

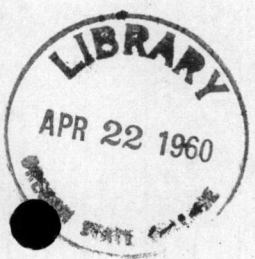
FREQUENCY, PERSISTENCE, AND SEQUENCE OF LOW HUMIDITY SPELLS AT
EUGENE, OREGON

Question: Once a low humidity spell has begun at Eugene, how long is it likely to last?

Table 1: As an example of how to read Table 1, look at the row of figures for the period 1-10 September. In this Note, a low humidity day is defined as a day on which the minimum relative humidity fell below 30%, and a low humidity spell is a series of consecutive low humidity days. At Eugene during the first ten days of September of the years 1948 through 1954, for instance, 7 spells occurred ranging in length from 1 to 4 days. There have been 4 spells lasting 1 day, 2 lasting 2 days, and so on. Notice that a low humidity spell beginning on 10 September and continuing through 13 September, for instance, is tabulated as having begun during 1-10 September.

From these figures, it may be estimated that once a low humidity spell has begun at Eugene during the first ten days of September, the chances of its lasting longer than 1 day are 3 out of 7, or 43%; and the chances of its lasting longer than 2 days are 1 out of 7, or 14%. For a further discussion of such probability estimates, see pages 12 and 13 of Note 22 in this series: "Putting Weather Records to Work."

In the columns to the right in Table 1 are tabulated data on the number of low humidity days in a given 10-day period of a given year, regardless of whether or not the days were consecutive. That is, during 1-10 September of 1948-54, Eugene experienced as many as 5 low humidity days during one year and as few as 1 during some other year, with a mean for the period of 2.5 days. These figures give some idea of the variability of the number of low humidity days from one year to the next and are discussed in more detail in Climatological Note 22.



LENGTH
OF LOW HUMIDITY SPELL IN DAYS

LENGTH OF LOW HUMIDITY SPELL IN DAYS												LOW HUMIDITY DAYS AT EUGENE		
												More than 10	Most in one year	Least in one year
													Mean	
												Days per year		
January	1-10												0	0
	11-20												0	0
	21-31												0	0
February	1-10	1											1	0.2
	11-20												0	0
	21-29												0	0
March	1-10												0	0
	11-20		1										2	0.3
	21-31												0	0
April	1-10	3	1				1						5	1.7
	11-20	3			1								4	1.0
	21-30	2											2	0.7
May	1-10	5											2	0.8
	11-20	3	1										2	0.8
	21-31	1		1	1	1	1						7	2.3
June	1-10	1	3										4	2.0
	11-20	1	1			1			1				7	2.3
	21-30	1			1	1							7	1.3
July	1-10	2	6	1		1							6	3.3
	11-20	4	2	1	2								7	3.8
	21-31	4	3	2	1		1						7	4.5
August	1-10	2		1		2							5	2.0
	11-20	4	2		1					1			8	3.1
	21-31	3	1			3							7	2.9
September	1-10	4	2				1						5	2.5
	11-20	3	4	1	1	1	1						9	4.7
	21-30	5	1										3	1.8
October	1-10	1					1						6	1.1
	11-20			1									3	0.5
	21-31												0	0
November	1-10												0	0
	11-20												0	0
	21-30												0	0
December	1-10												0	0
	11-20												0	0
	21-31												0	0

Question: Once a low humidity spell has ended at Eugene, how long is it likely to be before the next one begins?

Table 2: From this table one may obtain information on the sequences of spells of low humidity and those of higher humidity. During the period April through June, which we might call Spring, Eugene has experienced during the years 1948-54 a total of 6 low humidity spells which lasted for 2 days. This information will be found in Table 2 in the column headed "Length of low humidity spell in days: 2" and in the row marked "Total" in the middle section of the Table. In this same middle section marked "April-June" one may see that, of these 6 2-day spells, 1 has been followed in 3 days by the beginning of another low humidity spell, and 2 others have been followed in from 4 to 6 days by another low humidity spell. In other words, during Spring at Eugene, a low humidity spell which lasts 2 days has a chance of (1 + 2), or 3 in 6 of being followed by another low humidity spell no sooner than 3 days and no longer than 6 days later.

Similar data are tabulated for the periods October through March and July through September. Combinations of data such as those made in the preceding paragraph may be made for other lengths of spells and for these other periods of the year.

The data: One must keep in mind that the observations of minimum relative humidity on which this Note is based were made at the U. S. Weather Bureau Station at Eugene Airport. Since for a given sample of air the relative humidity changes when temperature changes, it is quite likely that differences in the daily minimum R. H. between various locations in the Eugene area occur, especially on days when temperature differs from place to place. The values in the tables, therefore, should be considered only a suggestion of the patterns of low humidity. Even so, this Note will give the user a good idea of how likely low humidity spells of various lengths are during various times of the year in the Eugene area.

William P. Lowry
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Table 2

SEQUENCES OF LOW HUMIDITY SPELLS AT EUGENE

Length of time before beginning of next low humidity spell - days	Length of low humidity spell in days										
	1	2	3	4	5	6	7	8	9	10	More than 10
<hr/>											
October - March	<hr/>										
1											
2											
3											
4-6						1					
7-10											
11-15											
16-20											
21-30		1									
more than 30	2		1								
Total	2	1	1			1					
<hr/>											
April - June	<hr/>										
1	3				2			1			
2	1	1				1					
3		1		1							
4-6	2	2	1	1	1						
7-10	4										
11-15	2	2									
16-20	2										
21-30	3			1		1					
more than 30	3										
Total	20	6	1	3	3	2		1			
<hr/>											
July - September	<hr/>										
1	5	7		1	2	1					
2	4	1	2	1		1					
3	6	3									
4-6	7	6	1	2	3	1				1	
7-10	4	3	2		1						
11-15	1	1	1		1						
16-20	1										
21-30				1							
more than 30	4		1			1					
Total	32	21	7	5	7	4				1	