

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

Site description:

Site elevation: 632 m (2072 ft)

Site latitude: 45° 41' 19" N

Site longitude: 99° 15' 14" W

Date of activation: December 5, 2001

Data averaging interval: 10 minutes

Overall data recovery rate: 86.98% 50m
90.90% 70m



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Electrical Engineering Department
Wind Resource Assessment Network Project
Site: Leola

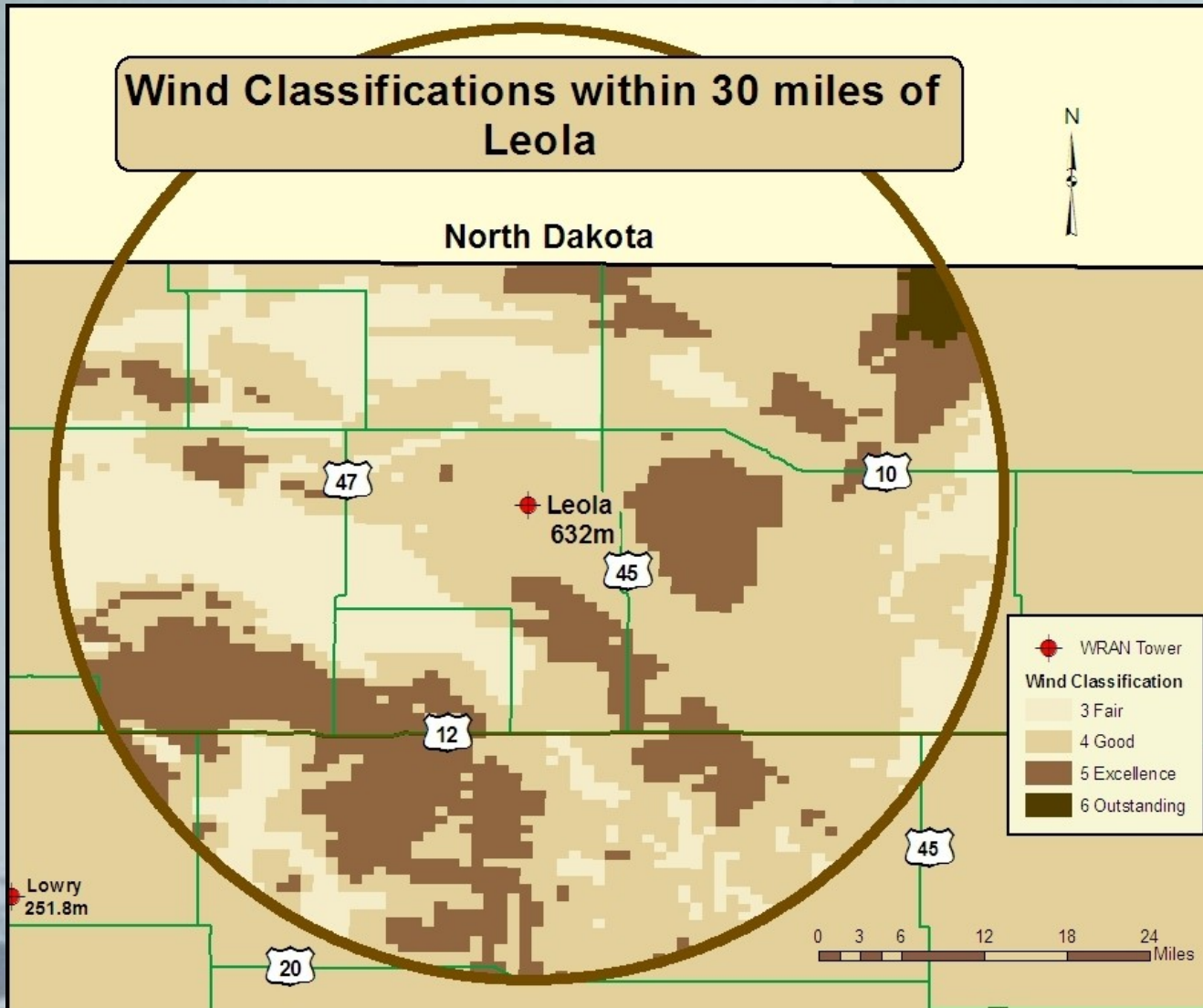
Data collection period:
December 4, 2001 –
July 31, 2007

Average 50 meter Wind
Speed:

8.23 meters per second

Extrapolated average 100
meter Wind Speed:



10.86 meters per second








NREL's Wind Classification around the Leola Tower

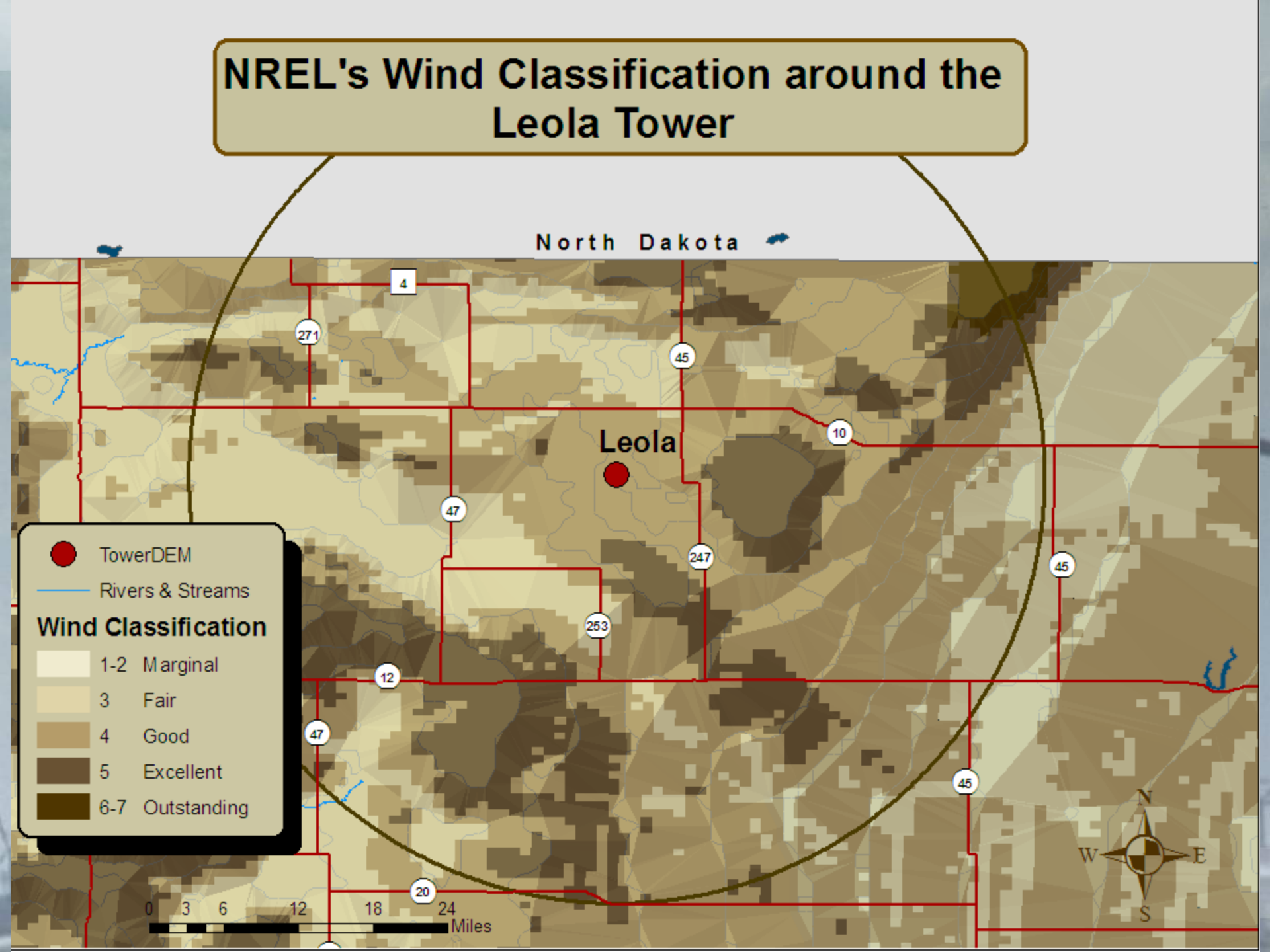
North Dakota

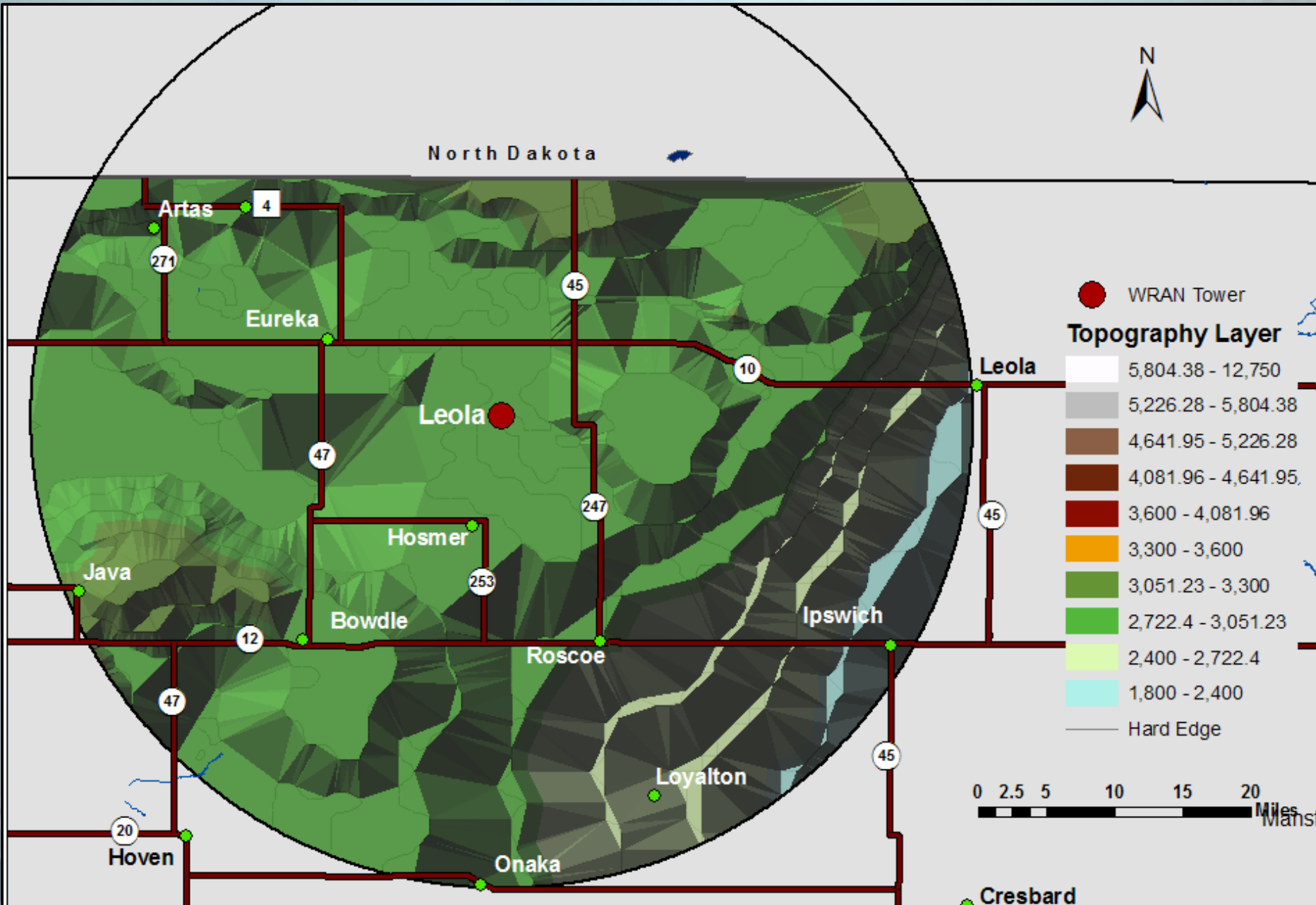
Leola

-  TowerDEM
-  Rivers & Streams

Wind Classification

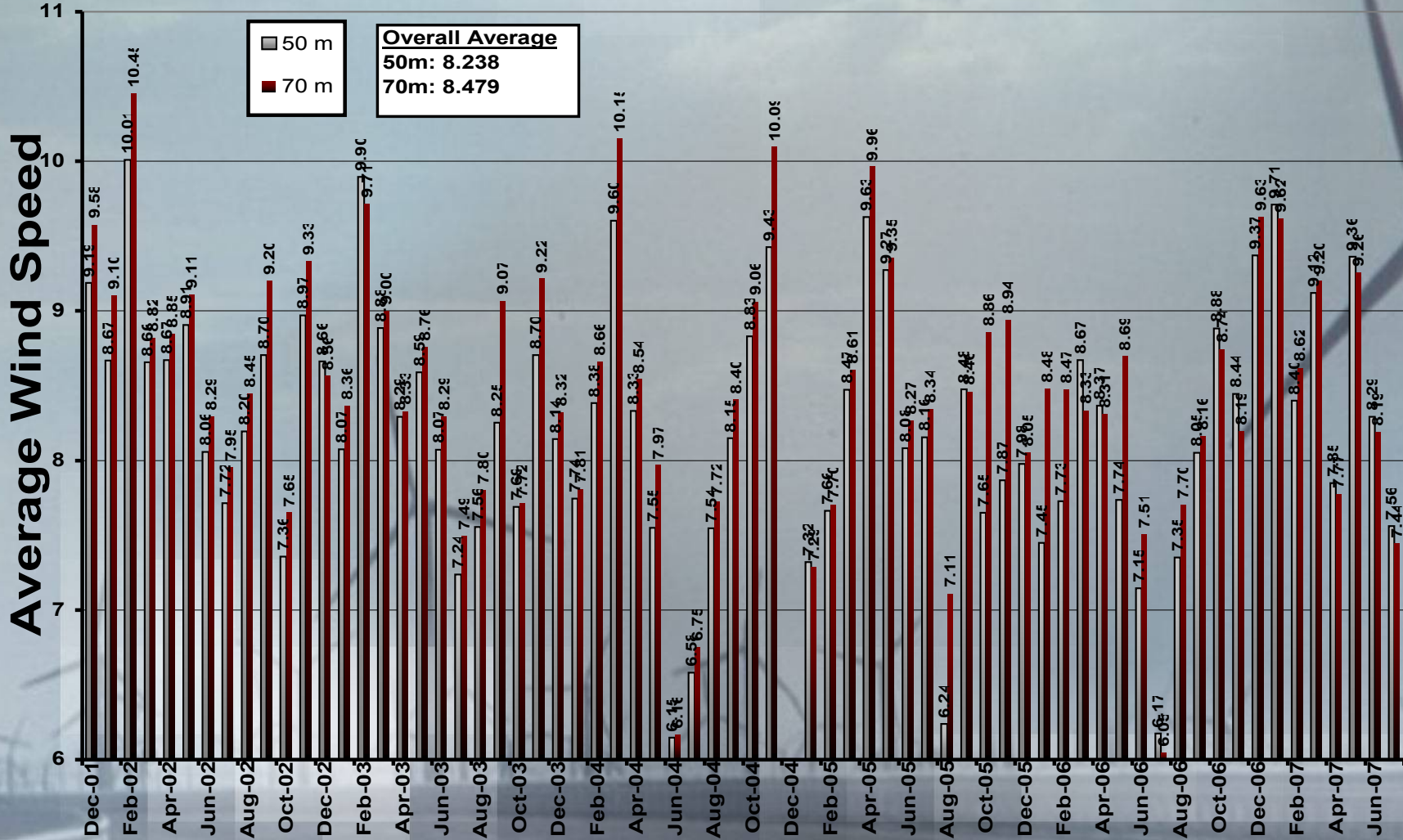
	1-2 Marginal
	3 Fair
	4 Good
	5 Excellent
	6-7 Outstanding





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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, measured in meters per second, at each measurement height. Last Updated 08/03/2007



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**Notes for proper data
interpretation P. 1/3**

Month	Notes
Dec 2001	There were a number of short icing events during this month. This will tend to reduce the average values shown somewhat.
Dec 2002	There was a major problem with icing during this month, making the values highly suspect. The 70 meter instruments were more affected than the 50 meter ones. Note that the 70 meter average wind speed for Dec 2002 is actually lower than that at 50 meters. This does not make physical sense and is almost certainly an artifact caused by the icing problem.
Jun 2003	There was a significant disruption of communication in early June that led to a loss of the data from 04:20 on 1 June to 0:20 on 11 June.
May – Jun 2004	There was a significant disruption of communication in early June that led to a loss of the data from 00:30:00 5/5/2004 to 00:50:00 6/16/2004. 6049 total data points were lost in those two months. These values were factored into the overall data recovery rate found on slide #2.
Dec 2004	A base station computer problem led to a loss of data for the entire month of December 2004. Some of these data may be recoverable, and if they are they will be posted here.

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**Notes for proper data
interpretation P. 2/3**

Month	Notes
August 2005	<p>There were four missing data points, which were attributed to a common logger error. There was also a suspected anemometer failure at the 50m level. If this is the case, the 50m wind speed data will be skewed low. The problem is currently being investigated.</p>
September 2005	<p>There were five missing data points, which were attributed to a common logger error. There was also a suspected anemometer failure at the 50m level. The good anemometer was used for this month's analysis. The use of just one sensor at the 50m level may explain why the 50m average was slightly higher than the 70m level. The possible cause could be turbulence from the tower.</p>
October 2005	<p>There were 145 missing data points, which were attributed to a logger error, resulting in the loss of one day's data. There was also a suspected anemometer failure at the 50m level. The good anemometer was used for this month's 50m analysis.</p>
November 2005	<p>There were data missing this month on the 50 and 70 meter sensors. The 50 meter level has a permanently bad anemometer, and the 70 meter level has an anemometer that appears to be experiencing a higher drag than usual at lower wind speeds.</p>
December 2005	<p>Again, there were data missing this month on the 50 and 70 meter sensors. The problems seem to be similar to those experienced in November.</p>

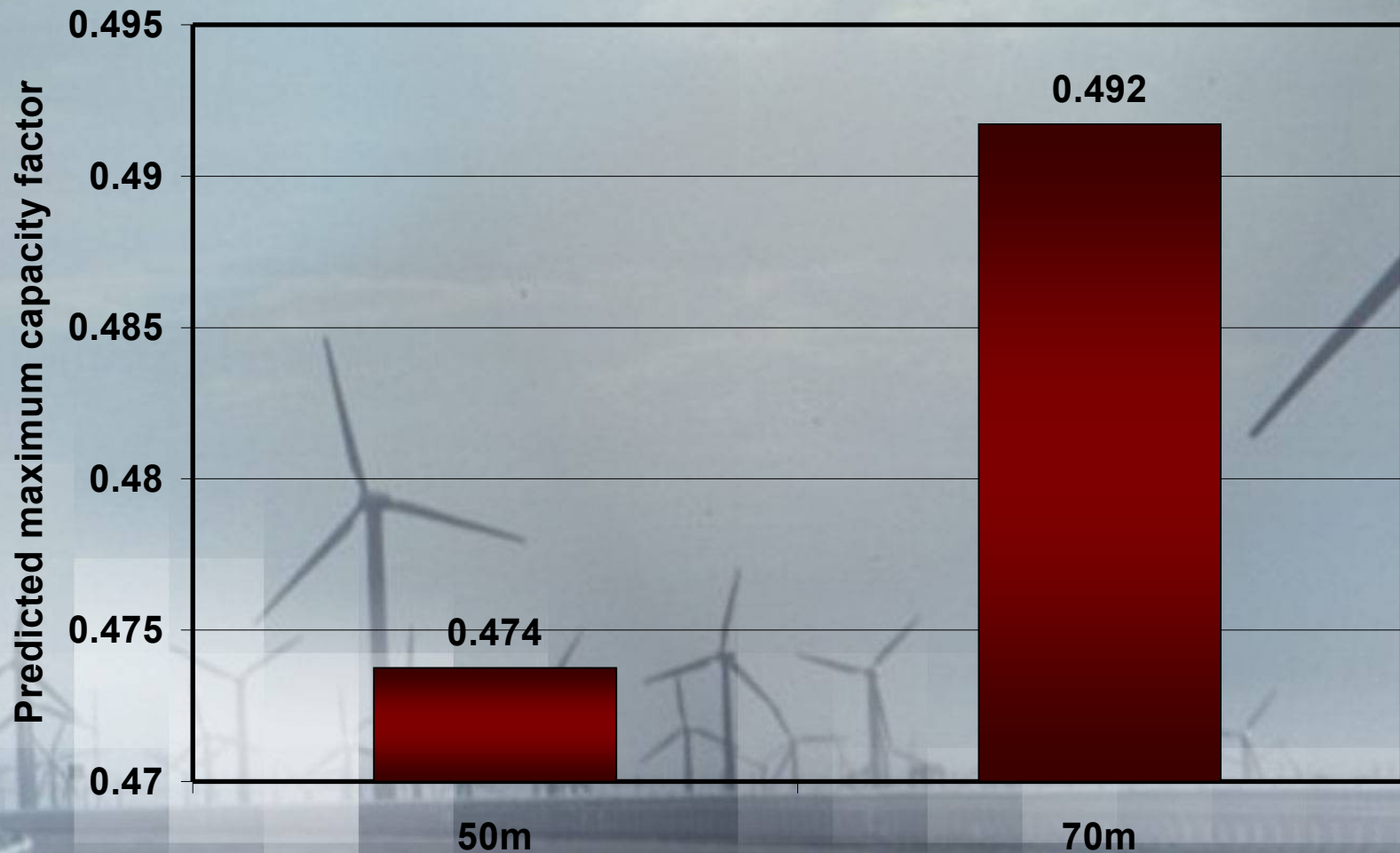
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Notes for proper data
interpretation P. 3/3

Month	Notes
January- October 2006	<p>Data recovery during this time period was limited by sensor icing, and by an apparent malfunction of one of the 50-meter sensors. Also, there are several months during this period in which the 70-meter average is lower than the 50-meter average. The reason for this is not yet clear. It <i>could</i> be real, but this is still being investigated.</p>
January 2007	<p>A closer inspection of why the 70-meter anemometer's average is lower than the 50-meter's average wind speed showed a satellite was installed near the 70-meter anemometer. The anemometer faces north while the installed satellite faces south. The large face of the satellite blocks the south wind, so the wind speed is skewed low when the wind blows from the south, southwest and southeast.</p>

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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. Last Updated 8/03/2007.



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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, over all data from activation to February 28, 2003.

