South Dakota's Wind Classifications

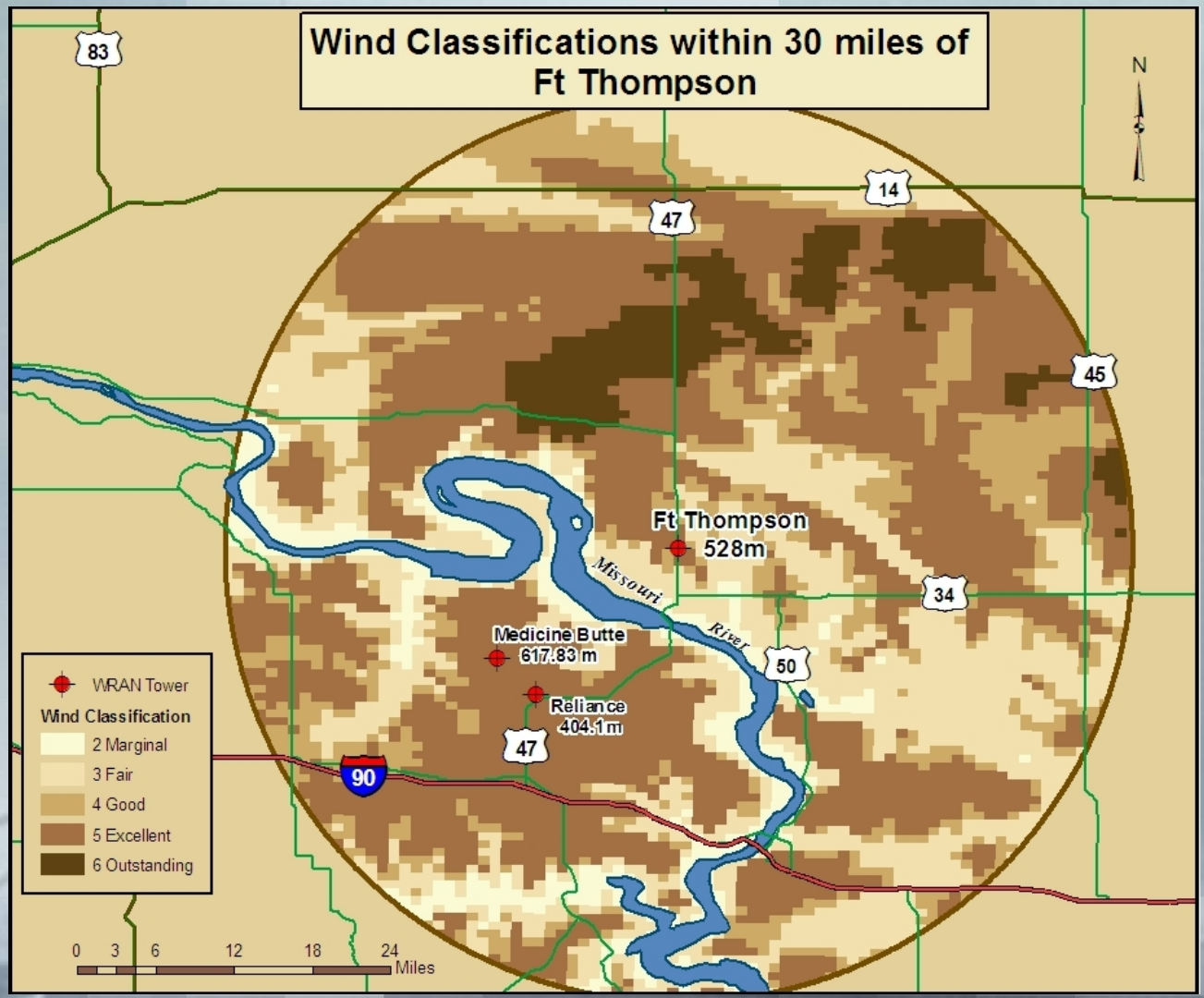
Credit to NREL for their Wind Classification Data

Credit to Microsoft Office Online for the Wind Turbine Template.

Cartographic Designs by Shanon R. Conley

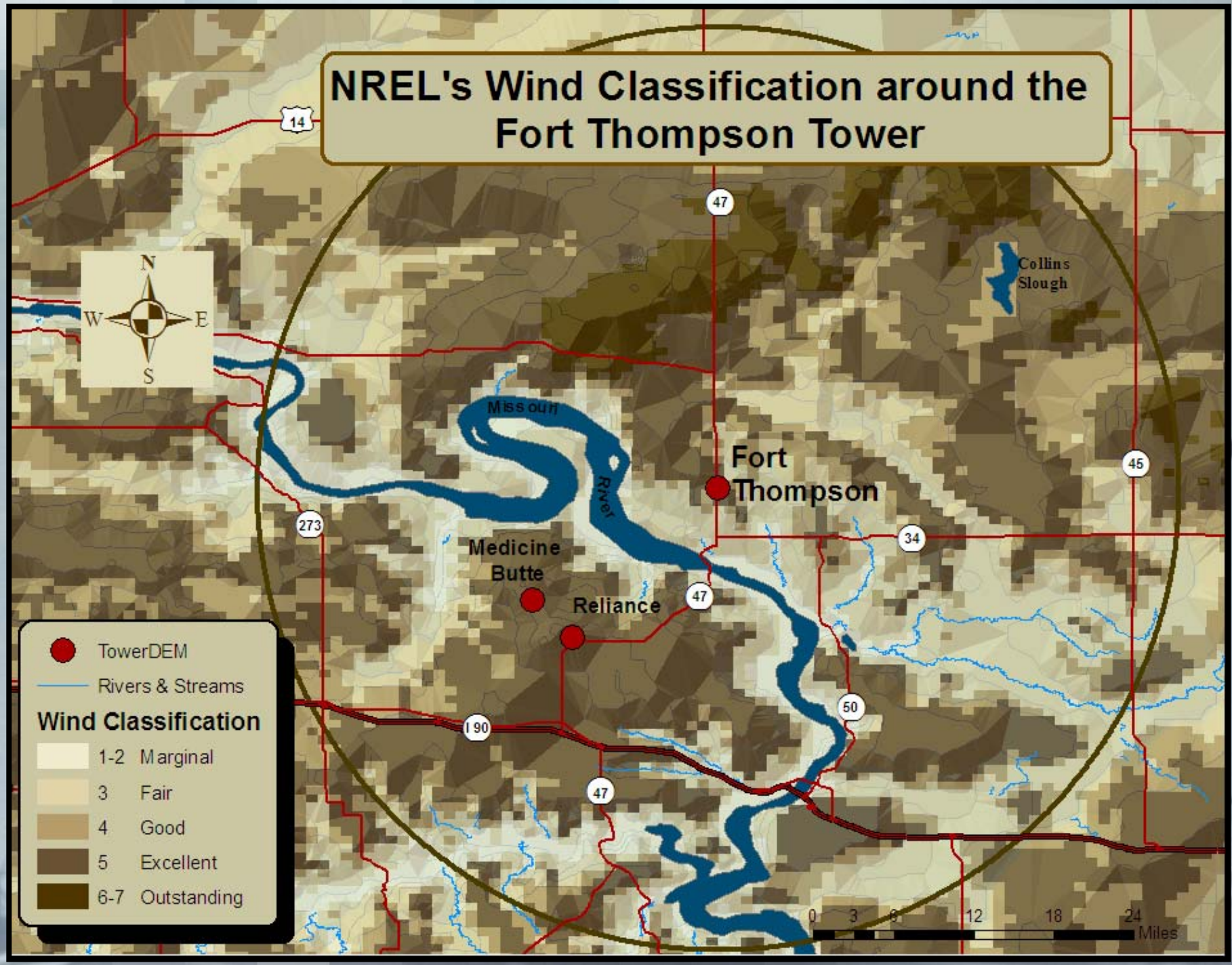
South Dakota State University
Electrical Engineering Department
Wind Resource Assessment Network Project
Site: Fort Thompson

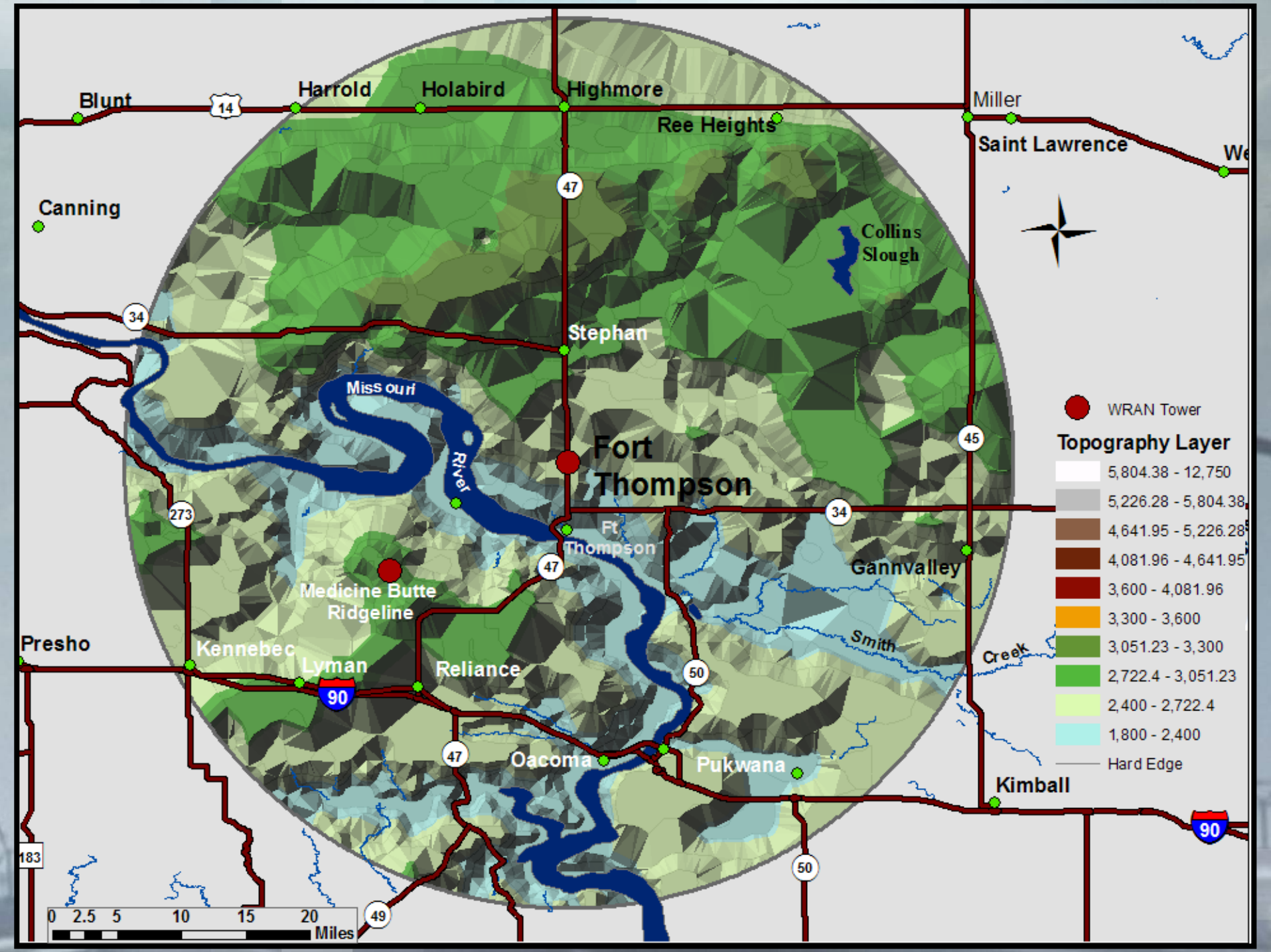
Data collection period:
November 21, 2001 –
November 30, 2007



Site description:

Site elevation: 528 m (1733 ft)
Site latitude: 44º 07' 45" N
Site longitude: 99º 26' 11" W
Date of activation: November 21, 2001
Data averaging interval: 10 minutes
Overall data recovery rate: 95.4% (50m)
94.8% (70m)


NREL's Wind Classification around the Fort Thompson Tower
N
W
E
S
14
47
Collins Slough
Missouri River
Fort Thompson
45
273
34
Medicine Butte
Reliance
47
50
I 90
47
TowerDEM
Rivers & Streams
Wind Classification
1-2 Marginal
3 Fair
4 Good
5 Excellent
6-7 Outstanding
0 3 6 12 18 24
Miles


Blunt
Harrold
Holabird
Highmore
Miller
Ree Heights
Saint Lawrence
Canning
Collins Slough
Stephan
Missouri River
Fort Thompson
Ft Thompson
Gannvalley
Medicine Butte Ridgeline
Presho
Kennebec
Lyman
Reliance
Smith Creek
Oacoma
Pukwana
Kimball
14
47
34
273
45
50
90
183
49
WRAN Tower
Topography Layer
5,804.38 - 12,750
5,226.28 - 5,804.38
4,641.95 - 5,226.28
4,081.96 - 4,641.95
3,600 - 4,081.96
3,300 - 3,600
3,051.23 - 3,300
2,722.4 - 3,051.23
2,400 - 2,722.4
1,800 - 2,400
Hard Edge
0 2.5 5 10 15 20
Miles

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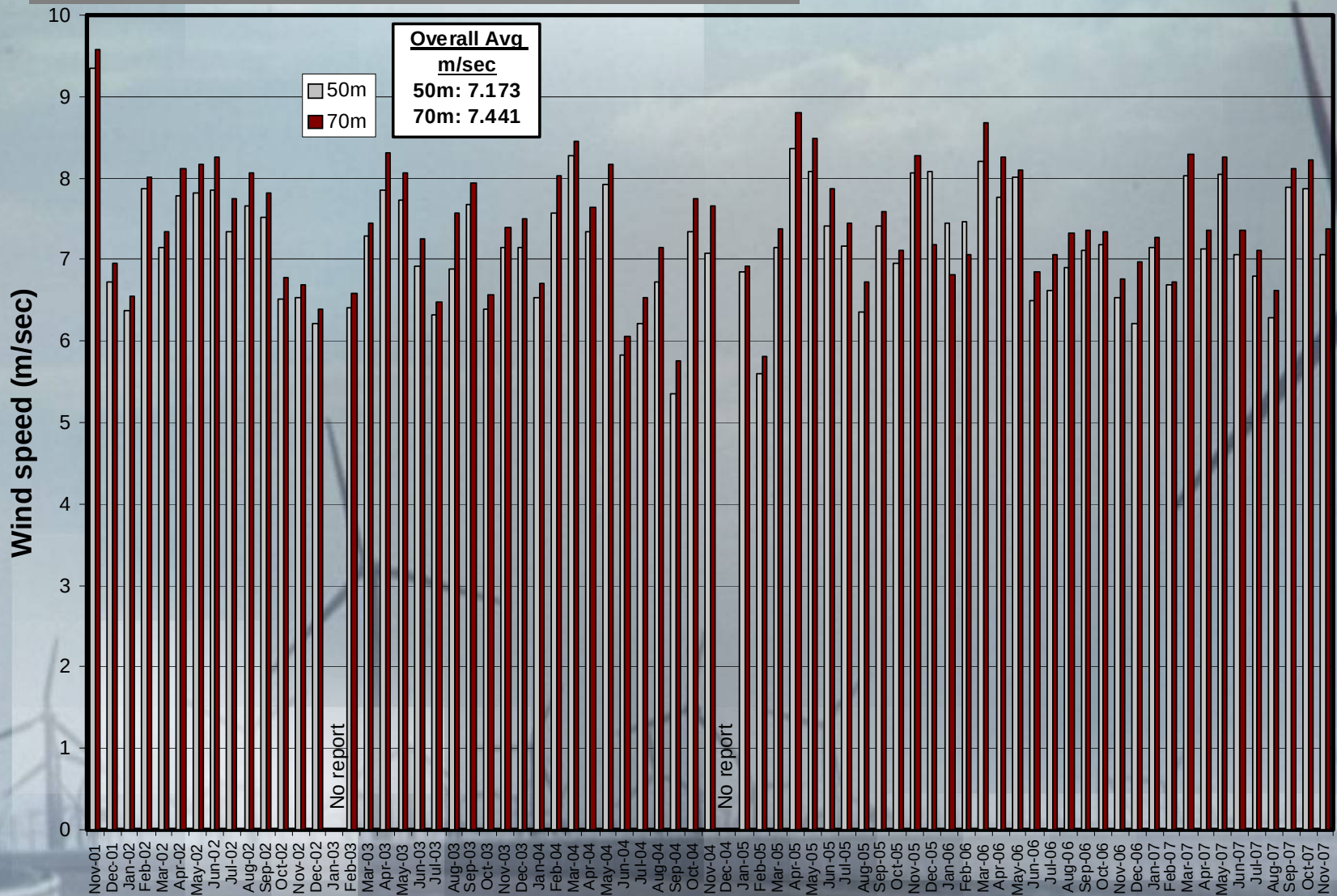
This slide shows the monthly average wind speed in meters per second at this site, and also the overall average wind speed (in the inset box), at each measurement height.



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Notes for data interpretation (pg 1/3)

Month	Notes
November 2001	**The data set for this month is very small, and thus the average wind speeds, which are clearly outliers, are probably suspect.**
January 2003	**This month's data have not yet been processed due to an as yet unexplained problem with the data. Hopefully, these will be posted shortly. All of the overall averages and data recovery rates exclude January 2003 at this time.**
Winter 2003	**There is a weird trend here; the average monthly wind speeds actually *declined* during the winter, which is the opposite of what we would normally expect. At this time, we believe this to be the result of normal meteorological variability.**
August 2003	**There was a sensor failure at 70 m that led to some data loss in the first half of August 2003.**
December 2004-March 2005	**Ft. Tom suffered some intermittent comm problems that led to spotty data loss during this interval. Unfortunately, we have no data at all for December 2004 because of a problem with the base station computer, although some of these data may be recoverable. We're working on this.**
August 2005	**This month's data is complete, aside from six missing data points, which are usually attributed to logger error.**

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Notes for data interpretation (pg 2/3)

Month	Notes
November 2005	**There were numerous missing data points toward the end of the month. The apparent cause is that the big ice storm of November 28 broke one of the 50 meter anemometers.**
December 2005-January 2006	**The 50-meter anemometer broken by the ice storm remained out of action during this period, and thus and the data recovery rate at 50 meters was low.**
February 2006	**The 50-meter anemometer was replaced at the end of February 2006. The 50 meter data were discarded prior to that point.**
March 2006	**The 50-meter wind vane appeared unchanging beginning mid month. This was possible caused by falling ice damaging the sensors. Besides that the data set for this month was missing two full days of data points, which was attributed to a communication glitch.**
August 2006	**Data set for this month was missing two full days of data points, which was attributed to a communication glitch.**
October 2006	**The damaged 50-m wind vane was replaced October 24th. Octobers overall data set came in complete and normal.**

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Notes for data interpretation (pg 3/3)

Month	Notes
December 2006- January 2007	**The December data was only partially complete due to ice accumulation at the middle and end of the month on the sensors. The sensors appeared to work intermittently throughout the month.**

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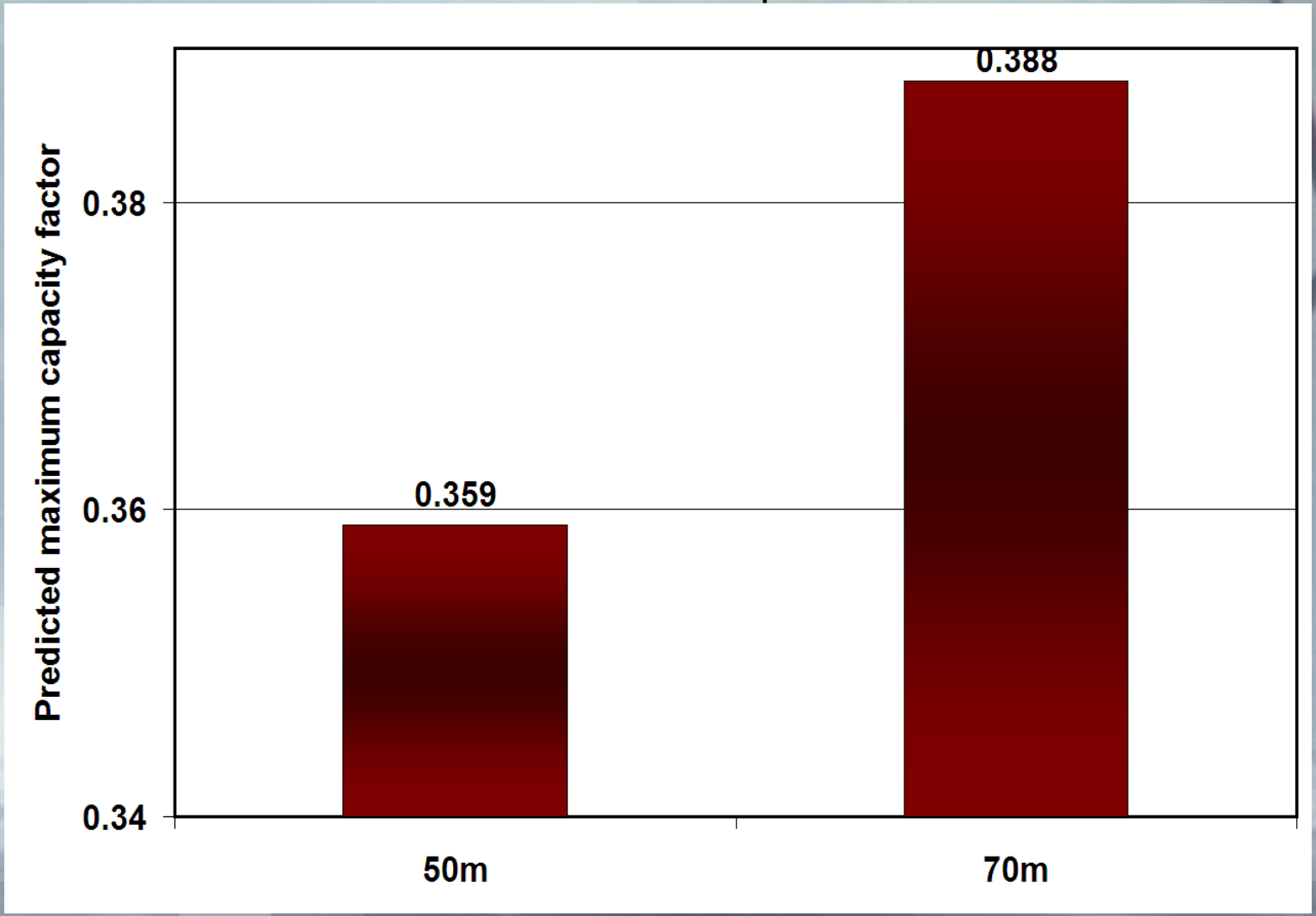
This slide shows the expected maximum capacity factor that could be expected from a wind turbine on this site. The capacity factor can be thought of as the percentage of maximum possible energy that the turbine would actually produce, given the variability of the wind resource at the site. This is taken over the entire period of data collection.



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This slide shows the diurnal variation of the wind speed (that is, the average wind speed as a function of time of day) at each measurement height, using all data from activation to December 31, 2002.