HAYS

BLAINE COUNTY

The Hays site is located seven miles north of Hays and about twenty-eight miles south of Fort Belknap at 48 06 17 N and 108 42 43 W (Site No. 150 on Map II-1). Elevation at the site is 3,150 feet. This monitoring site is part of the wind monitoring program of the Montana Department of Natural Resources and Conservation.

The site is on top of McGuire Hill in a rolling grassland area typical of eastern Montana. It has excellent exposure to winds from all directions. The site is typical of a series of low ridges (drainage divides) that run approximately northeast-southwest between the Little Rockies and Bears Paw Mountains. The site is right next to state Highway 66. Winter access is good.

The site is located on the Fort Belknap Reservation. Electrical service in the area is provided by the Big Flat Electric Cooperative. A 69 kV line runs next to the site and a 230 kV line, 28 miles to the north, runs between Fort Peck and Havre. There is no commercial airport nearby.

The site was installed December 14, 1983. Wind data were collected from January 1, 1984 to July 15, 1985. A Met One anemometer and a Campbell Scientific datalogger were used. The anemometer height was 33 feet.

Data recovery was poor to excellent, ranging from 31.3 percent in September to 100.0 percent in October. Overall data recovery was 87.5 percent.

Average monthly wind speeds ranged from 8.9 miles per hour in August to 13.9 miles per hour in December. Average annual wind speed was 12.0 miles per hour.

Average monthly wind power ranged from 72.5 watts/m^2 in August to 336.4 watts/m^2 in December.

Average wind speed did not vary much between seasons. Average seasonal speeds were 10.7 miles per hour in the summer, 11.4 miles per hour in the autumn, 13.0 miles per hour in the winter, and 12.0 miles per hour in the spring. In the winter and spring, the highest wind speed occurred in early afternoon. High winds in the summer were a little later than in the winter and spring, and high winds in the autumn were a little earlier. Diurnal range of average wind speeds was greatest in the summer and least in the winter.

Valid wind direction data were not collected between January 30, 1984 and July 20, 1984; the effect of this on the wind direction statistics is unknown. According to the available data, the wind blew most frequently from the south-southwest through the west-southwest. Winds were least common from the east-northeast through the south-southeast. By direction, average wind speeds ranged from 6.7 miles per hour from the south-southeast to 16.3 miles per hour from the northwest.

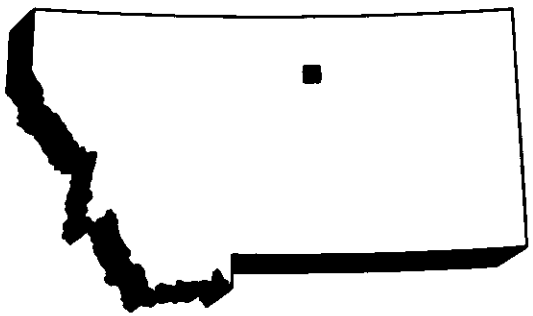


Table IV - 7

Monthly Wind Speed Distribution

BLAINE COUNTY - HAYS

01/01/84 - 07/15/85

SPEED (MILES/HOUR)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
CALM	0.4	0.1	0.0	0.1	1.8	0.6	0.0	2.0	3.1	0.7	0.4	0.4	0.6
0.1-1.0	1.0	1.2	0.3	0.1	0.3	0.5	0.2	0.4	0.0	0.8	0.8	1.6	0.6
1.1-2.0	3.0	1.9	1.6	0.9	0.8	0.7	0.9	0.4	4.0	2.3	1.2	1.9	1.5
2.1-3.0	2.8	2.7	4.3	1.6	2.1	1.8	2.6	4.3	1.8	2.4	2.9	3.1	2.7
3.1-4.0	4.7	5.1	6.8	4.0	4.7	5.6	4.3	7.8	5.3	5.8	4.5	4.7	5.2
4.1-5.0	5.3	4.0	6.9	4.2	5.4	4.7	6.8	10.2	9.3	5.1	2.9	5.9	5.6
5.1-6.0	5.3	5.8	7.7	7.5	7.6	7.4	9.9	8.2	12.4	8.7	7.0	7.7	7.5
6.1-7.0	4.5	5.5	7.5	6.2	5.3	6.4	8.4	6.4	10.2	6.3	4.5	6.1	6.2
7.1-8.0	4.9	6.7	8.3	7.0	8.7	6.5	9.5	11.5	11.1	5.4	7.0	3.4	7.2
8.1-9.0	5.5	6.1	6.3	5.6	5.8	6.4	8.2	8.2	4.4	4.3	6.2	3.9	6.0
9.1-10.0	4.7	6.2	7.0	6.0	7.2	6.0	8.5	8.2	6.7	7.7	4.5	5.5	6.5
10.1-11.0	3.2	4.4	4.3	4.0	5.1	6.6	5.6	4.3	2.2	6.5	4.1	2.0	4.5
11.1-12.0	5.1	5.9	4.7	5.0	4.7	5.4	5.5	4.5	6.7	5.8	4.5	3.2	5.0
12.1-13.0	4.2	4.3	3.8	3.7	4.1	4.9	3.8	3.5	1.8	4.7	2.9	2.8	3.9
13.1-14.0	5.0	5.2	4.6	5.1	5.3	4.2	3.9	6.6	2.2	5.0	4.5	4.0	4.8
14.1-15.0	3.2	2.8	3.7	2.9	3.0	3.5	3.0	2.7	2.2	3.2	2.5	2.8	3.1
15.1-16.0	3.4	4.2	3.3	2.8	2.6	3.4	2.1	2.7	2.7	2.6	1.7	2.8	3.0
16.1-17.0	4.0	4.0	3.1	3.8	3.5	3.1	2.4	2.1	1.8	2.6	2.5	2.8	3.2
17.1-18.0	3.3	3.0	3.4	2.9	2.2	2.4	2.6	1.4	1.8	2.6	1.7	3.2	2.7
18.1-19.0	4.5	3.6	3.5	3.1	2.6	2.6	3.0	0.8	0.9	3.9	3.3	3.0	3.2
19.1-20.0	2.5	2.3	2.5	2.7	2.0	2.5	1.8	0.2	1.3	2.4	3.3	3.4	2.3
20.1-25.0	10.5	9.9	4.9	11.5	6.8	9.5	5.9	2.7	7.6	8.5	20.2	14.5	8.8
25.1-30.0	5.6	3.5	1.4	5.9	4.5	3.9	0.7	0.4	0.0	2.2	4.1	6.3	3.6
30.1-35.0	2.8	1.1	0.1	1.5	2.8	1.0	0.3	0.2	0.0	0.5	1.7	2.6	1.4
35.1-40.0	0.6	0.4	0.1	1.3	0.7	0.2	0.1	0.0	0.4	0.3	0.8	1.3	0.5
>40.0	0.3	0.2	0.0	0.6	0.4	0.1	0.0	0.2	0.0	0.0	0.0	0.9	0.2
AVERAGE SPEED (MPH)	13.2	12.3	10.4	13.5	12.2	12.1	10.3	8.9	9.2	11.3	13.7	13.9	12.0
AVERAGE SPEED (M/SEC)	5.9	5.5	4.6	6.0	5.5	5.4	4.6	4.0	4.1	5.0	6.1	6.2	5.3
AVERAGE WIND POWER (WATTS/M**2)	267.4	201.0	114.3	262.9	214.4	173.6	99.2	72.5	92.2	148.3	261.1	336.4	194.6
PERCENT DATA RECOVERY	99.7	90.1	99.2	99.9	99.3	78.1	99.0	68.8	31.3	100.0	33.6	99.9	87.5

SPEED (METERS/SECOND)
CALM
0.1- 0.4
0.5- 0.9
1.0- 1.3
1.4- 1.8
1.9- 2.2
2.3- 2.7
2.8- 3.1
3.2- 3.6
3.7- 4.0
4.1- 4.5
4.6- 4.9
5.0- 5.4
5.5- 5.8
5.9- 6.3
6.4- 6.7
6.8- 7.2
7.3- 7.6
7.7- 8.0
8.1- 8.5
8.6- 8.9
9.0-11.2
11.3-13.4
13.5-15.6
15.7-17.9
>17.9

ANEMOMETER HEIGHT = 10 METERS = 33 FEET
NUMBER OF OBSERVATIONS = 11726
PERCENTAGE DATA RECOVERY = 87.5

SOURCE: GEORESEARCH, INC.

Table IV - 8

Percentage Frequency Summary for Wind Speed

BLAINE COUNTY - HAYS

(WINTER)

01/01/84 - 07/15/85

		WIND SPEED (MPH)																	
		CALM	0.1-2.0	2.1-4.0	4.1-6.0	6.1-8.0	8.1-10.0	10.1-12.0	12.1-14.0	14.1-16.0	16.1-18.0	18.1-20.0	20.1-25.0	25.1-30.0	30.1-35.0	35.1-40.0	>40.0		
		WIND SPEED (METERS/SECOND)																AV SPEED (MPH)	AV SPEED (M/SEC)
		CALM	0.1-0.9	0.9-1.8	1.8-2.7	2.7-3.6	3.6-4.5	4.5-5.4	5.4-6.3	6.3-7.2	7.2-8.0	8.1-8.9	9.0-11.2	11.2-13.4	13.5-15.6	15.7-17.9	>17.9		
	1	0.0	4.2	6.9	14.6	10.4	12.5	11.1	11.8	6.3	4.9	2.1	9.0	6.3	0.0	0.0	0.0	11.7	5.2
	2	0.0	4.2	9.0	13.2	11.8	12.5	9.0	9.0	4.9	5.6	4.9	13.2	2.8	0.0	0.0	0.0	11.6	5.2
	3	0.7	2.1	6.9	14.6	12.5	14.6	6.9	8.3	4.2	9.7	2.8	12.5	3.5	0.7	0.0	0.0	11.8	5.3
	4	0.0	2.8	10.4	9.7	13.9	13.2	7.6	6.3	4.9	7.6	4.9	13.2	4.2	1.4	0.0	0.0	12.2	5.4
	5	0.0	2.1	8.3	14.6	11.1	11.8	9.0	5.6	3.5	9.0	10.4	9.0	4.2	0.7	0.0	0.7	12.5	5.6
	6	0.0	2.1	8.3	11.1	14.6	11.1	6.9	6.9	6.9	6.9	8.3	12.5	2.1	1.4	0.0	0.7	12.7	5.7
	7	0.0	0.7	7.6	12.5	12.5	11.1	8.3	9.0	7.6	7.6	5.6	10.4	3.5	2.8	0.0	0.7	13.0	5.8
	8	0.0	4.2	6.3	6.9	11.8	16.0	8.3	9.0	8.3	6.9	4.9	10.4	3.5	2.8	0.0	0.7	13.0	5.8
H	9	0.0	6.3	5.6	8.3	8.3	13.9	12.5	10.4	3.5	5.6	4.2	15.3	2.8	2.8	0.0	0.7	13.0	5.8
	10	0.7	3.5	6.3	13.9	6.9	11.8	9.0	9.7	6.3	6.3	4.9	12.5	4.2	2.8	1.4	0.0	13.1	5.8
O	11	2.1	2.1	7.6	11.1	9.7	9.7	5.6	9.7	5.6	8.3	6.3	12.5	4.2	5.6	0.0	0.0	13.5	6.1
	12	1.4	5.6	4.9	11.2	7.0	6.3	6.3	9.1	6.3	7.0	5.6	19.6	5.6	3.5	0.7	0.0	14.3	6.4
U	13	1.4	5.5	9.0	7.6	4.1	4.8	6.2	7.6	8.3	8.3	10.3	16.6	2.8	5.5	2.1	0.0	15.0	6.7
	14	0.0	6.2	8.3	9.7	4.1	4.8	3.4	9.0	6.9	9.7	9.7	15.9	6.2	3.4	2.1	0.7	15.3	6.8
R	15	0.0	6.9	6.9	4.1	7.6	4.8	2.8	13.1	11.0	8.3	7.6	15.9	5.5	2.1	3.4	0.0	15.2	6.8
	16	0.7	4.1	6.2	9.7	4.8	9.0	4.1	9.0	9.0	6.2	13.8	13.1	5.5	2.8	1.4	0.7	14.9	6.7
	17	0.0	2.8	9.0	8.3	9.7	6.9	6.9	9.7	9.7	6.9	11.7	11.7	2.1	4.8	0.0	0.0	13.8	6.2
	18	0.0	3.4	7.6	11.7	7.6	9.0	14.5	8.3	7.6	4.8	9.0	11.0	2.1	2.8	0.7	0.0	12.9	5.8
	19	0.0	3.4	5.5	12.4	11.0	13.8	11.7	8.3	5.5	5.5	6.2	13.1	0.0	2.1	1.4	0.0	12.4	5.5
	20	0.0	2.1	6.9	9.7	15.2	10.3	14.5	8.3	4.1	6.2	5.5	13.8	1.4	1.4	0.7	0.0	12.4	5.5
	21	0.0	2.8	10.3	10.3	13.1	11.0	6.9	12.4	6.9	6.9	2.1	11.7	4.1	0.7	0.7	0.0	12.2	5.4
	22	0.0	1.4	10.3	10.3	16.6	12.4	9.7	6.2	5.5	7.6	5.5	9.7	2.1	2.1	0.0	0.7	12.1	5.4
	23	0.0	2.8	4.9	14.1	17.6	10.6	9.9	8.5	7.0	2.8	4.9	10.6	3.5	1.4	0.0	1.4	12.3	5.5
	24	0.0	4.3	10.7	12.1	7.1	17.1	8.6	6.4	7.9	7.1	3.6	8.6	4.3	2.1	0.0	0.0	11.8	5.3
ALL HOURS		0.3	3.6	7.7	10.9	10.4	10.8	8.3	8.8	6.6	6.9	6.4	12.6	3.6	2.3	0.6	0.3	13.0	5.8

SOURCE: GEORESEARCH, INC.

Table IV - 9

Percentage Frequency Summary for Wind Speed

BLAINE COUNTY - HAYS

(SPRING)

01/01/84 - 07/15/85

		WIND SPEED (MPH)																	
		CALM	0.1-2.0	2.1-4.0	4.1-6.0	6.1-8.0	8.1-10.0	10.1-12.0	12.1-14.0	14.1-16.0	16.1-18.0	18.1-20.0	20.1-25.0	25.1-30.0	30.1-35.0	35.1-40.0	>40.0		
		WIND SPEED (METERS/SECOND)																	
		CALM	0.1-0.9	0.9-1.8	1.8-2.7	2.7-3.6	3.6-4.5	4.5-5.4	5.4-6.3	6.3-7.2	7.2-8.0	8.1-8.9	9.0-11.2	11.2-13.4	13.5-15.6	15.7-17.9	>17.9	AV SPEED (MPH)	AV SPEED (M/SEC)
	1	0.5	2.7	8.7	20.1	18.5	9.8	8.2	4.9	5.4	5.4	5.4	7.1	1.6	0.5	1.1	0.0	10.5	4.7
	2	0.5	0.5	14.1	20.1	12.0	10.9	7.1	10.9	4.9	4.9	4.9	7.1	0.0	1.6	0.5	0.0	10.5	4.7
	3	0.5	1.6	11.4	14.1	17.4	13.0	9.8	9.8	4.3	2.2	6.0	6.5	2.2	0.0	1.1	0.0	10.6	4.7
	4	0.5	1.1	9.8	16.8	19.6	14.1	7.1	10.9	3.8	3.3	3.3	5.4	2.7	0.0	1.1	0.5	10.5	4.7
	5	0.5	1.1	8.2	18.5	18.5	15.8	8.2	6.5	5.4	6.0	2.2	5.4	1.6	0.5	0.5	1.1	10.5	4.7
	6	0.5	1.1	6.0	16.4	20.2	19.1	8.2	8.2	4.4	3.8	3.3	3.8	3.8	1.1	0.0	0.0	10.4	4.6
	7	0.5	1.6	9.9	14.8	21.4	13.7	7.1	9.3	6.0	3.8	4.4	4.9	1.1	1.1	0.0	0.0	10.2	4.5
	8	0.5	3.8	12.6	16.5	15.4	11.0	6.0	7.7	6.0	6.0	3.8	6.0	1.1	1.6	1.6	0.0	10.6	4.7
H	9	1.1	2.2	14.3	13.2	10.4	9.3	9.3	6.6	7.1	8.8	4.4	8.8	1.6	0.5	1.1	1.1	11.7	5.2
	10	0.5	2.2	9.3	13.7	9.3	10.4	11.5	8.2	2.7	6.0	4.9	13.2	3.3	2.7	0.5	1.1	12.7	5.7
O	11	1.1	1.6	8.2	9.9	11.0	11.5	7.7	8.2	4.9	5.5	8.8	12.6	3.8	3.3	1.6	0.0	13.6	6.1
	12	0.5	1.6	7.1	14.8	7.1	8.8	9.9	7.1	3.3	8.8	7.1	15.4	2.2	4.9	1.1	0.0	13.7	6.1
U	13	0.5	0.5	9.2	7.6	10.9	10.3	6.5	7.1	8.7	9.2	8.2	12.5	3.8	3.3	1.1	0.5	14.1	6.3
	14	0.5	1.1	4.3	8.2	10.3	9.8	8.7	9.2	7.6	11.4	9.2	10.3	4.9	2.7	1.6	0.0	14.5	6.5
R	15	0.5	0.5	5.4	8.2	10.3	6.5	10.9	10.3	10.3	9.2	8.2	10.3	5.4	3.8	0.0	0.0	14.4	6.4
	16	1.1	0.0	4.9	10.3	8.2	7.1	10.9	8.2	13.6	7.6	6.5	13.6	4.9	2.7	0.5	0.0	14.4	6.4
	17	0.0	0.5	4.9	7.6	8.7	10.9	8.7	11.4	9.2	8.7	8.2	12.0	5.4	3.3	0.5	0.0	14.6	6.5
	18	0.0	0.5	6.0	5.4	13.0	9.8	9.2	13.6	9.8	8.7	5.4	10.9	5.4	1.6	0.5	0.0	13.8	6.2
	19	0.0	0.0	6.5	9.8	12.5	11.4	12.5	10.9	6.5	5.4	7.1	10.9	4.9	1.1	0.5	0.0	13.1	5.9
	20	0.5	1.6	3.8	9.8	17.5	18.0	14.2	10.4	1.6	6.6	3.8	7.1	3.3	0.5	1.1	0.0	11.7	5.2
	21	1.1	2.2	7.1	10.9	18.0	20.8	12.0	9.3	3.8	2.2	3.3	6.0	2.2	1.1	0.0	0.0	10.6	4.7
	22	1.6	1.1	7.1	11.5	20.3	19.2	9.9	8.8	5.5	4.9	3.3	3.8	2.7	0.0	0.0	0.0	10.3	4.6
	23	1.1	1.1	3.9	17.7	15.5	19.3	11.6	7.7	4.4	6.1	3.9	6.6	1.1	0.0	0.0	0.0	10.4	4.7
	24	0.6	2.2	5.6	19.4	17.2	12.8	7.8	6.7	6.1	6.7	5.6	6.7	1.7	1.1	0.0	0.0	10.7	4.8
ALL HOURS		0.6	1.4	7.9	13.1	14.3	12.6	9.3	8.8	6.1	6.3	5.5	8.6	3.0	1.6	0.7	0.2	12.0	5.4

SOURCE: GEORESEARCH, INC.

Table IV - 10

Percentage Frequency Summary for Wind Speed

BLAINE COUNTY - HAYS

(SUMMER)

01/01/84 - 07/15/85

		WIND SPEED (MPH)																	
		CALM	0.1-2.0	2.1-4.0	4.1-6.0	6.1-8.0	8.1-10.0	10.1-12.0	12.1-14.0	14.1-16.0	16.1-18.0	18.1-20.0	20.1-25.0	25.1-30.0	30.1-35.0	35.1-40.0	>40.0		
		WIND SPEED (METERS/SECOND)																AV SPEED (MPH)	AV SPEED (M/SEC)
		CALM	0.1-0.9	0.9-1.8	1.8-2.7	2.7-3.6	3.6-4.5	4.5-5.4	5.4-6.3	6.3-7.2	7.2-8.0	8.1-8.9	9.0-11.2	11.2-13.4	13.5-15.6	15.7-17.9	>17.9		
	1	0.0	0.0	7.1	14.2	23.0	17.7	14.2	8.0	7.1	4.4	1.8	2.7	0.0	0.0	0.0	0.0	9.7	4.3
	2	0.9	0.9	11.5	15.0	15.9	20.4	13.3	11.5	1.8	1.8	2.7	2.7	0.9	0.9	0.0	0.0	9.3	4.1
	3	1.8	1.8	11.5	17.7	16.8	23.0	11.5	4.4	1.8	3.5	1.8	2.7	0.9	0.9	0.0	0.0	8.7	3.9
	4	1.8	0.9	11.5	26.5	18.6	15.9	8.8	5.3	2.7	2.7	0.9	3.5	0.0	0.0	0.9	0.0	8.4	3.8
	5	0.9	0.9	16.1	22.3	21.4	16.1	8.0	2.7	2.7	1.8	0.0	5.4	0.0	1.8	0.0	0.0	8.4	3.7
	6	0.9	0.9	13.4	20.5	17.9	22.3	9.8	4.5	2.7	0.0	2.7	2.7	0.0	0.9	0.9	0.0	8.6	3.8
	7	0.9	4.5	10.7	25.0	25.0	12.5	7.1	6.3	0.9	2.7	1.8	2.7	0.0	0.0	0.0	0.0	7.9	3.5
	8	0.9	3.6	14.3	21.4	17.0	9.8	8.9	6.3	6.3	2.7	6.3	2.7	0.0	0.0	0.0	0.0	8.8	3.9
H	9	0.0	2.7	12.6	18.9	13.5	11.7	9.0	5.4	4.5	8.1	4.5	6.3	2.7	0.0	0.0	0.0	10.4	4.6
	10	0.0	2.7	13.5	15.3	9.9	12.6	5.4	11.7	4.5	4.5	4.5	9.9	4.5	0.0	0.0	0.9	11.3	5.1
O	11	0.0	0.9	12.8	12.8	12.8	9.2	10.1	7.3	7.3	7.3	4.6	9.2	4.6	0.9	0.0	0.0	11.9	5.3
	12	0.9	0.0	11.1	20.4	9.3	6.5	9.3	6.5	7.4	7.4	7.4	8.3	4.6	0.9	0.0	0.0	11.8	5.3
U	13	0.9	0.0	6.3	18.8	9.8	11.6	5.4	13.4	5.4	6.3	7.1	13.4	0.0	1.8	0.0	0.0	12.1	5.4
	14	0.0	0.0	3.6	12.6	15.3	10.8	8.1	11.7	8.1	6.3	8.1	14.4	0.0	0.9	0.0	0.0	12.7	5.7
R	15	0.0	0.0	3.6	10.8	13.5	11.7	10.8	6.3	15.3	0.9	9.9	13.5	2.7	0.9	0.0	0.0	13.1	5.8
	16	0.0	0.0	2.7	12.6	18.0	4.5	9.9	9.9	8.1	9.9	5.4	14.4	4.5	0.0	0.0	0.0	13.3	5.9
	17	0.0	0.0	3.6	10.8	12.6	18.0	6.3	10.8	8.1	7.2	3.6	18.0	0.9	0.0	0.0	0.0	12.8	5.7
	18	0.9	1.8	2.7	9.0	12.6	9.9	10.8	12.6	9.0	9.0	6.3	14.4	0.9	0.0	0.0	0.0	12.8	5.7
	19	0.9	1.8	2.7	9.9	4.5	13.5	11.7	18.9	10.8	6.3	8.1	9.9	0.9	0.0	0.0	0.0	12.7	5.7
	20	0.0	0.9	1.8	5.5	14.5	10.0	18.2	10.9	11.8	10.9	4.5	9.1	0.0	1.8	0.0	0.0	13.0	5.8
	21	0.0	0.9	4.5	6.4	16.4	22.7	18.2	9.1	6.4	5.5	4.5	1.8	0.0	3.6	0.0	0.0	11.2	5.0
	22	0.9	0.0	2.8	13.8	20.2	27.5	13.8	8.3	2.8	3.7	1.8	3.7	0.9	0.0	0.0	0.0	9.9	4.4
	23	0.9	0.0	4.6	11.0	23.9	20.2	19.3	10.1	1.8	0.9	1.8	5.5	0.0	0.0	0.0	0.0	9.8	4.4
	24	0.9	0.0	8.3	11.9	20.2	21.1	16.5	8.3	4.6	3.7	1.8	2.8	0.0	0.0	0.0	0.0	9.4	4.2
ALL HOURS		0.6	1.1	8.1	15.2	16.0	15.0	11.0	8.7	5.9	4.9	4.2	7.5	1.2	0.6	0.1	0.0	10.7	4.8

SOURCE: GEORESEARCH, INC.

Table IV - 11

Percentage Frequency Summary for Wind Speed

BLAINE COUNTY - HAYS

(AUTUMN)

01/01/84 - 07/15/85

		WIND SPEED (MPH)																	
		CALM	0.1-2.0	2.1-4.0	4.1-6.0	6.1-8.0	8.1-10.0	10.1-12.0	12.1-14.0	14.1-16.0	16.1-18.0	18.1-20.0	20.1-25.0	25.1-30.0	30.1-35.0	35.1-40.0	>40.0		
		WIND SPEED (METERS/SECOND)																AV SPEED (MPH)	AV SPEED (M/SEC)
		CALM	0.1-0.9	0.9-1.8	1.8-2.7	2.7-3.6	3.6-4.5	4.5-5.4	5.4-6.3	6.3-7.2	7.2-8.0	8.1-8.9	9.0-11.2	11.2-13.4	13.5-15.6	15.7-17.9	>17.9		
	1	0.0	6.0	6.0	18.0	22.0	6.0	4.0	4.0	12.0	8.0	4.0	10.0	0.0	0.0	0.0	0.0	10.5	4.7
	2	0.0	6.0	10.0	16.0	16.0	12.0	6.0	4.0	6.0	4.0	6.0	8.0	6.0	0.0	0.0	0.0	10.8	4.8
	3	0.0	4.0	2.0	14.0	20.0	16.0	6.0	12.0	8.0	0.0	2.0	14.0	0.0	2.0	0.0	0.0	11.2	5.0
	4	2.0	0.0	4.0	24.0	14.0	14.0	12.0	8.0	4.0	2.0	6.0	8.0	0.0	2.0	0.0	0.0	10.5	4.7
	5	2.0	2.0	6.0	12.0	22.0	14.0	18.0	4.0	0.0	2.0	8.0	8.0	0.0	2.0	0.0	0.0	10.5	4.7
	6	2.0	2.0	6.0	14.0	26.0	6.0	10.0	10.0	0.0	6.0	10.0	6.0	2.0	0.0	0.0	0.0	10.7	4.8
	7	4.0	0.0	8.0	12.0	20.0	12.0	14.0	4.0	6.0	4.0	6.0	8.0	2.0	0.0	0.0	0.0	10.8	4.8
	8	2.0	0.0	8.0	18.0	14.0	10.0	10.0	12.0	4.0	0.0	6.0	14.0	2.0	0.0	0.0	0.0	11.2	5.0
H	9	2.0	2.0	12.0	18.0	6.0	14.0	4.0	16.0	8.0	0.0	4.0	12.0	2.0	0.0	0.0	0.0	10.8	4.8
	10	2.0	12.0	2.0	10.0	10.0	16.0	6.0	10.0	4.0	6.0	4.0	16.0	2.0	0.0	0.0	0.0	11.4	5.1
O	11	0.0	4.0	10.0	10.0	8.0	8.0	12.0	12.0	0.0	6.0	6.0	20.0	4.0	0.0	0.0	0.0	13.0	5.8
	12	0.0	2.0	8.0	8.0	6.0	14.0	8.0	6.0	10.0	2.0	6.0	22.0	6.0	0.0	2.0	0.0	14.4	6.4
U	13	0.0	0.0	7.7	13.5	11.5	5.8	11.5	7.7	5.8	3.8	7.7	21.2	3.8	0.0	0.0	0.0	13.5	6.0
	14	1.9	0.0	7.7	7.7	7.7	7.7	19.2	5.8	7.7	9.6	7.7	11.5	1.9	3.8	0.0	0.0	13.4	6.0
R	15	1.9	0.0	7.7	11.5	5.8	7.7	15.4	9.6	13.5	5.8	3.8	9.6	3.8	1.9	1.9	0.0	13.3	5.9
	16	1.9	1.9	5.8	15.4	11.5	5.8	13.5	15.4	3.8	7.7	0.0	11.5	3.8	1.9	0.0	0.0	12.2	5.4
	17	1.9	3.8	7.7	13.5	3.8	21.2	9.6	5.8	9.6	0.0	5.8	13.5	0.0	3.8	0.0	0.0	12.0	5.4
	18	2.0	0.0	9.8	5.9	19.6	15.7	11.8	9.8	3.9	3.9	9.8	3.9	2.0	0.0	2.0	0.0	11.3	5.0
	19	0.0	3.9	15.7	9.8	17.6	11.8	13.7	5.9	2.0	7.8	5.9	2.0	2.0	2.0	0.0	0.0	10.2	4.5
	20	0.0	3.9	11.8	19.6	13.7	11.8	11.8	5.9	2.0	7.8	3.9	7.8	0.0	0.0	0.0	0.0	9.7	4.3
	21	0.0	3.9	11.8	19.6	7.8	15.7	13.7	7.8	5.9	2.0	5.9	5.9	0.0	0.0	0.0	0.0	9.7	4.3
	22	0.0	2.0	8.2	18.4	10.2	12.2	14.3	10.2	2.0	8.2	4.1	10.2	0.0	0.0	0.0	0.0	10.8	4.8
	23	0.0	10.2	8.2	16.3	12.2	12.2	6.1	6.1	4.1	8.2	6.1	10.2	0.0	0.0	0.0	0.0	10.4	4.6
	24	0.0	4.1	4.1	24.5	18.4	8.2	10.2	4.1	4.1	6.1	6.1	10.2	0.0	0.0	0.0	0.0	10.3	4.6
ALL HOURS		1.1	3.1	7.8	14.5	13.5	11.6	10.9	8.2	5.3	4.6	5.6	11.0	1.8	0.8	0.2	0.0	11.4	5.1

SOURCE: GEORESEARCH, INC.

Table IV - 12

Annual Wind Rose Distribution

BLAINE COUNTY - HAYS

01/01/84 - 07/15/85

DIRECTION>	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	<DIRECTION
SPEED (MPH)																		SPEED (M/SEC)
0.1- 1.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.7	0.1- 0.4
1.1- 2.0	0.1	0.2	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	1.6	0.5- 0.9
2.1- 3.0	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	2.5	1.0- 1.3 S
3.1- 4.0	0.1	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.8	0.4	0.4	0.1	0.2	0.2	5.1	1.4- 1.8 P
S 4.1- 5.0	0.2	0.2	0.5	0.4	0.3	0.2	0.2	0.3	0.4	0.6	0.8	0.5	0.3	0.2	0.2	0.2	5.5	1.9- 2.2 E
P 5.1- 6.0	0.5	0.4	0.4	0.5	0.4	0.3	0.2	0.3	0.3	1.0	1.5	0.8	0.3	0.1	0.2	0.3	7.4	2.3- 2.7 E
E 6.1- 7.0	0.2	0.3	0.5	0.3	0.3	0.2	0.1	0.2	0.5	0.9	0.9	0.8	0.3	0.1	0.3	0.3	6.2	2.8- 3.1 D
E 7.1- 8.0	0.3	0.4	0.4	0.5	0.3	0.2	0.2	0.2	0.6	0.9	1.0	0.8	0.4	0.3	0.2	0.3	7.1	3.2- 3.6
D 8.1- 9.0	0.3	0.3	0.4	0.3	0.2	0.2	0.1	0.2	0.7	0.6	0.8	0.7	0.3	0.1	0.1	0.4	5.6	3.7- 4.0 M
9.1-10.0	0.3	0.3	0.3	0.2	0.3	0.2	0.1	0.1	0.7	0.7	0.9	0.8	0.3	0.3	0.3	0.3	6.2	4.1- 4.5 E
M 10.1-11.0	0.2	0.1	0.3	0.2	0.2	0.1	0.1	0.0	0.3	0.3	0.8	0.5	0.2	0.3	0.3	0.4	4.2	4.6- 4.9 T
I 11.1-12.0	0.1	0.3	0.3	0.2	0.2	0.0	0.1	0.0	0.3	0.5	0.8	0.5	0.3	0.2	0.4	0.3	4.7	5.0- 5.4 E
L 12.1-13.0	0.1	0.1	0.2	0.1	0.2	0.0	0.1	0.0	0.1	0.4	0.8	0.4	0.2	0.2	0.4	0.3	3.8	5.5- 5.8 R
E 13.1-14.0	0.1	0.1	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.5	0.9	0.5	0.2	0.3	0.5	0.3	4.5	5.9- 6.3 S
S 14.1-15.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.3	0.5	0.3	0.2	0.2	0.4	0.3	3.0	6.4- 6.7 /
/ 15.1-16.0	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.2	0.3	0.6	0.3	0.2	0.1	0.5	0.3	3.0	6.8- 7.2 S
H 16.1-17.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.6	0.5	0.2	0.2	0.4	0.4	3.1	7.3- 7.6 E
O 17.1-18.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.7	0.3	0.1	0.3	0.5	0.3	2.8	7.7- 8.0 C
U 18.1-19.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.4	0.8	0.4	0.2	0.3	0.5	0.3	3.4	8.1- 8.5 O
R 19.1-20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.4	0.4	0.2	0.2	0.5	0.3	2.5	8.6- 8.9 N
20.1-25.0	0.2	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.4	0.8	2.4	1.3	0.7	0.7	1.8	1.0	9.8	9.0-11.2 D
25.1-30.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.8	1.0	0.4	0.3	0.5	0.2	3.6	11.3-13.4
30.1-35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.3	0.1	0.2	0.1	1.6	13.5-15.6
35.1-40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.0	0.0	0.8	15.7-17.9
>40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	>17.9
CALM																	0.8	CALM
TOTAL	3.5	4.0	4.7	3.7	3.5	2.5	2.1	2.2	6.1	10.2	17.9	12.6	6.1	4.9	8.6	6.5	100.0	TOTAL
AV SPEED (MPH)	9.6	9.1	8.8	8.1	9.6	8.3	7.7	6.7	9.8	11.3	13.5	14.4	14.4	15.3	16.3	13.6	12.2	AV SPEED (MPH)
AV SPEED (M/SEC)	4.3	4.1	3.9	3.6	4.3	3.7	3.5	3.0	4.4	5.1	6.0	6.4	6.5	6.8	7.3	6.1	5.4	AV SPEED (M/SEC)

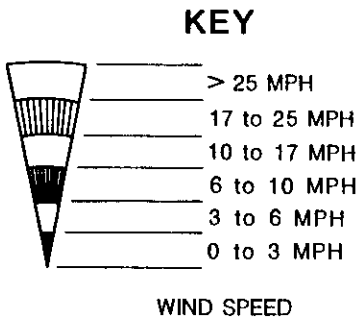
SOURCE: GEORESEARCH, INC.

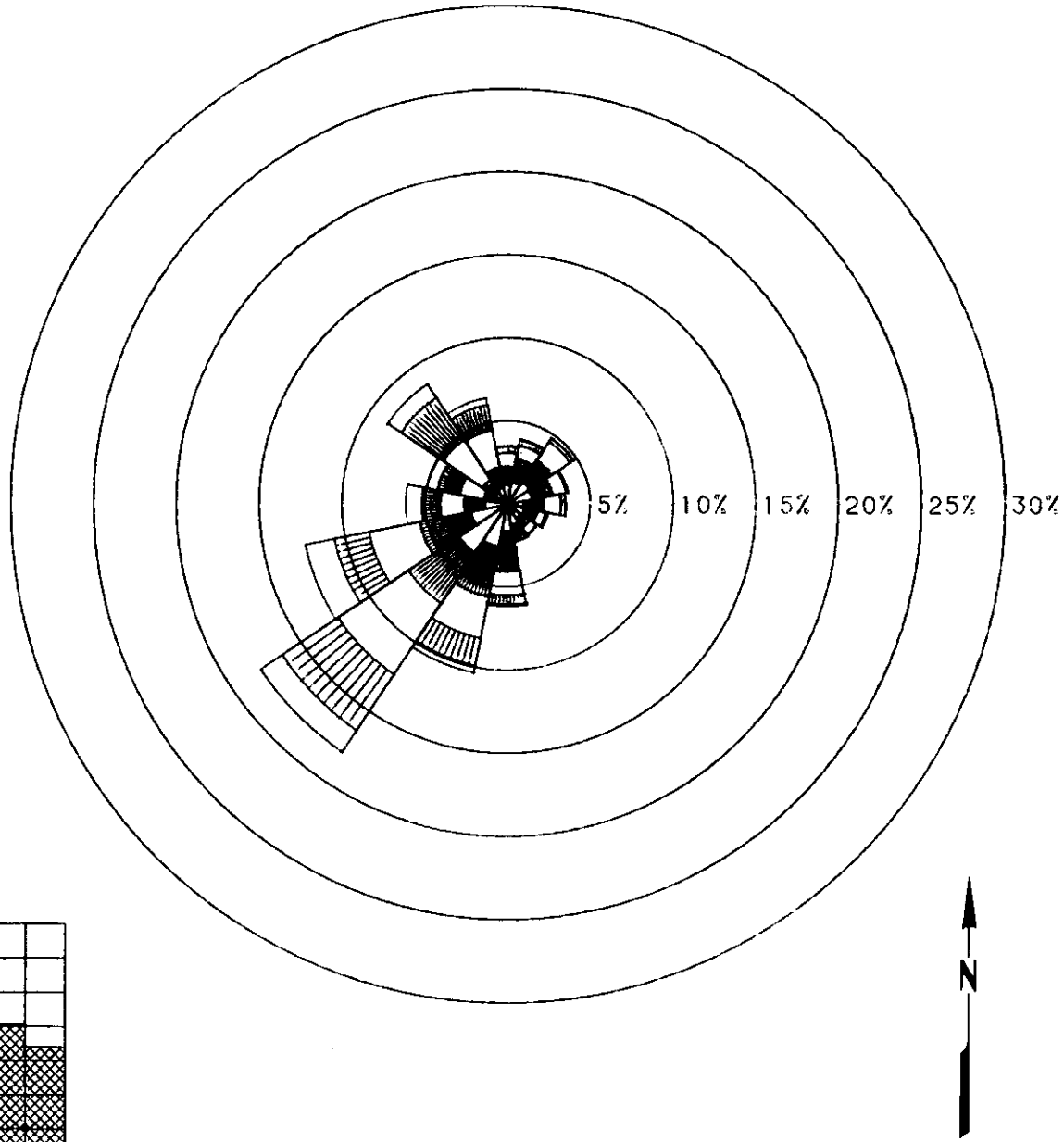
Figure IV - 1

Annual Wind Rose

BLAINE COUNTY - HAYS

(1984 - 1985)





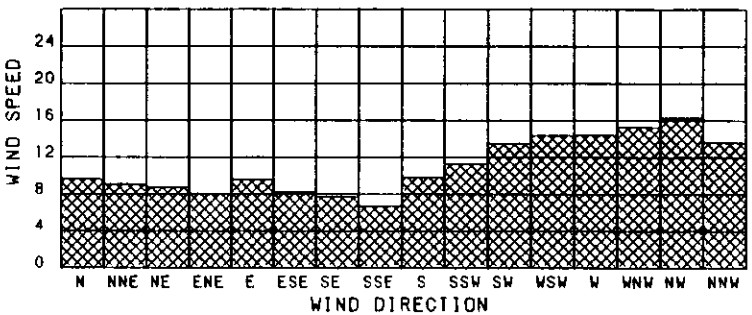


Table IV - 13

Coefficients of Weibull Distribution

BLAINE COUNTY - HAYS

01/01/84 - 07/15/85

MONTH	SCALE FACTOR (C) (M/SEC)	SHAPE FACTOR (K)
JANUARY	6.7675	1.5802
FEBRUARY	6.1154	1.7294
MARCH	5.0212	1.7592
APRIL	6.3888	1.7118
MAY	5.5188	1.8030
JUNE	5.7674	1.8076
JULY	4.6313	2.0507
AUGUST	4.1845	2.0401
SEPTEMBER	3.8593	2.0669
OCTOBER	5.5662	1.7356
NOVEMBER	6.9981	1.5790
DECEMBER	7.0125	1.4357
YEAR	5.6748	1.7143

SOURCE: GEORESEARCH, INC.