

Wind Resource Summary for Rollag Site

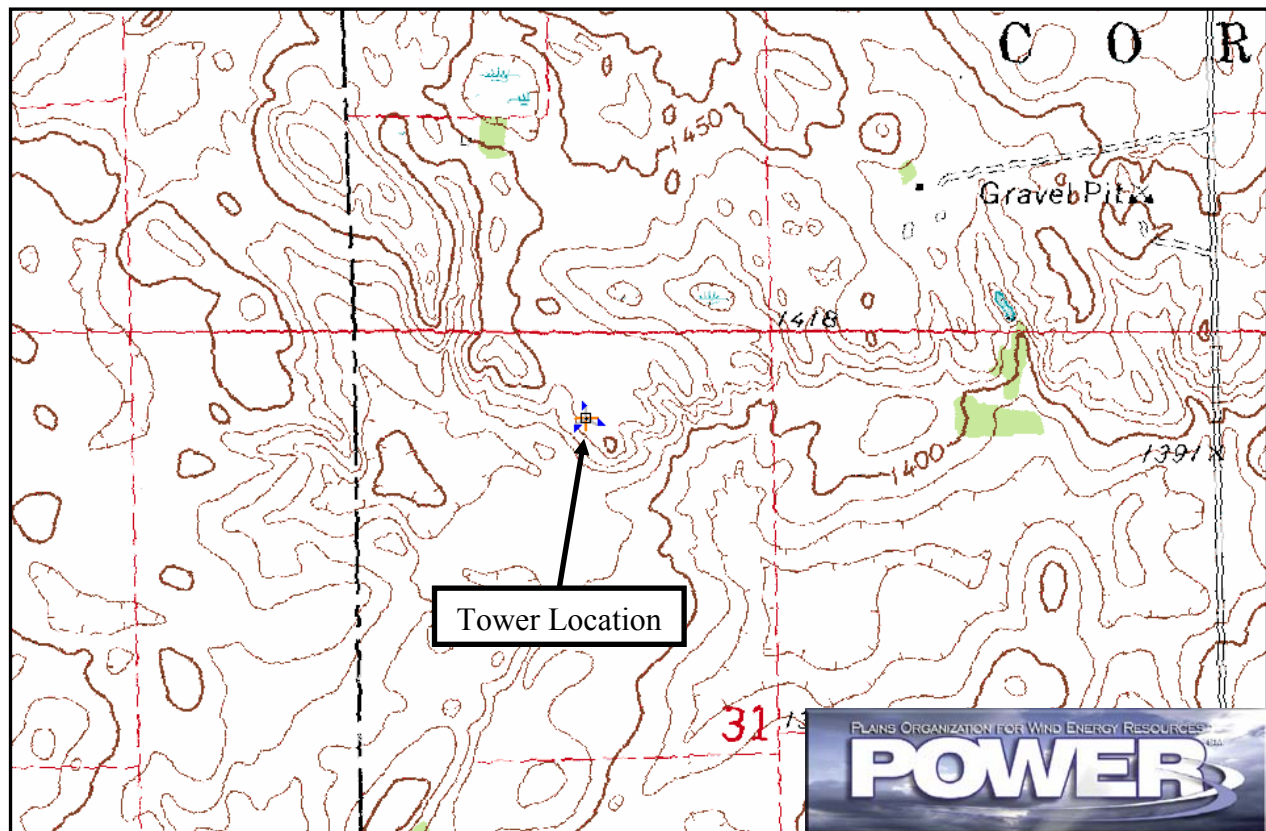
Minnesota Department of Commerce

Monitoring Period:^a 7/31/1994 – 5/9/2000

Site Description:

Latitude: N 46° 43' 51"	Township: 138 N
Longitude: W 96° 10' 9"	Range: 43 W
Elevation: 1,440 feet	Section: 31
Tower Type: NRG tilt-up	Tower Height: 131 feet

The monitoring site was 3.5 miles southeast of the town of Rollag, Minnesota. The tower was instrumented at 3 levels: 33 feet (10 m), 98 feet (30 m), and 131 feet (40 m). Cultivated fields surround the location. The terrain is somewhat hilly with many small lakes and ponds dispersed throughout the countryside.



Summary Wind Data:	33 ft AGL ^b	98 ft AGL	131 ft AGL
Mean Wind Speed	11.0 mph	13.2 mph	14.3 mph
Maximum, 60-min Mean Wind Speed	52.9 mph at 131 ft AGL – 4/5/2000 6:00 p.m.		
Estimated Wind Power Class ^c	Class 2 (261 W/m ² at 131 ft AGL)		

^a Data recovery rates at 33, 98, and 131 feet were 90%, 97%, and 87%, respectively.

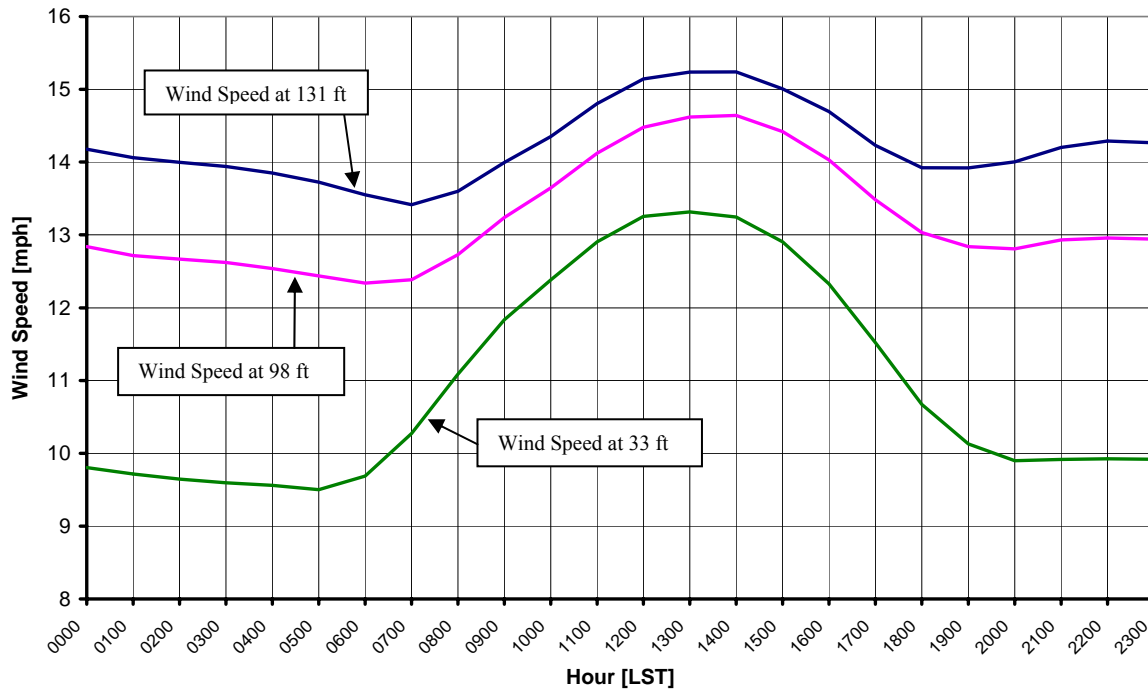
^b Above ground level.

^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	14.2	6.34	12.8	5.74	9.8	4.38
0100	14.1	6.29	12.7	5.68	9.7	4.34
0200	14.0	6.26	12.7	5.66	9.6	4.31
0300	13.9	6.23	12.6	5.64	9.6	4.29
0400	13.9	6.19	12.5	5.60	9.6	4.27
0500	13.7	6.14	12.4	5.56	9.5	4.25
0600	13.6	6.06	12.3	5.52	9.7	4.33
0700	13.4	6.00	12.4	5.54	10.3	4.59
0800	13.6	6.08	12.7	5.69	11.1	4.96
0900	14.0	6.26	13.2	5.92	11.8	5.29
1000	14.4	6.42	13.6	6.10	12.4	5.53
1100	14.8	6.62	14.1	6.31	12.9	5.77
1200	15.1	6.77	14.5	6.47	13.3	5.93
1300	15.2	6.81	14.6	6.54	13.3	5.95
1400	15.2	6.81	14.6	6.54	13.2	5.92
1500	15.0	6.71	14.4	6.45	12.9	5.77
1600	14.7	6.57	14.0	6.27	12.3	5.51
1700	14.2	6.36	13.5	6.03	11.5	5.15
1800	13.9	6.22	13.0	5.83	10.7	4.77
1900	13.9	6.22	12.8	5.74	10.1	4.53
2000	14.0	6.26	12.8	5.73	9.9	4.42
2100	14.2	6.35	12.9	5.78	9.9	4.43
2200	14.3	6.39	13.0	5.79	9.9	4.44
2300	14.3	6.38	12.9	5.79	9.9	4.43

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7/31/1994 – 5/9/2000**



^d Local standard time.



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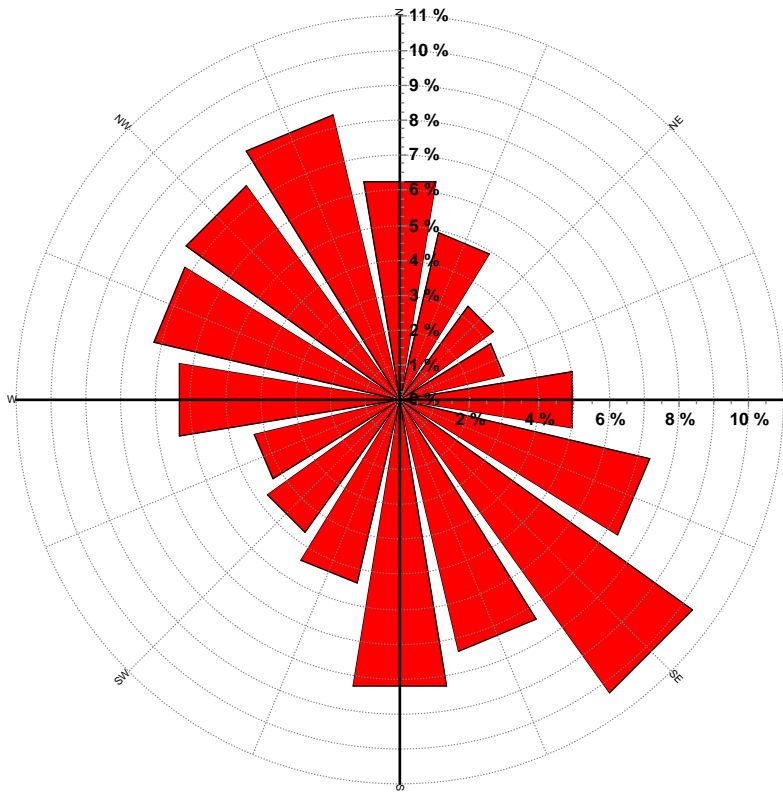
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Wind Directional Frequency

Winds from the... Frequency (%)

NNW	8.4
NW	7.6
WNW	7.2
W	6.4
WSW	4.3
SW	4.7
SSW	5.4
S	8.3
SSE	7.4
SE	10.3
ESE	7.4
E	5.0
ENE	3.1
NE	3.3
NNE	4.9
N	6.3

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Wind Rose for 131 ft AGL
7/31/1994 – 5/9/2000



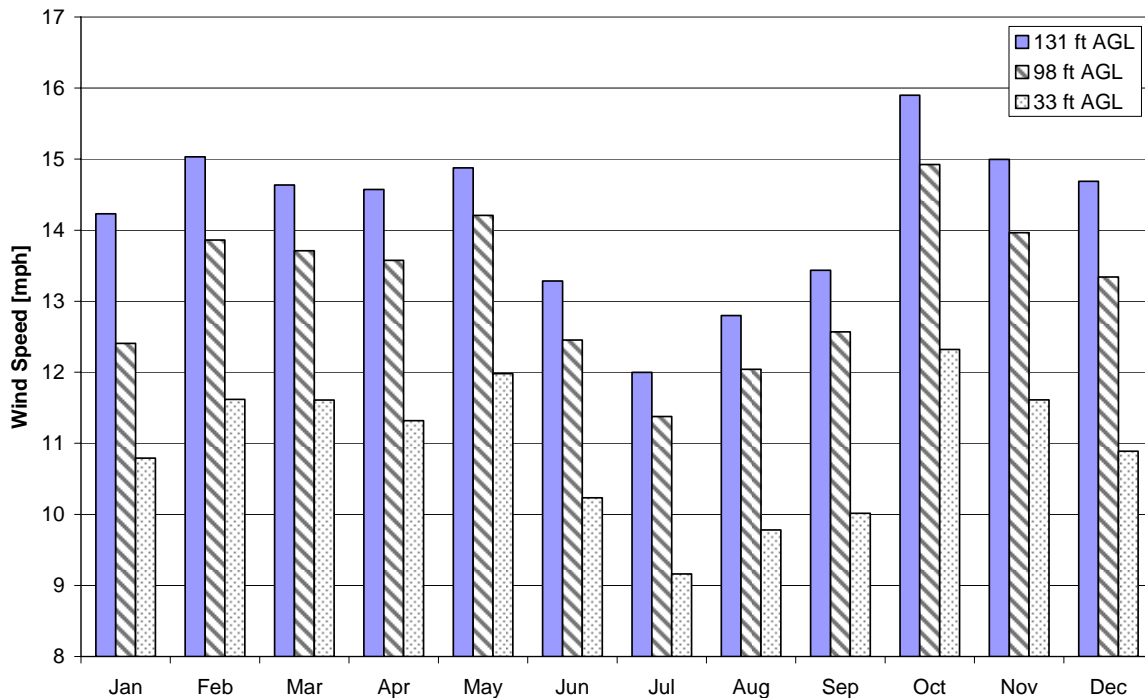
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Monthly Wind Speed Averages

Month	131 ft AGL		98 ft AGL		33 ft AGL	
	mph	m/s	mph	m/s	mph	m/s
Jan	14.2	6.36	12.4	5.55	10.8	4.82
Feb	15.0	6.72	13.9	6.20	11.6	5.19
Mar	14.6	6.54	13.7	6.13	11.6	5.19
Apr	14.6	6.51	13.6	6.07	11.3	5.06
May	14.9	6.65	14.2	6.35	12.0	5.36
Jun	13.3	5.94	12.5	5.57	10.2	4.57
Jul	12.0	5.36	11.4	5.09	9.2	4.10
Aug	12.8	5.72	12.0	5.38	9.8	4.37
Sep	13.4	6.01	12.6	5.62	10.0	4.48
Oct	15.9	7.11	14.9	6.67	12.3	5.51
Nov	15.0	6.70	14.0	6.24	11.6	5.19
Dec	14.7	6.57	13.3	5.96	10.9	4.87

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