LONG-TIME PRECIPITATION PATTERNS: A GUIDE FOR OUTDOOR PLANNING

1. VICINITY OF HOPKINSVILLE, KENTUCKY

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Farmers, building and road contractors, homeowners, and others consider probability information concerning rainfall, temperature and other weather elements since they remember in a general way what happened in the past. Those who wish to give closer attention to scheduling field and other outside operations to take advantage of rainfall patterns may find the information in this report very helpful.

On the average, the Hopkinsville area receives the smallest amount of precipitation in the months of August through October and the largest amounts in January and March (Fig. 1). It is apparent, however, that, in planning some kinds of outdoor work, weekly data would be more useful than seasonal or monthly averages. By studying statistically many years of precipitation data for this area, we can estimate the chances of receiving certain amounts of rainfall in a given weekly period.

Left of the dividing line in Table 1 are figures showing, for each week of the year, the average weekly precipitation and the maximum precipitation that has occurred for that week. The precipitation average for any week is an arithmetic average of 60 weeks for the period 1901-60. For example, the week of January 17-23 gets an average of 1.57 inches of precipitation, and there has been as much as 13.59 inches during these 7 days. In the 60 years of record, there were 6 times that precipitation was less than 0.01 inch (trace or 0), and for the remaining 54 weeks, the measurable weekly totals were from 0.01 to 13.59 inches.

Barger and Thom's (1) method of obtaining estimates of probabilities of precipitation has been used in this study. The probabilities obtained are listed on the right-hand portion of Table 1 under "Percent Chance." Listed for each week are the probabilities of having less than specified amounts of precipitation. For example, for the week of March 1-7, the probability is 62 percent that the amount of precipitation will be less than 1.00 inch and 10 percent, or 1 chance in 10, that there will be no measurable rainfall (trace or 0). To state it another way, the probability is 38 percent (100-62) that the precipitation will be 1.00 inch or more.

Data from the 0.60 inch and 1.00 inch columns in Table 1 were plotted in Fig. 2. In this case, the probabilities are for 0.60 or more, and 1.00 inch or more. The curves were drawn for 3-week running means to minimize the effect of random variations from week to week and to present the longer period pattern. This method smooths short period singularities -- wet or dry periods which tend to occur during or near a particular week more frequently than chance would indicate.

The precipitation probabilities have a number of possible applications. The relatively drier period in late January and early February could be used for preparation of tobacco plant beds; for seeding clovers and grasses; and for the timely application of fertilizers. The probable occurrence of a dry period in April would indicate

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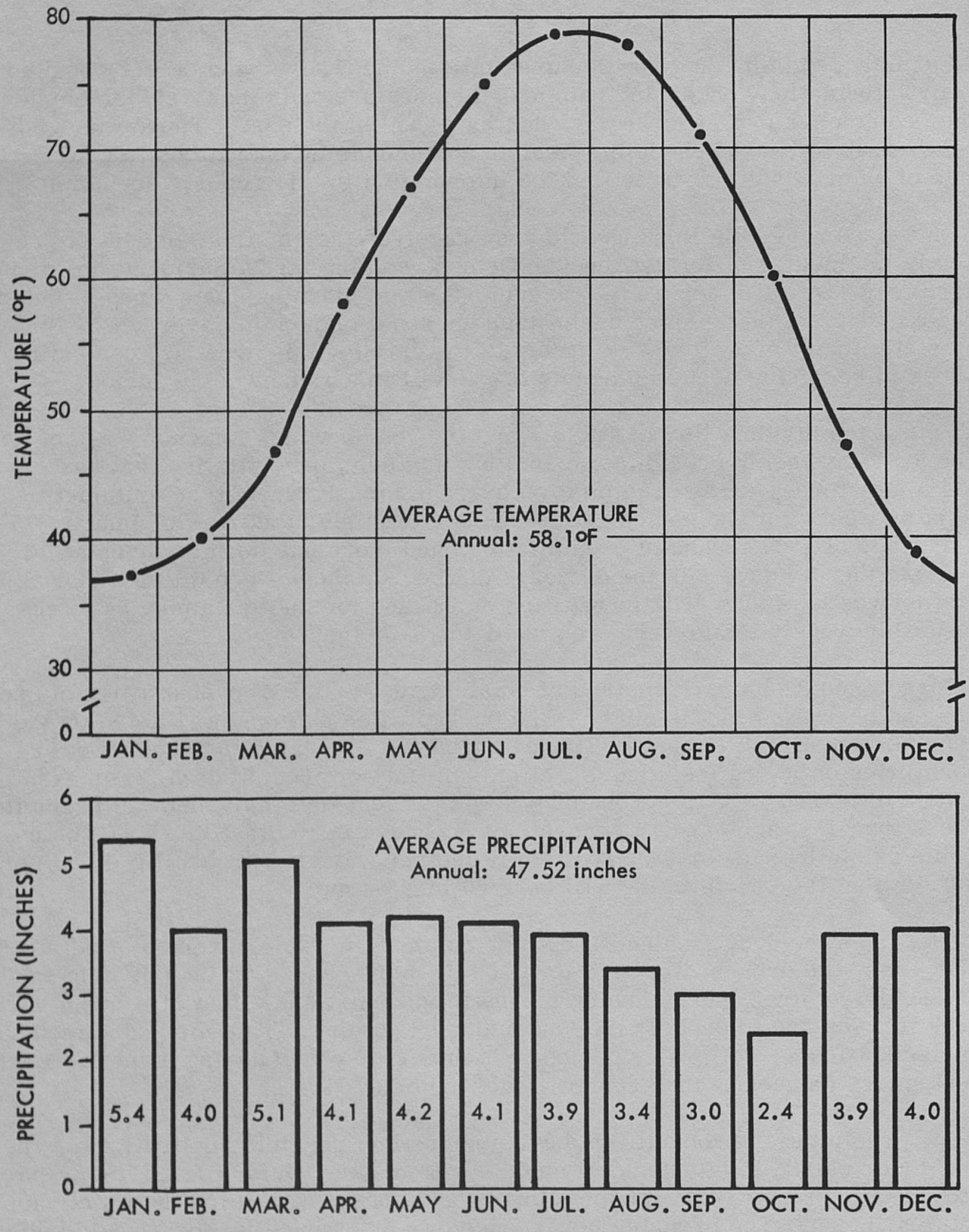

Fig. 1. -- Average monthly temperature and precipitation for Hopkinsville, Ky., 1931-60.

Table 1 - Weekly precipitation (inches) at Hopkinsville, Kentucky, 1901-60

WEEK BEGINNING MO.	DAY	AVERAGE	NO. WKS. TRACE, 0	MAXIMUM	PERCENT CHANCE TRACE 0	LESS THAN 0.20	0.40	0.60	0.80	1.00	1.50	2.00
Mar.	1	.93	6	4.47	10	22	34	46	55	62	80	86
	8	1.26	3	4.60	5	13	26	35	45	53	69	81
	15	1.04	4	5.27	7	21	32	46	56	62	76	85
	22	1.13	5	3.81	8	17	31	40	50	56	72	83
	29	1.05	3	6.45	5	19	31	43	53	59	76	86
Apr.	5	1.14	4	5.28	7	18	28	40	49	58	72	84
	12	1.03	5	4.53	8	21	34	42	54	61	76	85
	19	.71	2	2.47	3	22	40	54	67	76	90	96
	26	1.05	6	6.00	10	21	30	39	50	56	72	83
May	3	1.01	8	4.30	13	24	36	46	54	63	76	85
	10	.84	8	3.35	13	26	38	51	59	68	82	90
	17	.99	3	8.15	5	28	45	50	58	65	78	86
	24	.92	10	4.66	17	29	41	49	57	67	78	87
	31	1.03	8	5.45	13	27	39	49	55	62	74	84
June	7	.83	9	3.45	15	28	42	52	62	71	83	90
	14	.95	9	5.47	15	28	38	46	55	64	78	87
	21	.90	8	5.77	13	28	39	51	59	65	81	87
	28	1.02	12	5.57	20	32	40	48	56	62	75	83
July	5	.79	11	5.39	18	39	51	62	66	75	84	89
	12	.96	13	3.80	22	29	37	47	57	63	77	87
	19	.69	9	4.78	15	38	52	60	70	75	86	92
	26	1.05	10	6.52	17	27	41	48	53	60	74	83
Aug.	2	.84	8	4.20	13	26	39	53	60	67	81	89
	9	.95	11	3.62	18	32	42	52	60	65	78	85
	16	.86	10	4.25	17	39	50	60	64	70	79	86
	23	.55	16	2.53	27	45	54	66	72	81	90	95
	30	.72	14	3.98	23	40	51	61	66	73	84	90
Sept.	6	.70	11	2.90	18	34	47	59	65	72	85	91
	13	.53	19	3.83	32	52	62	70	76	81	89	95
	20	.71	18	3.80	30	42	52	60	66	72	83	91
	27	.70	19	5.30	32	47	56	66	70	74	85	91
Oct.	4	.86	13	6.05	22	41	50	57	63	69	79	88
	11	.56	20	3.57	33	49	59	68	72	79	88	93
	18	.66	19	3.17	32	45	51	61	69	75	86	92
	25	.59	17	3.51	28	42	55	66	74	79	90	95
Nov.	1	.84	14	4.07	23	35	43	52	60	65	80	88
	8	.89	12	6.28	20	32	44	53	61	68	80	88
	15	1.07	14	10.47	23	39	47	51	59	65	75	81
	22	.79	7	4.70	12	28	43	54	63	71	83	90
	29	.77	12	4.05	20	33	46	55	64	71	83	90
Dec.	6	1.02	10	4.82	17	27	36	45	53	61	75	86
	13	1.17	10	6.92	17	30	39	47	54	61	71	80
	20	.95	11	6.20	18	33	44	53	62	65	78	86
	27	1.11	2	3.98	3	17	29	38	49	58	75	84
Jan.	3	1.07	12	6.33	20	31	41	48	55	60	74	81
	10	1.04	9	6.33	15	28	36	46	55	62	75	85
	17	1.57	6	13.59	10	24	33	37	43	51	61	70
	24	.93	8	6.19	13	31	45	54	60	65	77	85
	31	.92	6	4.82	10	30	39	51	57	65	78	87
Feb.	7	.76	10	2.69	17	23	35	50	60	69	87	93
	14	1.09	6	6.29	10	22	34	42	52	60	74	84
	21	1.02	5	4.78	8	24	35	45	53	61	77	85

that seeding of legumes well in advance of this period would enhance the chances of success. The April dry spell would also be a good time for planting corn since the ground would be in shape for operation of machinery. Experience and experimental evidence indicate that higher yields often come from earlier planted corn.

One of the farmer's problems is the competition for available labor in May. By taking care of the tasks noted above in April he would be free to use available labor to accomplish in May those tasks which should be done then for best results. For example, the highest quality grass hay may be obtained from a cutting in early May; and the best quality and heaviest crop of alfalfa and clover hay may be obtained from a cutting in mid-May; tobacco transplanting from beds to fields usually takes place between May 15 and June 1.

It is apparent that some of the drier weeks of the year occur during late August to late September. This indicates that seeding of alfalfa immediately prior to, or during this period, would have less chance of success unless supplemental irrigation is available.

The foregoing are a few of the possible applications of precipitation probabilities. Others will become apparent to those who inspect the table and graphs with particular problems in mind.

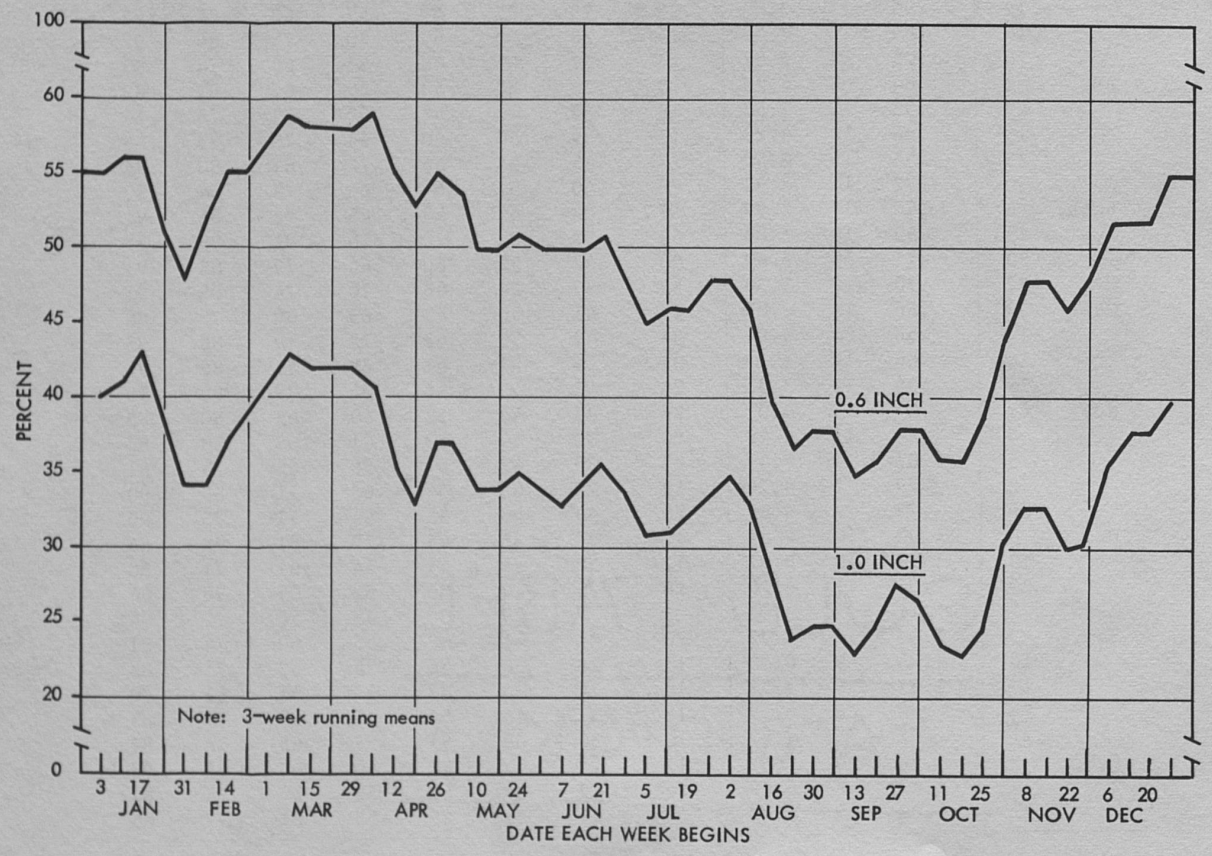

Fig. 2. -- Percent chance of weekly precipitation of 0.6 and 1.0 inch or more, Hopkinsville, Ky., 1901-60.

The probabilities listed in this report are based on past data but are the best estimate of what the rainfall will be for use in long-range planning several months or years ahead. Five-day outlooks and the daily forecasts should be used when short-range plans are of concern.

REFERENCE

1. Barger, G. L., and Thom, H. C. S., "Evaluation of Drought Hazard," Agron. Journal 41:519-526. 1949.