

Wind Resource Summary for Flowing Well Site

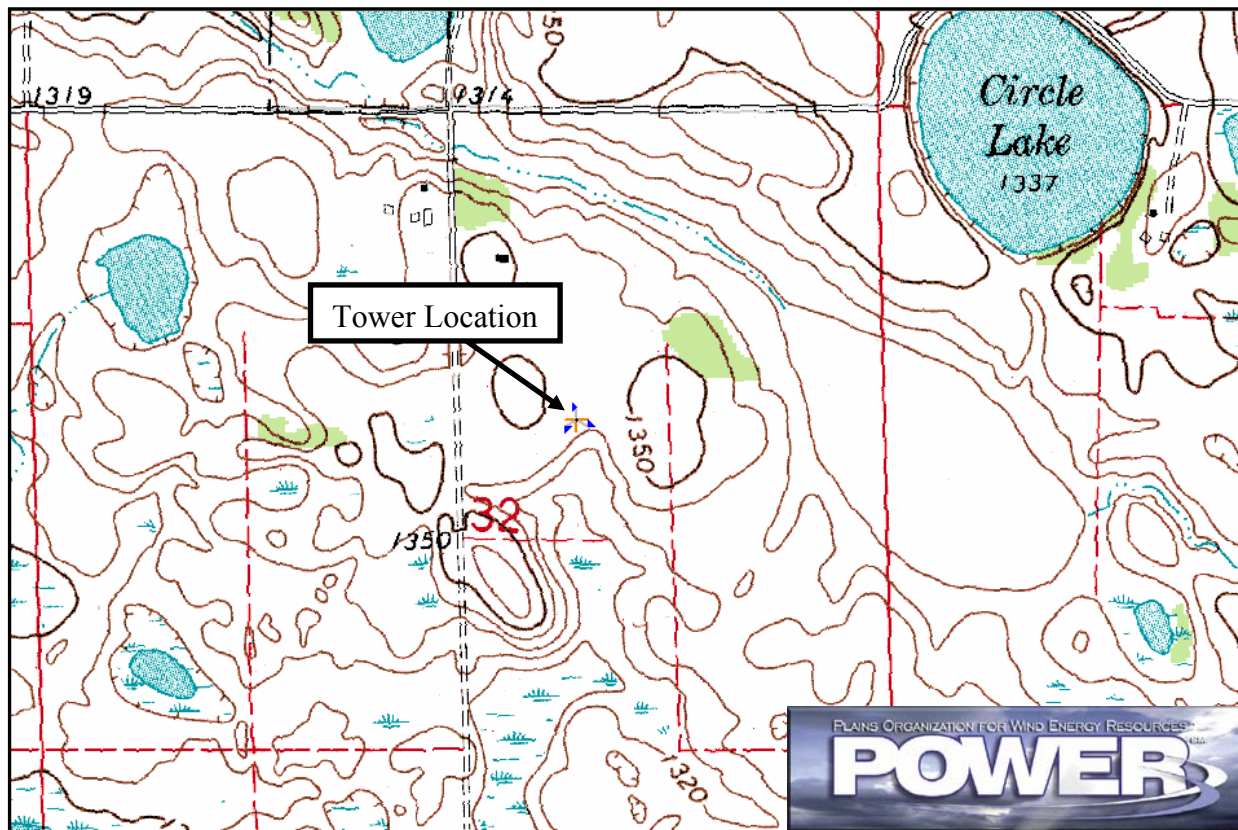
Minnesota Department of Commerce

Monitoring Period:^a 10/11/1996 – 3/10/1999

Site Description:

Latitude: N 47° 20' 01"	Township: 145 N
Longitude: W 95° 46' 16"	Range: 40 W
Elevation: 1,348 feet	Section: 32
Tower Type: NRG tilt-up	Tower Height: 131 feet

The monitoring site was 2 miles southeast of the town of Callaway, Minnesota. The tower was instrumented at 3 levels: 33 feet (10 m), 98 feet (30 m), and 131 feet (40 m). The terrain is hilly with many small lakes and ponds dispersed throughout the countryside. The majority of land is used for agricultural purposes, primarily for crops.



Summary Wind Data:	33 ft AGL ^b	98 ft AGL	131 ft AGL
Mean Wind Speed	10.0 mph	11.3 mph	12.2 mph
Maximum, 10-min Mean Wind Speed	52.7 mph at 131 ft AGL – 8/31/1997 9:50 p.m.		
Estimated Wind Power Class ^c	Class 1 (180 W/m ² at 131 ft AGL)		

^a Data recovery rates at 33, 98, and 131 feet were 86%, 85%, and 59%, respectively.

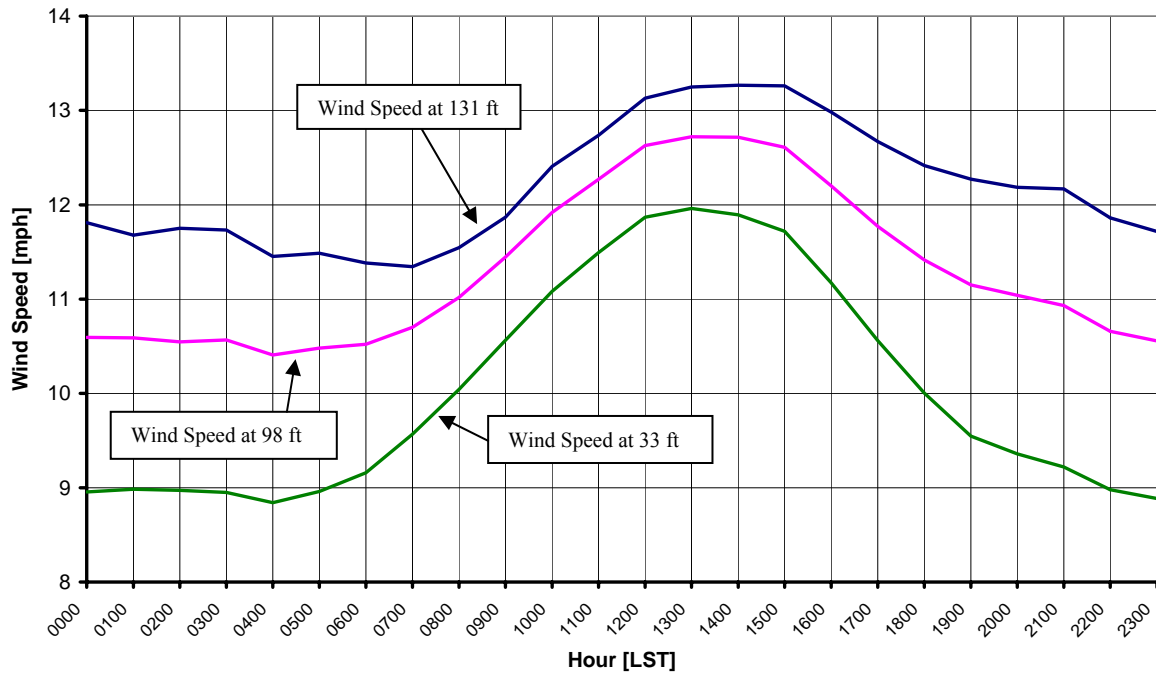
^b Above ground level.

^c Air temperature was not factored into calculation.

Average Hourly Wind Speeds

LST ^d	131 ft AGL		98 ft AGL		33 ft AGL	
	mph	m/s	mph	m/s	mph	m/s
0000	11.8	5.28	10.6	4.74	9.0	4.00
0100	11.7	5.22	10.6	4.73	9.0	4.02
0200	11.8	5.25	10.5	4.71	9.0	4.01
0300	11.7	5.25	10.6	4.72	9.0	4.00
0400	11.5	5.12	10.4	4.65	8.8	3.95
0500	11.5	5.13	10.5	4.69	9.0	4.01
0600	11.4	5.09	10.5	4.70	9.2	4.09
0700	11.3	5.07	10.7	4.78	9.6	4.28
0800	11.5	5.16	11.0	4.93	10.0	4.49
0900	11.9	5.31	11.4	5.12	10.6	4.72
1000	12.4	5.55	11.9	5.33	11.1	4.95
1100	12.7	5.69	12.3	5.49	11.5	5.14
1200	13.1	5.87	12.6	5.65	11.9	5.31
1300	13.2	5.92	12.7	5.69	12.0	5.35
1400	13.3	5.93	12.7	5.68	11.9	5.32
1500	13.3	5.93	12.6	5.64	11.7	5.24
1600	13.0	5.80	12.2	5.45	11.2	4.99
1700	12.7	5.66	11.8	5.26	10.6	4.72
1800	12.4	5.55	11.4	5.10	10.0	4.47
1900	12.3	5.49	11.2	4.99	9.5	4.27
2000	12.2	5.45	11.0	4.94	9.4	4.18
2100	12.2	5.44	10.9	4.89	9.2	4.12
2200	11.9	5.30	10.7	4.76	9.0	4.01
2300	11.7	5.24	10.6	4.72	8.9	3.97

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^d Local standard time.



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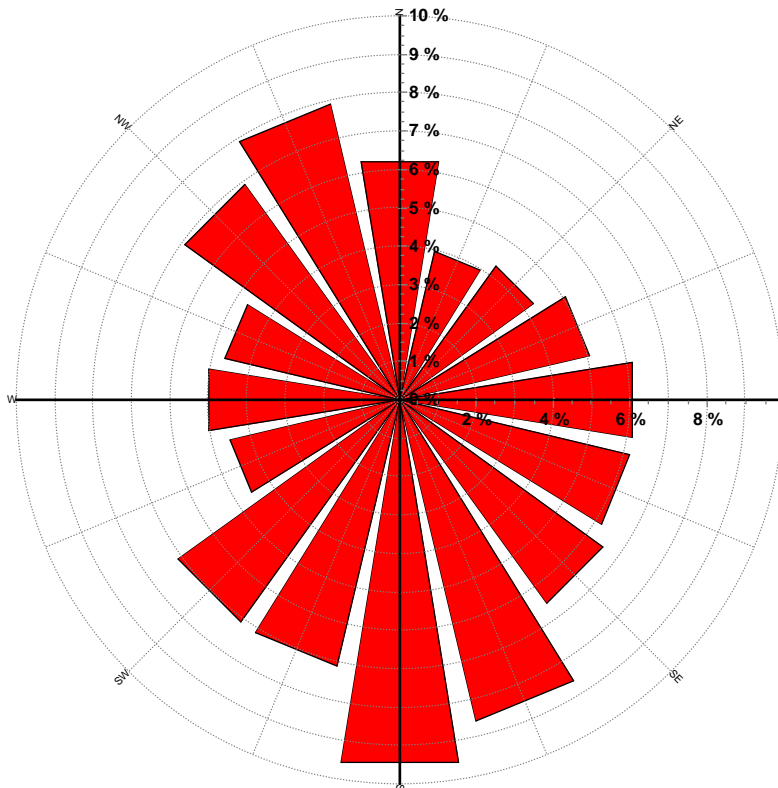
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Wind Directional Frequency

Winds from the... Frequency (%)

NNW	7.9
NW	6.9
WNW	4.7
W	5.0
WSW	4.5
SW	7.1
SSW	7.1
S	9.6
SSE	8.6
SE	6.5
ESE	6.2
E	6.1
ENE	5.1
NE	4.3
NNE	4.0
N	6.3

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Wind Rose for 131 ft AGL
10/11/1996 – 3/10/1999



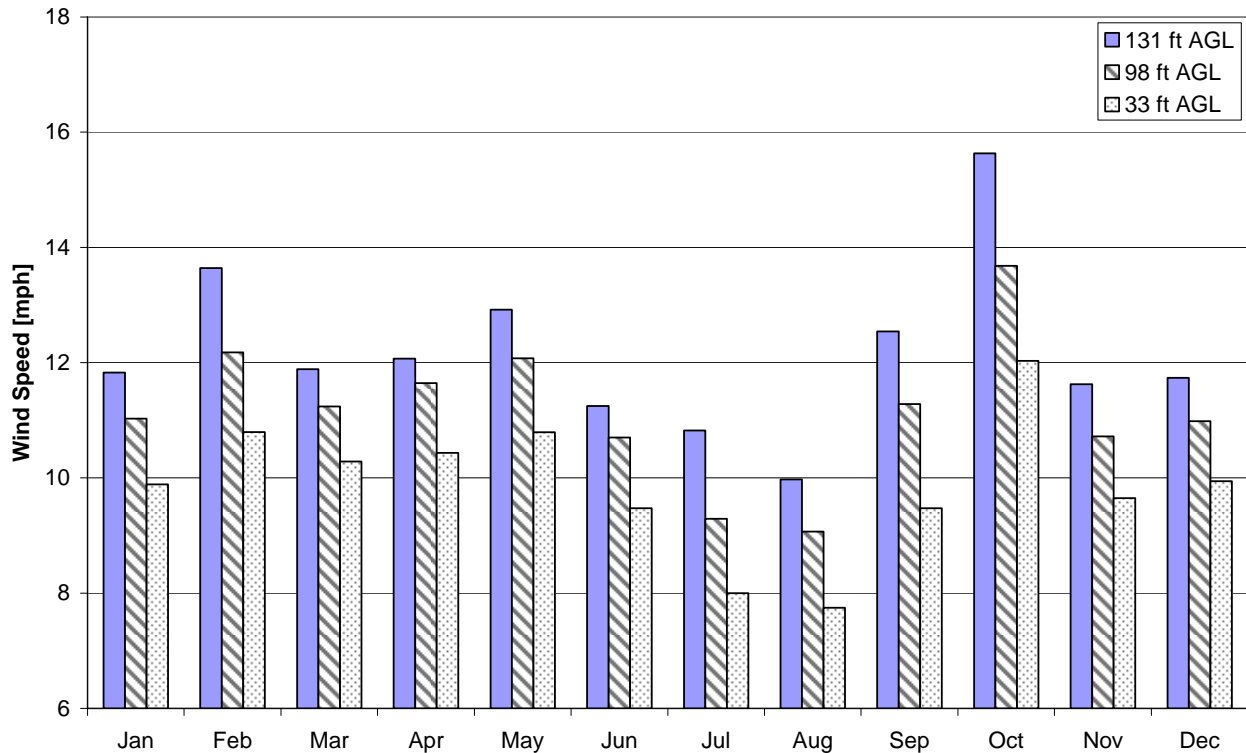
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Monthly Wind Speed Averages

Month	131 ft AGL		98 ft AGL		33 ft AGL	
	mph	m/s	mph	m/s	mph	m/s
Jan	11.8	5.29	11.0	4.93	9.9	4.42
Feb	13.6	6.10	12.2	5.44	10.8	4.83
Mar	11.9	5.31	11.2	5.02	10.3	4.60
Apr	12.1	5.40	11.6	5.21	10.4	4.67
May	12.9	5.78	12.1	5.40	10.8	4.82
Jun	11.2	5.03	10.7	4.78	9.5	4.24
Jul	10.8	4.84	9.3	4.15	8.0	3.58
Aug	10.0	4.46	9.1	4.05	7.7	3.46
Sep	12.5	5.61	11.3	5.04	9.5	4.24
Oct	15.6	6.99	13.7	6.12	12.0	5.38
Nov	11.6	5.20	10.7	4.79	9.6	4.31
Dec	11.7	5.25	11.0	4.91	9.9	4.44

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