

Long term data (70 to 80 years) of daily maximum temperature measured in a standard screen at 1.25 m above the ground have been used to derive the probabilities of heatwaves and specified maximum temperatures occurring throughout the year. Computer programmes have been written to analyse these data and produce the tables presented in this article.

The locations for which these long term data are available to date are Charleville, Dalby, Emerald, Goondiwindi and Roma. The analyses relate to the official meteorological recording site at each of these locations. For any particular site within the region, a knowledge of local topographical effects on temperature will allow most accurate use of the information presented.

Three distinct types of tables have been produced for each station:

- First and last maximum temperature occurrence (tables in Appendix 1).

The body of each table gives the date of the first (or last) occurrence of a particular maximum screen temperature for a given risk. For convenience, the year has been divided at January 15 (approximately the hottest time of the year). A first occurrence is that date prior to January 15 when the maximum temperature first goes above the specified temperature. A last occurrence is that day after January 15 when the maximum temperature last goes above the specified temperature.

The dates of the earliest and latest recorded first (last) occurrences of a particular temperature are also given. The probability

at the base of the table is the chance of receiving the particular maximum temperature at all before (after) January 15.

For example, consider the table for Goondiwindi (table 4). There is a 73% chance of receiving a maximum temperature of 40°C or greater before January 15 (that is, in 27% of years the maximum temperature does not go above 40°C before January 15) and there is a 10% chance that such a temperature will occur before November 10. The earliest first occurrence on record for this temperature is October 18 and the latest first occurrence recorded is January 15.

- Heatwave occurrence and duration probabilities (tables in Appendix 2).

These tables give the probabilities for the relevant weeks in the year which have at least 1 day, 2 consecutive days or 3 consecutive days with maximum temperature greater than or equal to that specified. Thus, they detail the chances related to the severity of heatwave throughout the season.

For example, at Dalby (table 7) there is a 13% chance of getting 2 consecutive days with maximum temperatures at or above 38°C in the week beginning January 8.

- Maximum temperature probabilities (tables in Appendix 3).

The tables give the weekly mean maximum temperature for a particular risk for each week of the year. The lowest and highest weekly mean maximum temperatures observed to date for each week are also given.

For example, at Roma (table 15) there is a 30% chance (or risk) that in the week beginning February 26 the weekly mean maximum temperature will be 34.0°C or higher. The highest and lowest weekly mean maximum temperatures observed to date for that week are 38.2° and 26.2°C respectively.

Use of tables

These tables present information that enables the risk, with respect to heat stress, associated with a particular management decision to be accurately specified.

For example, consider a sorghum crop on a property near Emerald that experiences maximum temperatures the same as those at the official recording site. It is desired to avoid the heatwave conditions of three consecutive days with temperatures above 38°C when the crop is at the head emergence stage. From table 8 it is seen that there is less than a 10% chance of such a heatwave occurring in any week after the end of January but there is still a 5% chance until the end of February. Thus, although the time of planting may be dictated by the occurrence of planting rain, the choice of variety remains a management option that can be used to manipulate the timing of crop development according to attitudes to risk.

Another example is with sheep where it is desired to avoid high temperatures at lambing. Consider a property near Charleville where rams are joined in autumn. Temperatures of 38°C at lambing can cause losses and from table 1 it can be seen that there is a 10% chance of the first occurrence of this temperature being before October 7. Hence, the timing of joining can be adjusted to take account of this particular factor depending on attitude to risk.

There are numerous situations where maximum temperature is a critical factor. Although there are usually many other factors that require consideration when making management decisions, the information presented here at least enables the specification of the risk with respect to maximum temperature associated with the decision. As a result, this information should prove a useful aid to farmers, advisers and researchers.

Appendix 1

TABLE 1—CHARLEVILLE

Date of First Heatwave Temperature for Year							Date of Last Heatwave Temperature for Year								
Temperature °C ..	35	36	37	38	39	40	Temperature °C ..	40	39	38	37	36	35		
Earliest	Sep. 11	Sep. 18	Sep. 21	Sep. 24	Sep. 24	Oct. 10	Earliest	Jan. 16	Jan. 16	Jan. 20	Jan. 17	Jan. 20	Feb. 2		
% Risk	10	Sep. 21	Sep. 25	Oct. 3	Oct. 7	Oct. 14	Oct. 26	% Risk	90	—	—	—	Feb. 7	Feb. 18	Mar. 1
	30	Oct. 4	Oct. 10	Oct. 20	Oct. 27	Nov. 4	Nov. 17		70	—	Feb. 2	Feb. 13	Feb. 22	Mar. 4	Mar. 13
	50	Oct. 13	Oct. 21	Oct. 31	Nov. 10	Nov. 19	Dec. 3		50	Feb. 1	Feb. 15	Feb. 24	Mar. 3	Mar. 14	Mar. 21
	70	Oct. 22	Oct. 31	Nov. 11	Nov. 24	Dec. 4	Dec. 21		30	Feb. 16	Feb. 27	Mar. 6	Mar. 13	Mar. 23	Mar. 30
	90	Nov. 3	Nov. 16	Nov. 27	Dec. 14	—	—		10	Mar. 7	Mar. 16	Mar. 19	Mar. 27	Apr. 6	Apr. 11
Latest	Nov. 23	Dec. 19	Dec. 24	Jan. 1	Jan. 11	Jan. 10	Latest	Mar. 29	Apr. 1	Apr. 2	Apr. 17	Apr. 23	Apr. 29		
Probability (%) ..	100	100	100	99	94	88	Probability (%) ..	71	87	92	97	100	100		

TABLE 2—DALBY

Date of First Heatwave Temperature for Year							Date of Last Heatwave Temperature for Year								
Temperature °C ..	35	36	37	38	39	40	Temperature °C ..	40	39	38	37	36	35		
Earliest	Sep. 22	Oct. 9	Oct. 9	Oct. 9	Oct. 20	Nov. 5	Earliest	Jan. 16	Jan. 16	Jan. 17	Jan. 18	Jan. 19	Jan. 25		
% Risk	10	Oct. 5	Oct. 11	Oct. 20	Nov. 4	Nov. 12	Nov. 27	% Risk	90	*	—	—	—	—	
	30	Oct. 25	Nov. 3	Nov. 16	Dec. 3	Dec. 12	Dec. 29		70	*	—	—	—	Feb. 2	Feb. 19
	50	Nov. 8	Nov. 20	Dec. 8	Dec. 30	—	—		50	*	—	—	Feb. 3	Feb. 17	Mar. 2
	70	Nov. 23	Dec. 7	Jan. 5	—	—	—		30	*	Jan. 28	Feb. 6	Feb. 17	Mar. 2	Mar. 14
	90	—	—	—	—	—	—		10	*	Feb. 25	Mar. 1	Mar. 6	Mar. 18	Mar. 29
Latest	Jan. 9	Jan. 10	Jan. 16	Jan. 16	Jan. 16	Jan. 14	Latest	Mar. 14	Mar. 14	Mar. 19	Mar. 25	May 16	May 16		
Probability (%) ..	94	89	77	62	52	42	Probability (%) ..	25	42	48	67	82	92		

* Insufficient occurrences for complete probability analysis

TABLE 3—EMERALD

Date of First Heatwave Temperature for Year							Date of Last Heatwave Temperature for Year								
Temperature °C ..	35	36	37	38	39	40	Temperature °C ..	40	39	38	37	36	35		
Earliest	Aug. 27	Sep. 14	Sep. 21	Sep. 22	Sep. 22	Oct. 3	Earliest	Jan. 16	Jan. 17	Jan. 18	Jan. 16	Jan. 19	Jan. 24		
% Risk {	10	Sep. 5	Sep. 23	Sep. 25	Sep. 30	Oct. 9	Oct. 26	% Risk {	90	—	—	—	Feb. 1	Feb. 16	
	30	Sep. 19	Oct. 8	Oct. 16	Oct. 25	Nov. 3	Nov. 19		70	—	—	Feb. 9	Feb. 20	Mar. 6	
	50	Oct. 9	Oct. 19	Oct. 30	Nov. 10	Nov. 21	Dec. 7		50	—	Feb. 2	Feb. 11	Feb. 22	Mar. 6	Mar. 18
	70	Oct. 19	Oct. 30	Nov. 14	Nov. 27	Dec. 12	Jan. 2		30	Feb. 1	Feb. 18	Feb. 25	Mar. 7	Mar. 20	Mar. 30
	90	Nov. 3	Nov. 14	Dec. 5	Dec. 22	—	—		10	Feb. 25	Mar. 9	Mar. 14	Mar. 25	Apr. 8	Apr. 17
Latest	Jan. 2	Jan. 3	Jan. 4	Jan. 11	Jan. 11	Jan. 13	Latest	Mar. 23	Mar. 31	Mar. 31	Apr. 22	Apr. 30	Apr. 30		
Probability (%) ..	100	100	99	97	89	77	Probability (%) ..	45	65	72	92	99	100		

TABLE 4—GOONDIWINDI

Date of First Heatwave Temperature for Year							Date of Last Heatwave Temperature for Year								
Temperature °C ..	35	36	36	38	39	40	Temperature °C ..	40	39	38	37	36	35		
Earliest	Sep. 15	Sep. 15	Oct. 4	Oct. 8	Oct. 10	Oct. 18	Earliest	Jan. 16	Jan. 16	Jan. 17	Jan. 17	Jan. 19	Jan. 30		
% Risk {	10	Oct. 3	Oct. 8	Oct. 12	Oct. 17	Oct. 24	Nov. 10	% Risk {	90	—	—	—	Feb. 9	Feb. 18	
	30	Oct. 18	Oct. 25	Nov. 1	Nov. 8	Nov. 17	Dec. 4		70	—	—	Jan. 31	Feb. 13	Feb. 22	Mar. 3
	50	Oct. 28	Nov. 6	Nov. 15	Nov. 24	Dec. 5	Dec. 22		50	—	Feb. 3	Feb. 13	Feb. 21	Mar. 2	Mar. 12
	70	Nov. 6	Nov. 19	Nov. 30	Dec. 11	Dec. 25	—		30	Feb. 2	Feb. 15	Feb. 22	Mar. 2	Mar. 12	Mar. 20
	90	Nov. 21	Dec. 7	Dec. 21	—	—	—		10	Feb. 21	Mar. 2	Mar. 6	Mar. 12	Apr. 2	Apr. 2
Latest	Dec. 20	Jan. 3	Jan. 6	Jan. 9	Jan. 15	Jan. 15	Latest	Mar. 19	Mar. 19	Apr. 1	Apr. 1	Apr. 19	Apr. 21		
Probability (%) ..	100	99	99	92	86	73	Probability (%) ..	51	72	78	90	97	99		

TABLE 5—ROMA

Date of First Heatwave Temperature for Year							Date of Last Heatwave Temperature for Year								
Temperature °C ..	35	36	37	38	39	40	Temperature °C ..	40	39	38	37	36	35		
Earliest	Jul. 31	Aug. 11	Sep. 20	Oct. 4	Oct. 6	Oct. 9	Earliest	Jan. 16	Jan. 17	Jan. 17	Jan. 17	Jan. 17	Feb. 5		
% Risk {	10	Sep. 20	Sep. 29	Oct. 4	Oct. 9	Oct. 17	Nov. 3	% Risk {	90	—	—	—	Feb. 13	Feb. 25	
	30	Oct. 5	Oct. 14	Oct. 21	Oct. 31	Nov. 8	Nov. 22		70	—	Jan. 25	Feb. 3	Feb. 13	Feb. 27	Mar. 10
	50	Oct. 15	Oct. 24	Nov. 2	Nov. 15	Nov. 24	Dec. 7		50	Jan. 29	Feb. 9	Feb. 15	Feb. 23	Mar. 9	Mar. 19
	70	Oct. 26	Nov. 3	Nov. 15	Nov. 30	Dec. 10	Dec. 26		30	Feb. 12	Feb. 21	Feb. 26	Mar. 8	Mar. 19	Mar. 28
	90	Nov. 10	Nov. 18	Dec. 2	Dec. 23	—	—		10	Mar. 1	Mar. 12	Mar. 13	Mar. 23	Apr. 2	Apr. 11
Latest	Nov. 25	Jan. 8	Jan. 8	Jan. 10	Jan. 14	Jan. 15	Latest	Mar. 19	Apr. 1	Apr. 1	Apr. 8	Apr. 14	Apr. 23		
Probability (%) ..	100	100	99	96	95	82	Probability (%) ..	65	80	86	92	100	100		

Appendix 2

TABLE 6—CHARLEVILLE

Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days
September 10	0	0	0	0	0	0	0	0	0
September 17	0	0	0	1	0	0	7	3	1
September 24	0	0	0	1	0	0	9	3	1
October 1	0	0	0	5	1	0	19	4	1
October 8	1	0	0	6	0	0	21	10	3
October 15	5	0	0	14	5	1	33	16	7
October 22	7	1	0	17	9	1	40	21	9
October 29	9	5	0	21	10	4	54	33	20
November 5	12	4	1	38	12	7	65	42	24
November 12	20	11	3	43	22	12	70	53	32
November 19	17	7	1	40	22	12	73	49	30
November 26	17	9	6	42	19	10	75	54	40
December 3	27	15	7	46	30	17	75	54	35
December 10	33	19	9	58	33	22	82	64	47
December 17	33	22	11	58	41	25	83	62	49
December 24	36	24	11	59	42	31	80	70	52
January 1	38	27	12	67	44	35	83	73	53
January 8	31	21	17	57	41	32	80	68	51
January 15	38	24	12	61	45	30	82	65	54
January 22	35	26	15	56	44	26	72	59	54
January 29	26	12	7	53	35	22	73	61	48
February 5	29	12	9	54	30	19	77	68	46
February 12	19	12	6	46	30	17	73	58	44
February 19	21	15	9	38	26	20	61	49	40
February 26	14	4	1	32	15	7	56	42	32
March 5	7	3	0	22	9	6	49	32	17
March 12	5	5	3	17	12	6	43	30	17
March 19	4	1	0	5	3	0	24	20	9
March 26	1	0	0	6	3	0	24	11	7

TABLE 6—CHARLEVILLE—*continued*
Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days
April 2	0	0	0	1	0	0	11	5	3
April 9	0	0	0	0	0	0	4	3	1
April 16	0	0	0	0	0	0	1	0	0
April 23	0	0	0	0	0	0	1	0	0
April 30	0	0	0	0	0	0	0	0	0

TABLE 7—DALBY
Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days
September 10	0	0	0	0	0	0	0	0	0
September 17	0	0	0	0	0	0	0	0	0
September 24	0	0	0	0	0	0	0	0	0
October 1	0	0	0	0	0	0	1	0	0
October 8	0	0	0	1	0	0	7	2	0
October 15	0	0	0	2	0	0	9	2	1
October 22	0	0	0	1	0	0	13	4	1
October 29	2	0	0	5	1	0	15	6	4
November 5	4	0	0	10	4	0	30	13	6
November 12	7	1	0	11	5	1	36	14	10
November 19	2	0	0	11	5	2	30	15	7
November 26	4	1	1	7	1	1	31	14	6
December 3	4	1	0	10	5	4	35	18	6
December 10	6	5	2	15	8	4	46	14	11
December 17	8	1	0	17	10	2	42	20	8
December 24	8	2	1	18	7	5	41	27	12
January 1	6	5	5	15	8	5	48	21	14
January 8	12	4	2	18	13	7	39	25	14
January 15	8	5	0	20	8	5	42	24	15
January 22	5	1	1	13	6	4	39	24	8

TABLE 7—DALBY—continued
Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days
January 29	7	1	0	12	7	2	27	15	8
February 5	2	0	0	9	4	0	37	18	8
February 12	5	1	0	13	6	0	32	17	10
February 19	2	0	0	11	4	2	32	19	11
February 26	1	0	0	6	1	1	21	11	2
March 5	1	0	0	2	0	0	12	4	0
March 12	1	0	0	4	1	1	12	6	1
March 19	0	0	0	1	0	0	7	2	0
March 26	0	0	0	0	0	0	4	0	0
April 2	0	0	0	0	0	0	1	0	0
April 9	0	0	0	0	0	0	0	0	0
April 16	0	0	0	0	0	0	0	0	0
April 23	0	0	0	0	0	0	0	0	0
April 30	0	0	0	0	0	0	0	0	0

TABLE 8—EMERALD
Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days
September 10	0	0	0	0	0	0	3	1	1
September 17	0	0	0	1	0	0	8	4	0
September 24	0	0	0	0	0	0	10	4	3
October 1	1	0	0	9	1	0	25	14	4
October 8	0	0	0	11	3	0	34	18	9
October 15	4	1	1	14	6	1	28	19	10
October 22	5	3	0	19	9	3	50	24	14
October 29	9	6	1	19	11	5	51	29	19
November 5	9	4	1	26	10	4	58	36	20
November 12	24	10	4	40	24	14	60	51	36
November 19	10	5	1	25	14	6	61	43	29

TABLE 8—EMERALD—continued
Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days
November 26	15	4	3	25	15	9	56	39	21
December 3	23	11	6	40	26	15	71	54	36
December 10	29	13	8	50	31	14	73	59	45
December 17	23	9	5	45	21	13	71	51	35
December 24	20	5	3	41	24	14	77	61	41
January 1	26	14	6	48	33	19	73	54	43
January 8	20	11	8	35	21	13	65	46	33
January 15	18	5	3	33	20	11	70	54	38
January 22	16	9	4	29	14	10	55	36	24
January 29	16	5	1	33	18	9	55	35	28
February 5	8	4	3	19	6	3	50	31	23
February 12	13	6	4	30	14	9	50	35	23
February 19	11	4	1	25	16	5	54	38	21
February 26	8	4	3	11	6	5	43	20	16
March 5	5	1	0	13	8	4	30	20	13
March 12	3	1	0	8	5	1	25	13	9
March 19	1	0	0	4	1	0	24	14	5
March 26	0	0	0	1	0	0	15	6	3
April 2	0	0	0	0	0	0	15	3	1
April 9	0	0	0	0	0	0	4	3	1
April 16	0	0	0	0	0	0	4	0	0
April 23	0	0	0	0	0	0	1	0	0
April 30	0	0	0	0	0	0	1	0	0

TABLE 9—GOONDIWINDI
Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days
September 10	0	0	0	0	0	0	1	0	0
September 17	0	0	0	0	0	0	1	0	0
September 24	0	0	0	0	0	0	1	1	0

TABLE 9—GOONDIWINDI—*continued*
Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
Week Beginning	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days	At least 1 Day	2 Consec. Days	3 Consec. Days
October 1	0	0	0	1	0	0	4	0	0
October 8	0	0	0	5	0	0	14	1	0
October 15	3	0	0	6	1	0	12	5	3
October 22	5	0	0	11	0	0	20	11	5
October 29	4	1	0	15	3	0	32	15	5
November 5	6	1	0	17	6	2	36	19	10
November 12	10	3	1	24	11	1	47	30	16
November 19	9	3	1	24	7	1	44	26	14
November 26	9	3	3	25	10	5	53	33	20
December 3	12	7	3	30	17	5	56	37	22
December 10	21	9	3	33	20	10	65	43	25
December 17	21	7	0	38	19	5	70	43	22
December 24	24	10	4	42	22	12	72	47	31
January 1	27	10	5	46	24	14	74	60	33
January 8	24	19	14	45	26	20	70	48	32
January 15	27	15	7	43	27	12	68	48	40
January 22	26	14	7	41	22	15	63	48	36
January 29	17	4	1	32	16	6	58	38	24
February 5	12	4	1	33	14	7	63	38	36
February 12	12	6	4	27	9	6	54	32	20
February 19	7	3	0	28	11	4	51	36	19
February 26	4	1	0	16	5	0	41	25	7
March 5	1	0	0	6	3	0	27	7	4
March 12	4	3	1	5	3	1	22	7	4
March 19	1	0	0	1	0	0	12	3	0
March 26	0	0	0	1	0	0	6	3	0
April 2	0	0	0	0	0	0	6	0	0
April 9	0	0	0	0	0	0	0	0	0
April 16	0	0	0	0	0	0	1	1	0
April 23	0	0	0	0	0	0	0	0	0
April 30	0	0	0	0	0	0	0	0	0

TABLE 10—ROMA

Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
	At Least 1 Day	2 Consec. Days	3 Consec. Days	At Least 1 Day	2 Consec. Days	3 Consec. Days	At Least 1 Day	2 Consec. Days	3 Consec. Days
September 10	0	0	0	0	0	0	0	0	0
September 17	0	0	0	0	0	0	4	0	0
September 24	0	0	0	0	0	0	4	0	0
October 1	0	0	0	4	1	0	17	7	3
October 8	3	0	0	7	1	0	17	9	3
October 15	1	0	0	11	3	0	22	9	5
October 22	4	0	0	11	5	0	30	16	7
October 29	5	1	0	15	9	5	42	22	9
November 5	10	4	3	26	10	5	54	26	12
November 12	17	7	1	35	12	5	59	38	31
November 19	19	5	3	31	19	7	56	43	26
November 26	9	4	3	22	12	6	68	44	21
December 3	24	10	5	36	27	17	65	47	33
December 10	27	11	6	51	24	15	82	58	35
December 17	26	14	5	47	28	12	72	49	35
December 24	24	14	11	48	27	20	77	59	43
January 1	26	15	9	53	32	24	83	61	52
January 8	30	17	11	46	31	24	72	54	46
January 15	31	11	5	43	33	16	65	51	41
January 22	25	15	10	47	27	19	65	56	38
January 29	24	6	6	38	21	12	64	47	21
February 5	17	7	1	41	22	11	65	44	28
February 12	17	6	1	32	20	11	63	43	32
February 19	14	6	3	36	17	10	59	43	30
February 26	6	1	1	21	9	4	47	32	17
March 5	3	0	0	14	6	1	40	20	10
March 12	5	3	1	9	6	3	31	11	4
March 19	1	0	0	3	1	0	24	10	5
March 26	0	0	0	1	0	0	12	6	4
April 2	0	0	0	0	0	0	9	4	1

TABLE 10—ROMA—continued
Heatwave occurrence and duration probabilities (%)

Temperature °C	40			38			36		
Week Beginning	At Least 1 Day	2 Consec. Days	3 Consec. Days	At Least 1 Day	2 Consec. Days	3 Consec. Days	At Least 1 Day	2 Consec. Days	3 Consec. Days
April 9	0	0	0	0	0	0	3	1	1
April 16	0	0	0	0	0	0	0	0	0
April 23	0	0	0	0	0	0	0	0	0
April 30	0	0	0	0	0	0	0	0	0

Appendix 3

TABLE 11—CHARLEVILLE
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
January 1	26.5	31.2	33.7	35.4	37.1	39.5	41.4
January 8	27.7	31.2	33.7	35.4	37.1	39.6	42.5
January 15	28.2	31.0	33.6	35.3	37.1	39.6	42.3
January 22	25.6	30.6	33.3	35.1	36.9	39.6	42.6
January 29	23.5	30.6	33.2	34.9	36.7	39.2	43.0
February 5	27.7	30.6	33.1	34.8	36.5	38.9	41.0
February 12	26.7	30.3	32.8	34.5	36.3	38.8	41.8
February 19	26.0	29.8	32.4	34.2	35.9	38.5	41.5
February 26	26.1	29.1	31.7	33.4	35.2	37.7	40.8
March 5	24.2	28.4	30.9	32.6	34.3	36.8	39.9
March 12	24.6	28.2	30.5	32.1	33.7	36.0	40.4
March 19	25.1	27.8	30.0	31.5	33.1	35.3	38.3
March 26	23.0	26.9	29.1	30.7	32.2	34.4	36.0
April 2	21.7	26.3	28.4	29.9	31.4	33.5	34.9
April 9	22.3	25.6	27.7	29.1	30.5	32.5	34.8
April 16	22.0	24.3	26.3	27.6	29.0	31.0	30.2
April 23	19.4	22.9	24.8	26.1	27.3	29.2	33.4
April 30	19.9	22.2	24.0	25.3	26.5	28.3	30.0
May 7	18.9	21.1	23.0	24.3	25.6	27.5	29.3
May 14	17.1	19.8	21.7	23.1	24.4	26.4	29.3
May 21	16.1	18.7	20.7	22.0	23.4	25.4	27.0

TABLE 11—CHARLEVILLE—*continued*
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
May 28	15.6	18.1	20.0	21.3	22.5	24.4	27.6
June 4	13.4	17.5	19.4	20.6	21.9	23.7	26.9
June 11	14.8	17.1	18.9	20.1	21.4	23.2	27.1
June 18	13.6	16.5	18.4	19.7	21.0	22.9	25.3
June 25	15.1	16.4	18.2	19.4	20.7	22.5	24.5
July 2	14.0	16.3	18.1	19.3	20.5	22.3	26.6
July 9	13.2	16.2	18.0	19.3	20.6	22.4	24.8
July 16	14.4	16.4	18.3	19.5	20.7	22.6	24.7
July 23	14.3	17.0	18.8	20.0	21.2	22.9	25.3
July 30	14.7	17.7	19.5	20.7	21.8	23.6	26.0
August 6	15.0	18.5	20.2	21.4	22.6	24.4	29.7
August 13	17.0	19.2	21.0	22.2	23.4	25.1	28.3
August 20	16.9	19.8	21.6	22.9	24.1	25.9	29.9
August 27	17.9	20.7	22.5	23.7	25.0	26.8	30.0
September 3	19.1	21.5	23.3	24.6	25.8	27.6	30.2
September 10	20.1	22.4	24.3	25.6	27.0	28.9	33.9
September 17	20.2	23.4	25.5	26.9	28.4	30.5	35.2
September 24	21.7	24.3	26.4	27.8	29.3	31.4	34.8
October 1	19.8	25.2	27.4	28.8	30.3	32.4	35.5
October 8	22.3	25.8	28.1	29.6	31.1	33.4	36.7
October 15	22.0	26.5	28.8	30.4	31.9	34.2	37.0
October 22	25.9	27.5	29.7	31.2	32.7	34.9	39.2
October 29	25.8	28.2	30.5	32.1	33.6	35.9	39.7
November 5	25.4	29.0	31.3	32.9	34.4	36.7	39.4
November 12	25.7	29.7	31.9	33.4	34.9	37.1	38.9
November 19	26.1	30.4	32.4	33.8	35.2	37.2	38.9
November 26	28.8	30.7	32.8	34.2	35.7	37.7	41.2
December 3	27.0	30.8	33.0	34.5	36.0	38.3	40.1
December 10	26.9	31.1	33.4	34.9	36.5	38.8	42.0
December 17	28.1	31.3	33.6	35.2	36.8	39.1	42.2
December 24	27.3	31.2	33.7	35.3	37.0	39.4	43.2

TABLE 12—DALBY
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
January 1	27.2	28.6	30.7	32.2	33.6	35.7	40.0
January 8	25.0	28.3	30.5	31.9	33.4	35.6	38.3
January 15	26.4	28.2	30.3	31.8	33.2	35.4	38.0
January 22	25.9	27.8	30.0	31.5	33.0	35.2	37.7
January 29	22.4	27.5	29.8	31.3	32.8	35.0	37.6
February 5	25.4	27.8	29.9	31.3	32.7	34.8	37.1
February 12	24.8	27.8	29.9	31.3	32.6	34.7	37.6
February 19	25.6	27.7	29.7	31.0	32.3	34.3	37.8
February 26	25.7	27.4	29.3	30.5	31.8	33.6	37.7
March 5	23.2	27.0	28.8	30.1	31.4	33.2	36.1
March 12	25.2	26.7	28.5	29.7	30.8	32.6	35.7
March 19	24.6	26.4	28.0	29.1	30.2	31.9	33.5
March 26	23.4	25.8	27.3	28.4	29.5	31.1	32.4
April 2	23.3	25.1	26.7	27.8	28.8	30.4	32.0
April 9	22.6	24.3	25.9	26.9	27.9	29.5	32.9
April 16	21.1	23.6	25.0	26.0	27.0	28.5	33.1
April 23	20.6	22.8	24.2	25.1	26.0	27.4	29.8
April 30	21.0	22.1	23.4	24.3	25.2	26.5	28.7
May 7	19.8	21.0	22.4	23.3	24.2	25.6	27.1
May 14	16.7	19.8	21.3	22.3	23.3	24.8	27.5
May 21	15.7	18.7	20.3	21.3	22.4	23.9	26.0
May 28	14.7	18.1	19.6	20.6	21.6	23.1	27.9
June 4	16.2	17.6	19.0	20.0	21.0	22.4	24.0
June 11	15.8	17.0	18.5	19.5	20.5	22.0	23.4
June 18	13.4	16.3	17.9	19.0	20.1	21.8	24.9
June 25	12.8	16.1	17.7	18.8	19.8	21.4	24.0
July 2	13.9	16.0	17.5	18.6	19.6	21.2	22.7
July 9	14.3	16.1	17.6	18.6	19.6	21.1	22.6
July 16	15.1	16.3	17.7	18.7	19.7	21.1	22.3
July 23	13.6	16.6	18.0	19.0	20.0	21.5	22.8
July 30	14.0	17.2	18.7	19.7	20.7	22.1	23.3

TABLE 12—DALBY—*continued*
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
August 6	15.5	17.9	19.3	20.3	21.2	22.7	28.2
August 13	17.1	18.4	19.9	20.8	21.8	23.2	25.5
August 20	16.7	18.8	20.4	21.4	22.4	24.0	27.6
August 27	16.8	19.6	21.2	22.3	23.4	24.9	27.2
September 3	17.9	20.4	22.1	23.2	24.3	25.9	28.5
September 10	19.5	21.1	22.8	24.0	25.2	26.9	30.2
September 17	18.9	21.7	23.5	24.7	25.9	27.7	31.2
September 24	20.2	22.4	24.2	25.5	26.7	28.5	31.5
October 1	20.8	23.3	25.2	26.5	27.8	29.6	31.2
October 8	22.2	23.9	25.9	27.2	28.6	30.6	33.7
October 15	21.2	24.5	26.5	27.9	29.2	31.2	33.1
October 22	23.5	25.4	27.3	28.7	30.0	31.9	34.2
October 29	23.5	26.1	28.1	29.4	30.8	32.7	36.7
November 5	23.6	26.4	28.5	30.0	31.4	33.6	37.7
November 12	23.8	26.8	29.0	30.5	32.0	34.2	37.8
November 19	24.7	27.4	29.4	30.8	32.2	34.3	36.4
November 26	25.2	27.6	29.7	31.1	32.5	34.5	39.3
December 3	24.9	27.9	30.0	31.4	32.9	34.9	38.4
December 10	24.5	28.3	30.4	31.8	33.2	35.3	38.8
December 17	25.8	28.4	30.5	31.9	33.3	35.4	37.4
December 24	24.6	28.5	30.6	32.0	33.5	35.6	39.6

TABLE 13—EMERALD
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
January 1	28.2	30.6	32.9	34.4	36.0	38.3	39.9
January 8	27.1	30.1	32.5	34.1	35.7	38.0	40.3
January 15	25.5	30.1	32.3	33.9	35.4	37.6	40.1
January 22	25.4	29.7	32.0	33.5	35.1	37.3	43.5
January 29	26.7	29.5	31.8	33.3	34.8	37.0	39.8

TABLE 13—EMERALD—*continued*
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
February 5	26.0	29.5	31.7	33.2	34.7	36.9	39.3
February 12	24.0	29.4	31.7	33.2	34.7	37.0	40.7
February 19	27.5	29.4	31.5	33.0	34.4	36.6	38.9
February 26	27.2	29.0	31.1	32.6	34.0	36.1	39.8
March 5	25.1	28.7	30.8	32.2	33.6	35.6	38.3
March 12	26.3	28.8	30.7	32.0	33.2	35.1	38.0
March 19	26.6	28.6	30.4	31.6	32.8	34.5	36.7
March 26	24.5	28.1	29.8	30.9	32.1	33.8	36.7
April 2	25.0	27.7	29.3	30.4	31.5	33.1	35.2
April 9	23.7	27.1	28.7	29.8	30.8	32.4	36.0
April 16	24.6	26.4	28.0	29.0	30.1	31.6	33.7
April 23	23.4	25.7	27.2	28.2	29.2	30.7	33.0
April 30	23.3	25.0	26.4	27.4	28.4	29.8	31.0
May 7	22.1	24.0	25.5	26.5	27.5	28.9	30.9
May 14	20.4	22.8	24.4	25.5	26.6	28.2	30.9
May 21	18.6	21.7	23.4	24.6	25.7	27.4	29.6
May 28	17.9	21.1	22.7	23.8	24.9	26.6	29.3
June 4	18.3	20.7	22.2	23.3	24.4	25.9	26.9
June 11	18.0	20.2	21.8	22.8	23.9	25.5	27.9
June 18	17.5	19.7	21.3	22.5	23.6	25.2	27.3
June 25	18.6	19.6	21.2	22.2	23.3	24.9	26.5
July 2	17.0	19.4	21.0	22.1	23.2	24.8	27.9
July 9	17.7	19.5	21.1	22.2	23.3	24.9	27.9
July 16	17.5	19.8	21.4	22.4	23.5	25.1	28.1
July 23	18.8	20.3	21.9	22.9	24.0	25.6	27.2
July 30	19.0	20.9	22.5	23.6	24.7	26.3	29.6
August 6	18.7	21.5	23.1	24.2	25.3	26.9	30.1
August 13	20.0	22.2	23.7	24.8	25.9	27.5	30.7
August 20	18.8	22.8	24.4	25.5	26.5	28.1	31.9
August 27	23.1	23.6	25.1	26.2	27.2	28.7	32.0
September 3	22.3	24.2	25.7	26.8	27.8	29.4	31.5

TABLE 13—EMERALD—*continued*

Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
September 10	21·2	25·2	26·7	27·8	28·8	30·4	34·8
September 17	24·8	26·3	27·8	28·9	30·0	32·6	35·5
September 24	23·8	26·8	28·5	29·6	30·8	32·4	35·9
October 1	24·2	27·4	29·2	30·4	31·7	33·5	36·3
October 8	24·9	28·0	29·9	31·2	32·4	34·3	35·9
October 15	25·6	28·5	30·4	31·7	33·0	34·9	37·0
October 22	28·3	29·2	31·0	32·3	33·6	35·5	38·5
October 29	26·0	29·6	31·5	32·9	34·2	36·1	39·9
November 5	24·6	30·1	32·1	33·4	34·8	36·7	40·5
November 12	27·1	30·6	32·5	33·9	35·2	37·1	39·4
November 19	25·7	30·9	32·7	34·0	35·2	37·0	38·8
November 26	29·2	31·1	33·0	34·2	35·5	37·3	40·7
December 3	27·3	31·2	33·2	34·6	35·9	38·0	40·4
December 10	27·0	31·1	33·2	34·7	36·1	38·3	42·7
December 17	27·6	31·0	33·2	34·6	36·1	38·2	41·2
December 24	25·8	30·9	33·1	34·6	36·0	38·2	39·1

TABLE 14—GOONDIWINDI

Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
January 1	27·5	30·2	32·5	34·1	35·7	38·0	40·5
January 8	25·9	30·1	32·5	34·1	35·7	38·0	41·5
January 15	28·1	30·2	32·4	34·0	35·5	37·8	43·0
January 22	26·0	29·9	32·2	33·8	35·3	37·6	42·0
January 29	24·8	29·9	32·0	33·5	35·0	37·1	40·6
February 5	27·3	29·8	31·9	33·4	34·8	36·9	39·2
February 12	26·0	29·3	31·5	33·1	34·6	36·8	39·3
February 19	27·0	28·7	31·1	32·7	34·3	36·7	38·6
February 26	28·2	28·5	30·6	32·0	33·4	35·5	33·1

TABLE 14—GOONDIWINDI—*continued*
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
March 5	23.5	28.2	30.0	31.3	32.6	34.4	37.5
March 12	24.8	27.9	29.6	30.8	32.0	33.7	37.1
March 19	26.0	27.5	29.1	30.3	31.4	33.0	34.9
March 26	24.3	26.6	28.3	29.4	30.6	32.2	33.4
April 2	23.2	25.7	27.4	28.5	29.6	31.2	33.0
April 9	23.4	24.7	26.3	27.4	28.5	30.2	32.0
April 16	22.6	23.8	25.4	26.5	27.6	29.2	32.7
April 23	19.5	22.9	24.5	25.6	26.7	28.2	30.2
April 30	20.3	21.7	23.3	24.4	25.5	27.1	25.2
May 7	18.0	20.0	21.7	22.8	23.9	25.6	27.5
May 14	16.4	18.7	20.5	21.7	22.8	24.6	26.5
May 21	15.7	17.8	19.5	20.7	21.9	23.7	25.3
May 28	14.5	17.2	18.9	20.0	21.1	22.8	26.8
June 4	14.3	16.9	18.4	19.4	20.5	22.0	23.1
June 11	15.5	16.3	17.9	19.0	20.1	21.6	24.2
June 18	12.8	15.6	17.3	18.4	19.6	21.3	24.3
June 25	13.8	15.4	17.0	18.1	19.2	20.8	22.4
July 2	12.4	15.2	16.8	17.9	19.0	20.6	22.3
July 9	12.0	15.2	16.8	17.9	18.9	20.5	22.2
July 16	13.1	15.4	16.9	17.9	19.0	20.5	21.5
July 23	13.0	15.7	17.3	18.3	19.4	20.9	23.6
July 30	12.8	16.3	17.9	18.9	20.0	21.5	24.1
August 6	14.9	17.1	18.6	19.6	20.6	22.1	28.7
August 13	15.6	17.7	19.2	20.3	21.3	22.8	25.8
August 20	15.8	18.2	19.8	20.9	22.0	23.6	27.7
August 27	16.4	19.1	20.7	21.8	22.9	24.5	26.6
September 3	18.4	19.8	21.4	22.5	23.7	25.3	28.6
September 10	18.3	20.5	22.3	23.6	24.9	26.8	28.8
September 17	17.5	21.4	23.5	24.9	26.3	28.3	31.7
September 24	18.7	22.2	24.3	25.7	27.1	29.1	33.5

TABLE 14—GOONDIWINDI—*continued*
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
October 1	20·1	23·2	25·2	26·6	28·0	30·1	32·6
October 8	23·1	23·9	26·0	27·5	29·0	31·1	34·6
October 15	21·5	24·5	26·8	28·3	29·8	32·1	35·2
October 22	22·4	25·4	27·7	29·2	30·7	32·9	37·6
October 29	19·8	26·0	28·4	30·0	31·6	33·9	36·2
November 5	21·7	26·6	29·0	30·7	32·3	34·7	37·3
November 12	22·1	27·2	29·7	31·3	33·0	35·4	39·2
November 19	21·1	28·0	30·3	31·9	33·4	35·7	38·1
November 26	27·2	28·6	30·9	32·4	34·0	36·3	40·3
December 3	25·4	29·0	31·3	32·9	34·4	36·7	38·7
December 10	25·8	29·4	31·7	33·3	34·9	37·2	40·4
December 17	26·7	29·9	32·1	33·6	35·2	37·4	40·1
December 24	23·4	30·0	32·3	33·9	35·5	37·8	40·2

TABLE 15—ROMA
Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
January 1	28·0	30·5	32·9	34·5	36·2	38·6	40·2
January 8	25·0	30·2	32·7	34·4	36·1	38·6	41·2
January 15	25·7	30·2	32·6	34·2	35·9	38·3	42·2
January 22	25·3	29·7	32·2	33·9	35·6	38·1	42·2
January 29	23·4	29·6	32·0	33·7	35·3	37·8	40·1
February 5	26·9	29·6	32·0	33·6	35·2	37·6	40·0
February 12	24·3	29·1	31·6	33·4	35·1	37·6	41·1
February 19	25·3	28·8	31·2	32·9	34·6	37·1	38·8
February 26	26·2	28·8	31·0	32·5	34·0	36·1	38·2
March 5	23·6	28·3	30·5	32·0	33·5	35·6	37·6
March 12	24·5	28·1	30·1	31·5	32·9	35·0	38·9
March 19	24·6	27·7	29·6	30·9	32·2	34·0	33·8
March 26	23·4	27·0	28·8	30·0	31·2	32·9	35·8

TABLE 15—ROMA—continued

Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
April 2	23·4	26·4	28·1	29·2	30·4	32·0	34·9
April 9	23·6	25·6	27·2	28·3	29·5	31·1	34·1
April 16	22·2	24·7	26·3	27·4	28·4	30·0	31·8
April 23	20·8	23·8	25·3	26·4	27·4	29·0	32·3
April 30	21·6	22·9	24·4	25·4	26·4	27·9	29·4
May 7	20·3	21·8	23·3	24·3	25·3	26·8	29·6
May 14	17·8	20·5	22·1	23·2	24·3	25·8	27·6
May 21	16·8	19·4	21·0	22·2	23·3	24·9	27·0
May 28	15·0	18·7	20·3	21·4	22·5	24·1	27·7
June 4	15·4	18·1	19·7	20·8	21·8	24·3	23·9
June 11	16·5	17·5	19·2	20·3	21·4	23·0	25·0
June 18	14·5	16·9	18·6	19·8	21·0	22·7	25·9
June 25	14·1	16·8	18·4	19·6	20·7	22·4	23·9
July 2	13·8	16·7	18·3	19·4	20·6	22·2	24·6
July 9	14·1	16·7	18·3	19·4	20·5	22·1	23·8
July 16	14·6	16·9	18·5	19·6	20·7	22·3	24·4
July 23	15·3	17·4	19·0	20·1	21·2	22·9	25·5
July 30	15·4	18·1	19·7	20·8	21·9	23·6	25·5
August 6	16·0	18·8	20·4	21·5	22·6	24·2	30·1
August 13	19·0	19·5	21·1	22·0	23·2	24·8	26·9
August 20	16·5	20·0	21·7	22·9	24·0	25·7	29·7
August 27	19·0	20·9	22·6	23·7	24·9	26·5	29·5
September 3	20·3	21·5	23·3	24·4	25·6	27·4	30·2
September 10	20·4	22·5	24·3	25·5	26·8	28·6	32·7
September 17	20·7	23·5	25·5	26·8	28·1	30·1	32·7
September 24	21·6	24·2	26·2	27·5	28·9	30·9	33·6
October 1	22·2	24·9	27·0	28·5	29·9	32·0	34·0
October 8	21·6	25·5	27·7	29·1	30·6	32·8	35·2
October 15	21·8	26·2	28·4	29·9	31·3	33·5	35·7
October 22	25·4	27·2	29·2	30·7	32·1	34·1	36·6

TABLE 15—ROMA—continued

Weekly mean maximum temperature (°C) for a given risk

Week Beginning	Lowest Observed	Percentage Risk					Highest Observed
		90	70	50	30	10	
October 29	24.7	27.9	30.0	31.5	32.9	35.0	40.0
November 5	24.5	28.5	30.6	32.1	33.6	35.8	39.2
November 12	24.6	29.1	31.2	32.7	34.2	36.4	39.6
November 19	25.3	29.6	31.7	33.1	34.5	36.5	38.4
November 26	27.6	30.0	32.1	33.5	34.9	37.0	40.5
December 3	25.7	30.1	32.4	33.9	35.5	37.7	40.7
December 10	26.9	30.3	32.6	34.2	35.8	38.1	41.3
December 17	26.2	30.4	32.7	34.3	35.9	38.2	40.8
December 24	27.6	30.5	32.9	34.5	36.1	38.5	41.1

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