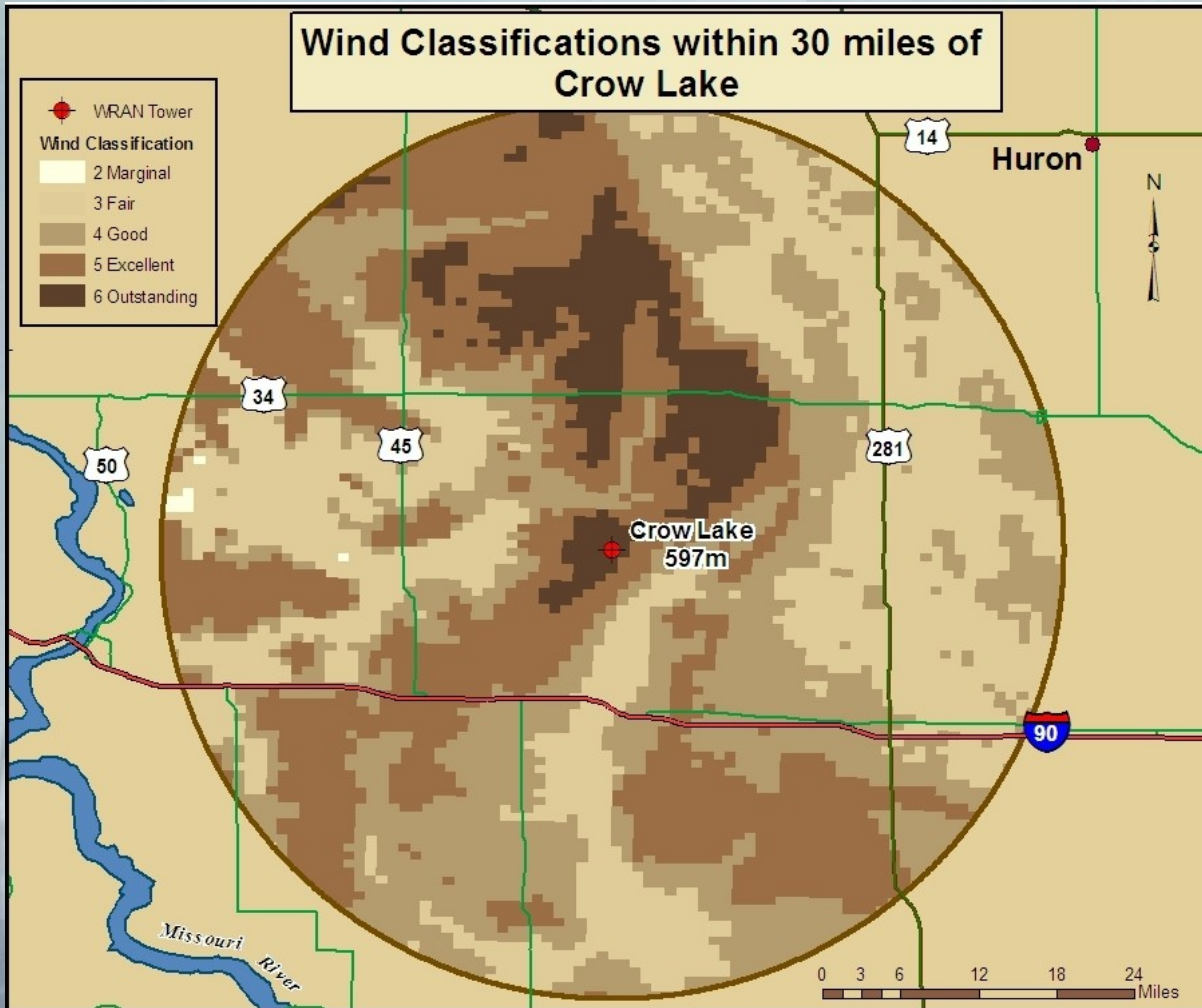


# South Dakota's Wind Classifications

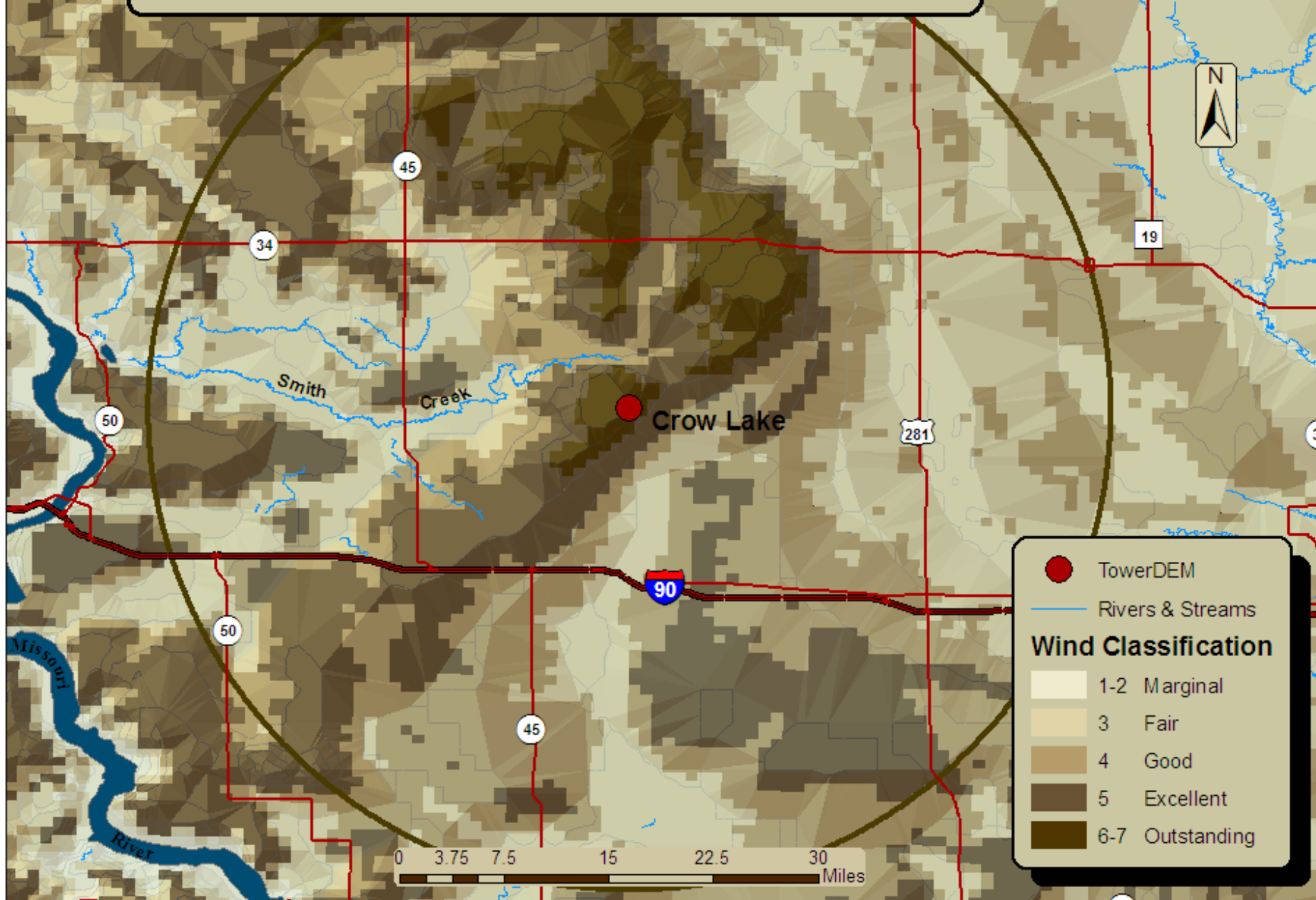


**South Dakota State University  
Electrical Engineering Department  
Wind Resource Assessment Network Project  
Site: Crow Lake**

**Data collection period:  
December 26, 2001 –  
July 31, 2007**



# NREL's Wind Classification around the Crow Lake Tower



## Site description:

Elevation: 597 m (1960 ft)

Latitude: 43° 54' 18" N

Longitude: 98° 45' 12" W

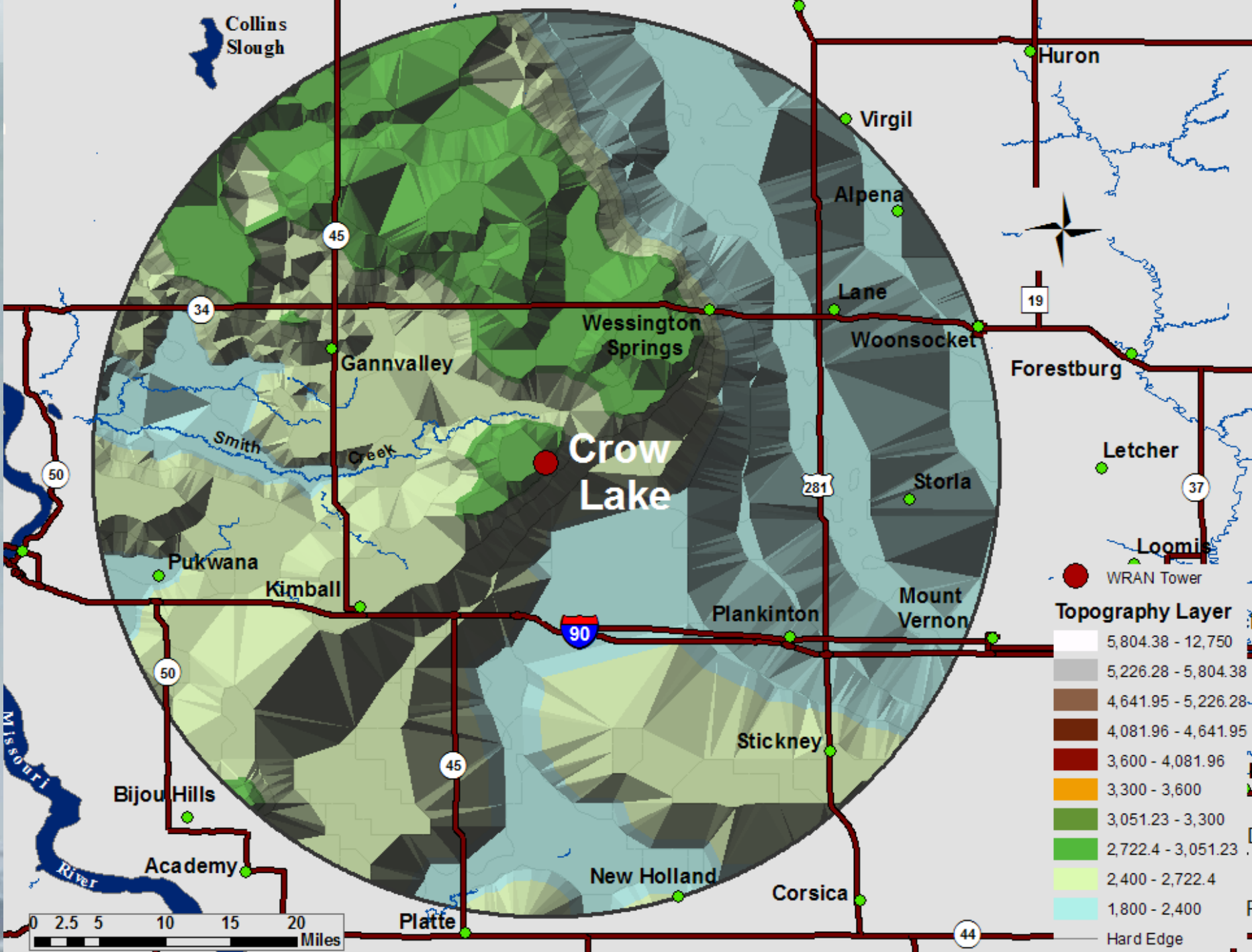
Date of activation: December 26, 2001

Data averaging interval: 10 minutes

Overall data recovery rate: 92.59% (50m)

92.37% (70m)





Collins Slough

Huron

Virgil

Alpena

Lane

Woonsocket

Forestburg

Wessington Springs

Gannvalley

Crow Lake

Letcher

Storla

Loomis

Pukwana

Kimball

Plankinton

Mount Vernon

**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

50

34

45

19

281

37

50

90

45

Bijou Hills

Academy

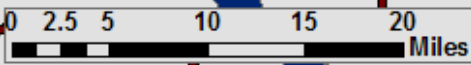
Stickney

New Holland

Corsica

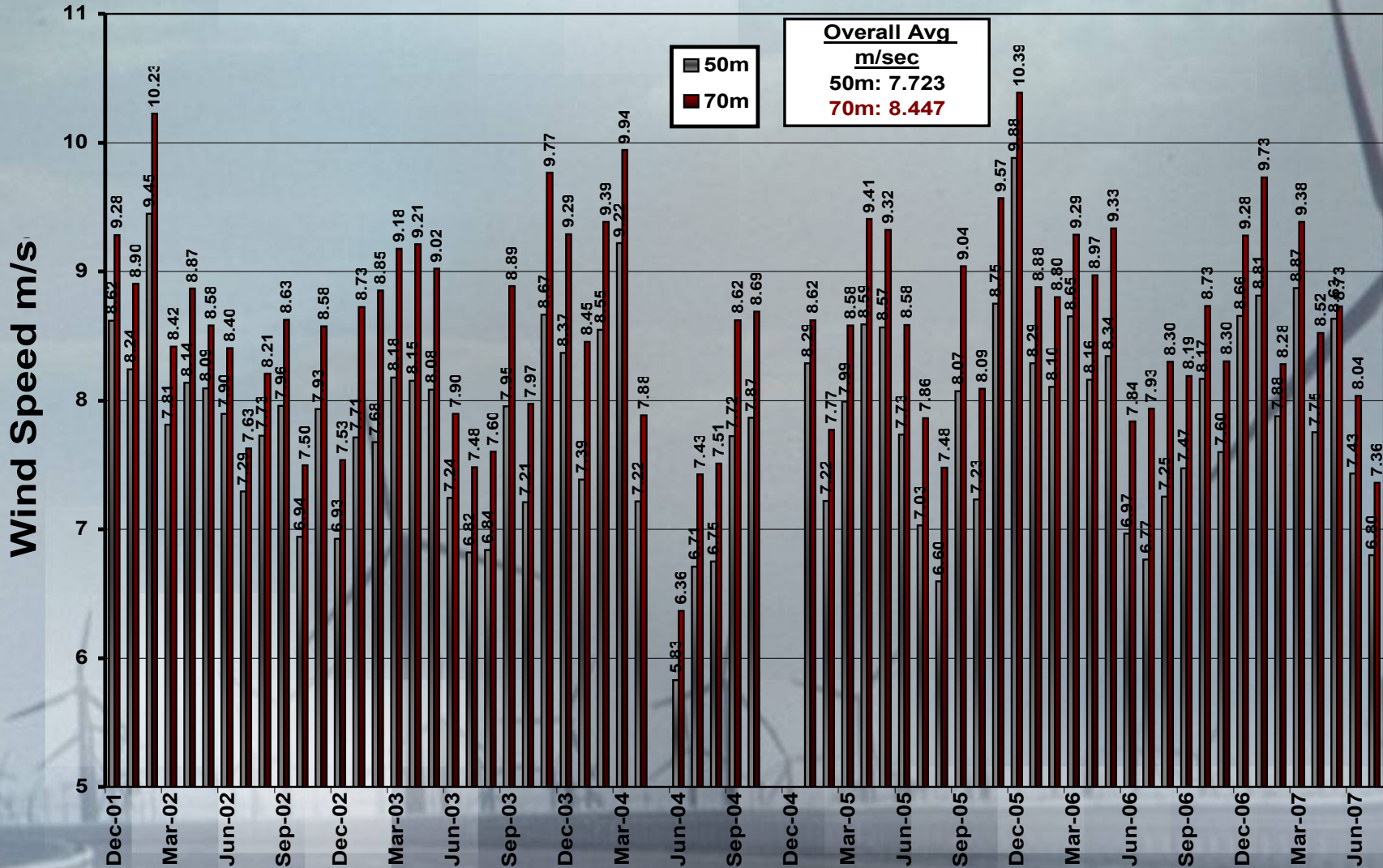
Platte

44



South Dakota State University  
 Electrical Engineering Department  
 Wind Resource Assessment Network Project  
 Site: Crow Lake

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 8/01/2007



Month	Notes
December 2002-January 2004	<p data-bbox="382 511 1798 811">During December 2002, an odd sensor failure occurred. One of the 70 meter anemometers developed a flaw that allowed it to work normally at moderate wind speeds (up to about 9 meters/sec) but then caused the measurements to drop to very low values (less than 4 meters/sec) when the wind speeds exceeded that 9 m/sec threshold. This problem went undetected for a period of time, until it caused the monthly average wind speeds in the summer of 2003 to be lower at 70 meters than at 50 meters. That got our attention. In an attempt to maintain accuracy of the data, while providing the most complete data set possible, we developed a method to “rehabilitate” the 70 meter data during this time period. This method entailed developing a mathematical relationship between the measurements of the two 70-meter anemometers, as functions of wind speed and direction, during the time when both anemometers were working properly. This equation was then applied to “correct” the flawed 70 meter data when it occurred.</p> <p data-bbox="382 1006 1779 1229">This procedure appears to have worked reasonably well. We believe the monthly average wind speeds shown are accurate to within about 0.1 m/sec, based on experience and comparisons with the rest of the data set. We suspect that the monthly average wind speeds given for June through September of 2003 are all slightly on the high side, again based on past experience, but as previously mentioned, we think this over prediction is on the order of 0.1 m/sec.</p>

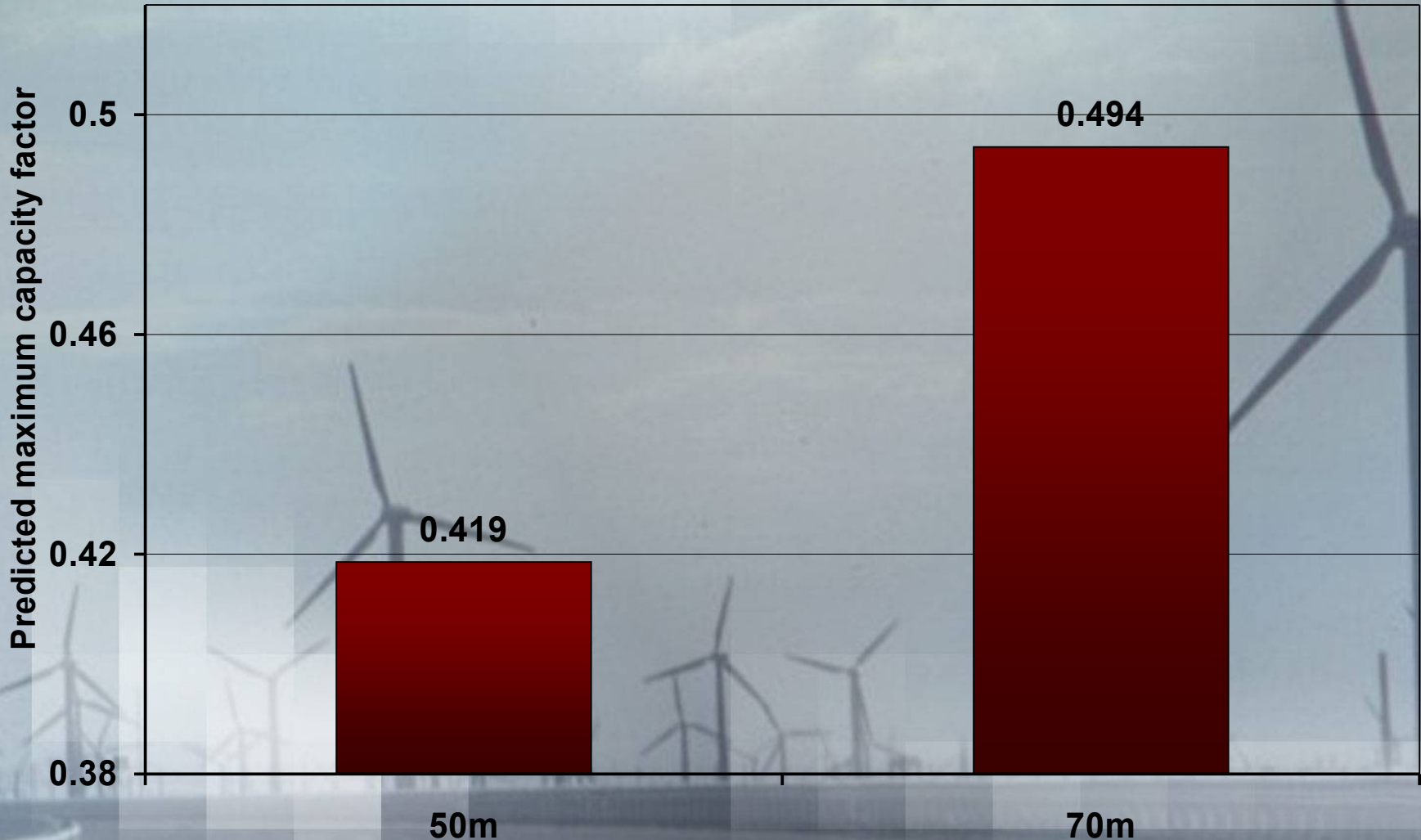
**South Dakota State University  
Electrical Engineering Department  
Wind Resource Assessment Network Project  
Site: Crow Lake**

**Notes for data  
interpretation (pg 2/2)**

<b>Month</b>	<b>Notes</b>
<b>December 2004</b>	We have no data for December 2004 due to a problem with the base station computer. Fortunately, some of these data may be recoverable, and we are working on this.
<b>November 2005</b>	Data set for this month exhibited losses due to an ice storm that froze up the sensors for the last few days of November. These sensors will be monitored in the future for defects.
<b>December 2005</b>	Losses from the ice storm in November continued into December for about a week. Icing was experienced again at the end of December for about a day.
<b>January 2006</b>	There was a small amount of data lost at the beginning of the month due to ice accumulation on the sensors. Monthly averages appear to follow past trends.
<b>December 2006</b>	December's data was only partially complete due to ice accumulation on the sensors. The sensors appeared to work intermittently throughout the month.
<b>May 2007</b>	May's data was complete, however a 70 meter anemometer facing northwest was damaged from a strong weather system. This data may be skewed low because the defaulted data was not used in the monthly average. The anemometer will be replaced ASAP.

**South Dakota State University  
Electrical Engineering Department  
Wind Resource Assessment Network Project  
Site: Crow Lake**

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 from the initial data collection to 8/01/2007.



**South Dakota State University  
Electrical Engineering Department  
Wind Resource Assessment Network Project  
Site: Crow Lake**

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 the entire period of data collection. This figure is computed using all data from activation to November 30, 2002.

