

Minnesota Tribal Coalition Tribal Utility Capacity Building Project

DE-FG36GO13118 A000

September 2003 – September 2006

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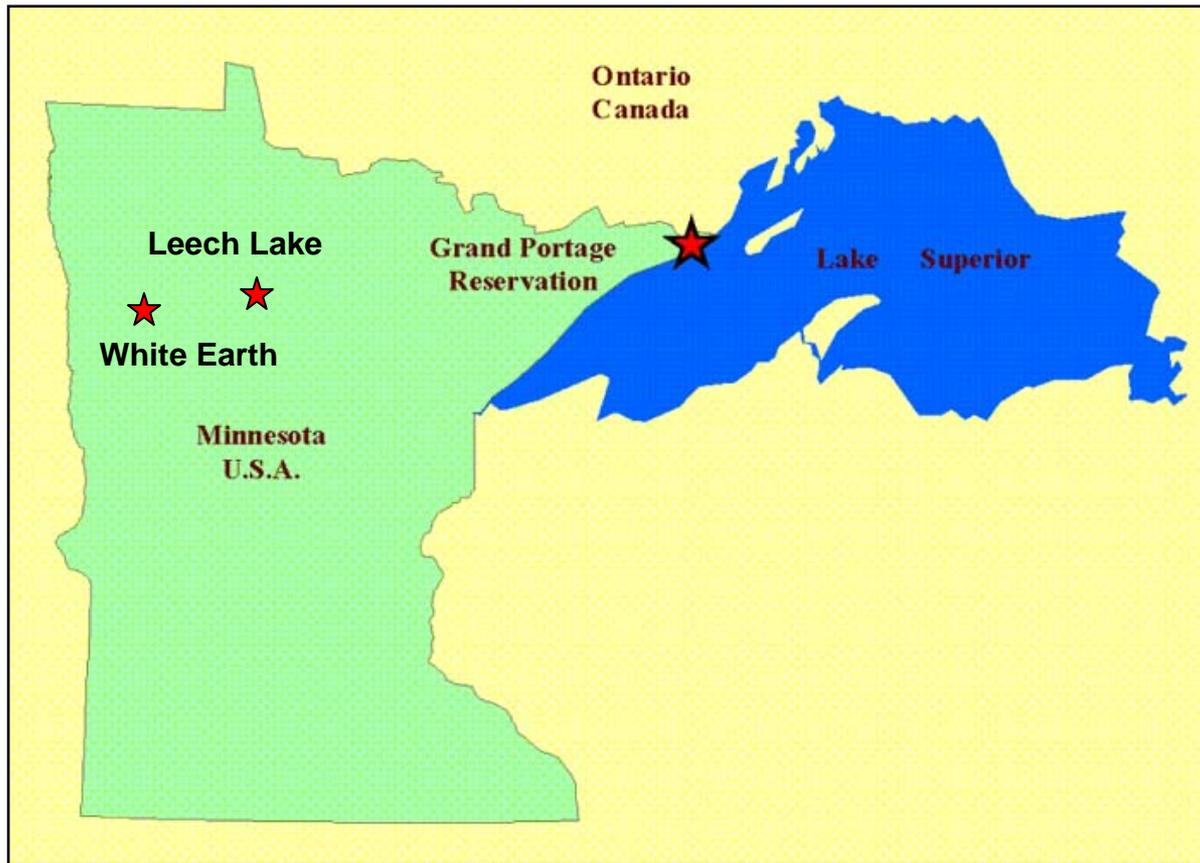
Grand Portage

White Earth

Leech Lake



Minnesota Tribal Coalition



Participants

White Earth Band of Chippewa Indians
Leech Lake Band of Chippewa Indians
Grand Portage Band of Chippewa Indians
White Earth Land Recovery Project
Center for Sustainable Community Development,
University of Minnesota Duluth

Michael Rivard, Minneapolis, MN
EAPC Architects Engineers, Grand Forks MN

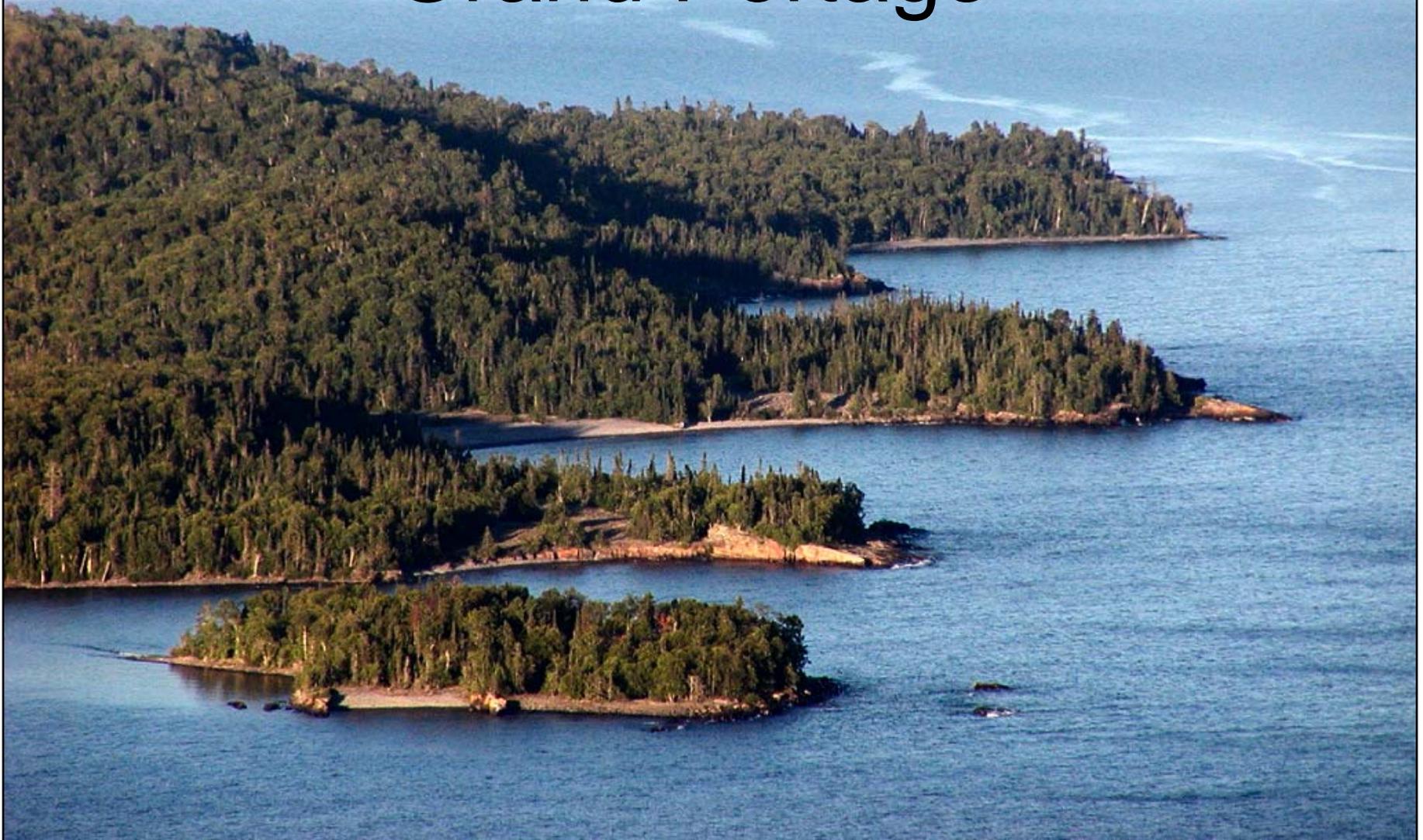
Focused on inter-related areas:

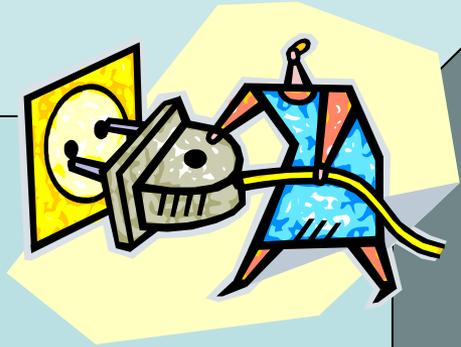
Education	educational material distribution, awareness
Assessment	on-reservation energy flow, consumption patterns, potentials for renewable energy resources
Strategic Plan	Tribal energy vision
Model Documents	codes, policies, institutions

Tribal Participants

- Michael Triplett, White Earth
- Brandy Toft, Leech Lake
- Shannon Judd, Grand Portage

Grand Portage





Total Electricity Consumption:



Community Center- 840,000 kWh/yr



Casino/Hotel- 2,200,000 kWh/yr



Households- 1,440,000 kWh/yr

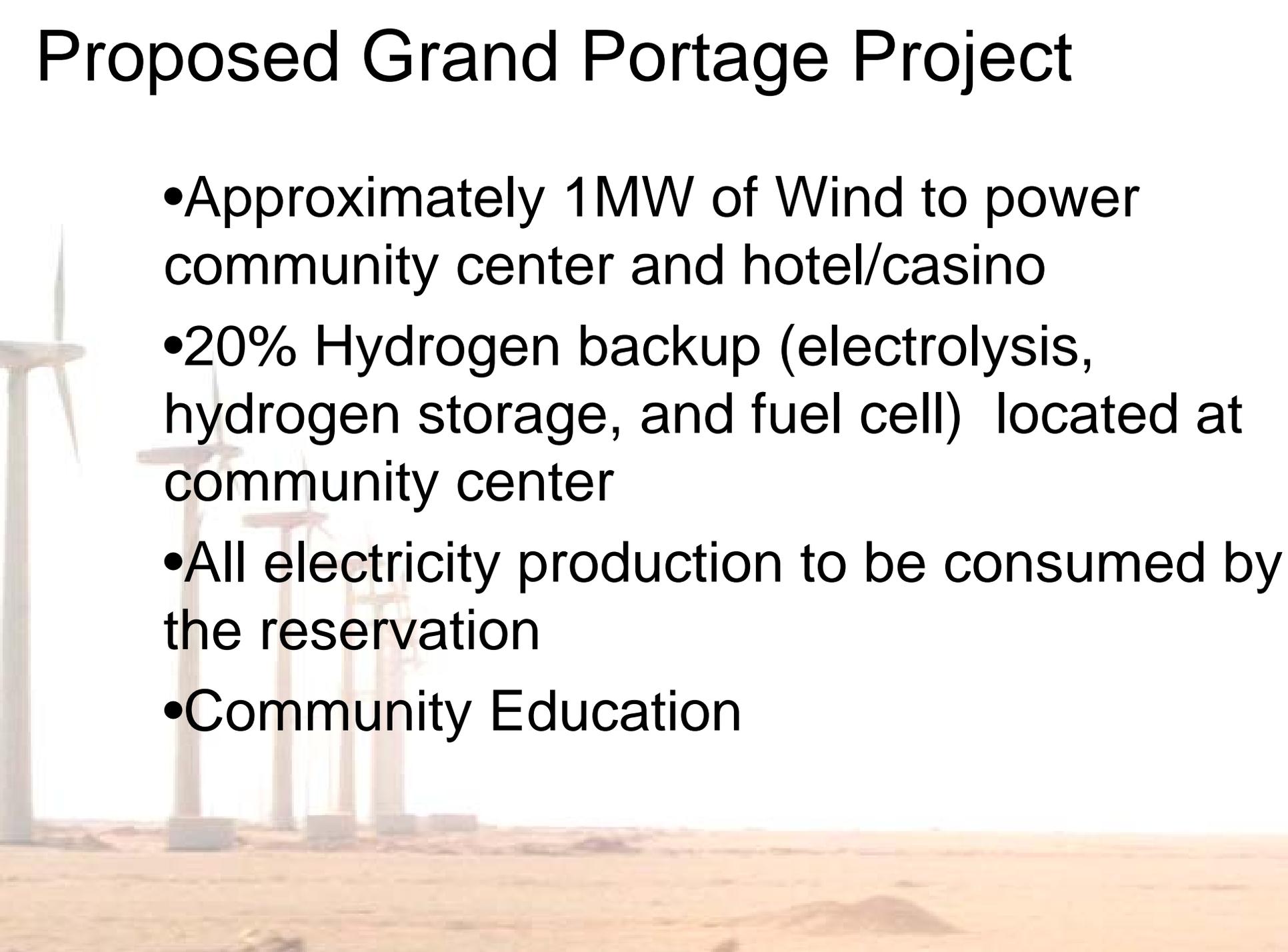


Tribal Council Offices- 640,000 kWh/yr

Total Consumption: 5,120,000 kWh/yr

Annual Cost: \$358,400.00

Proposed Grand Portage Project

The background of the slide is a photograph of a desert landscape. In the foreground, there is a sandy, flat ground. In the middle ground, several tall, white wind turbines are visible, spaced out across the horizon. The sky is a pale, clear blue. The overall scene is bright and open.

- Approximately 1MW of Wind to power community center and hotel/casino
- 20% Hydrogen backup (electrolysis, hydrogen storage, and fuel cell) located at community center
- All electricity production to be consumed by the reservation
- Community Education

Annual average wind speed=14.2 mph.

GP Wind Speed Distribution

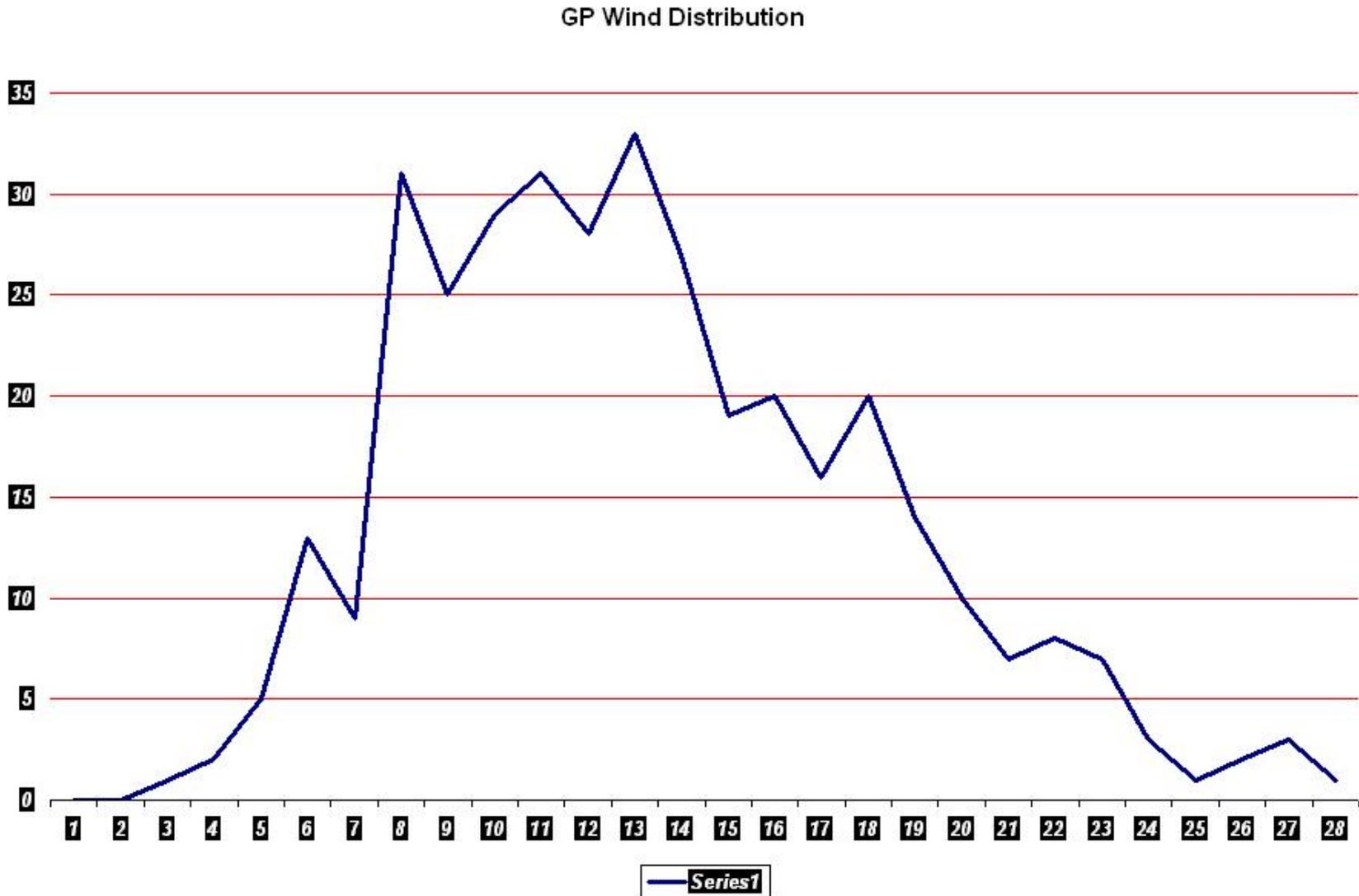


Fig #1. The number of days in each wind speed 'bin'.

Grand Portage Wind Speed Distribution

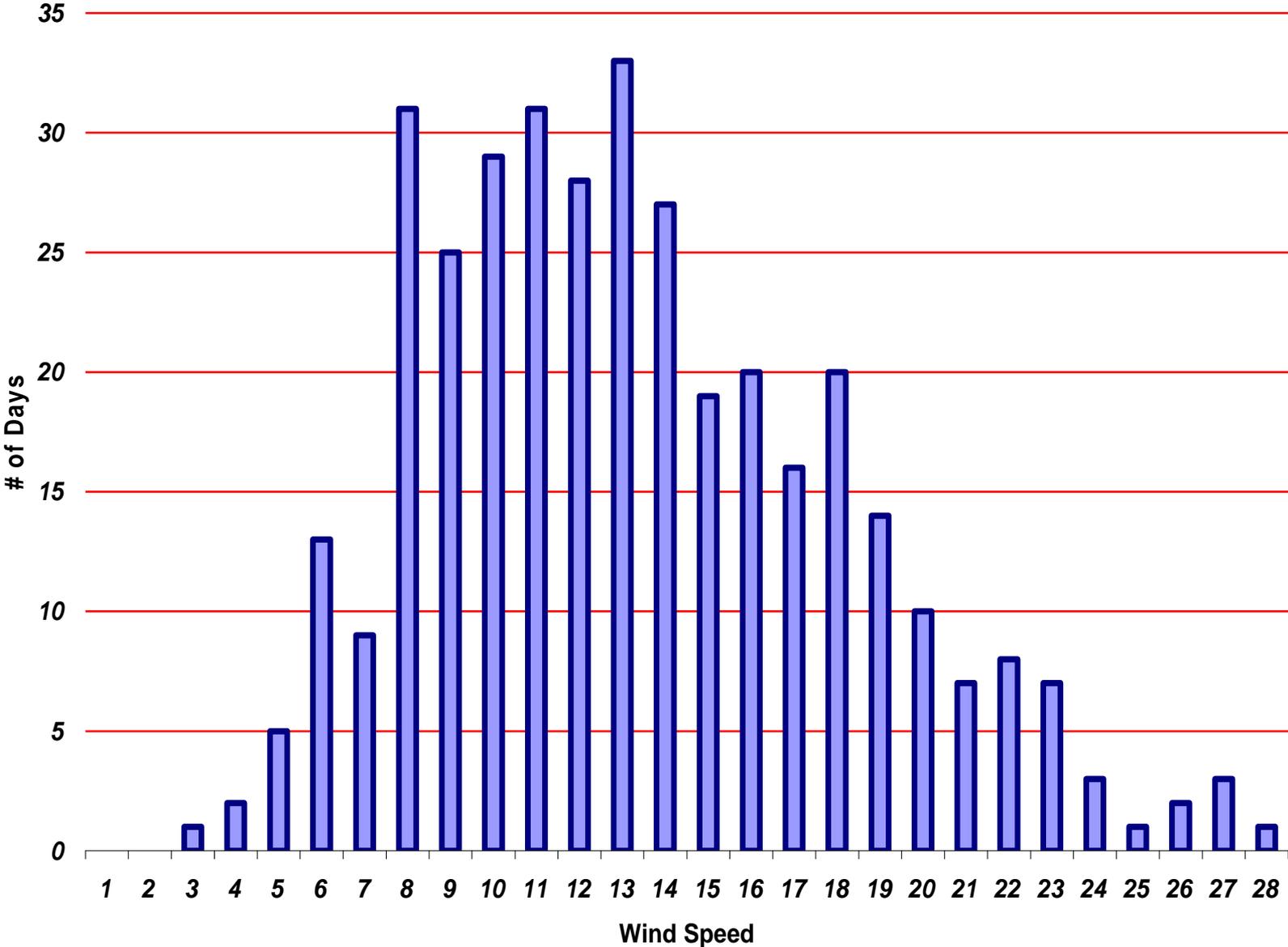
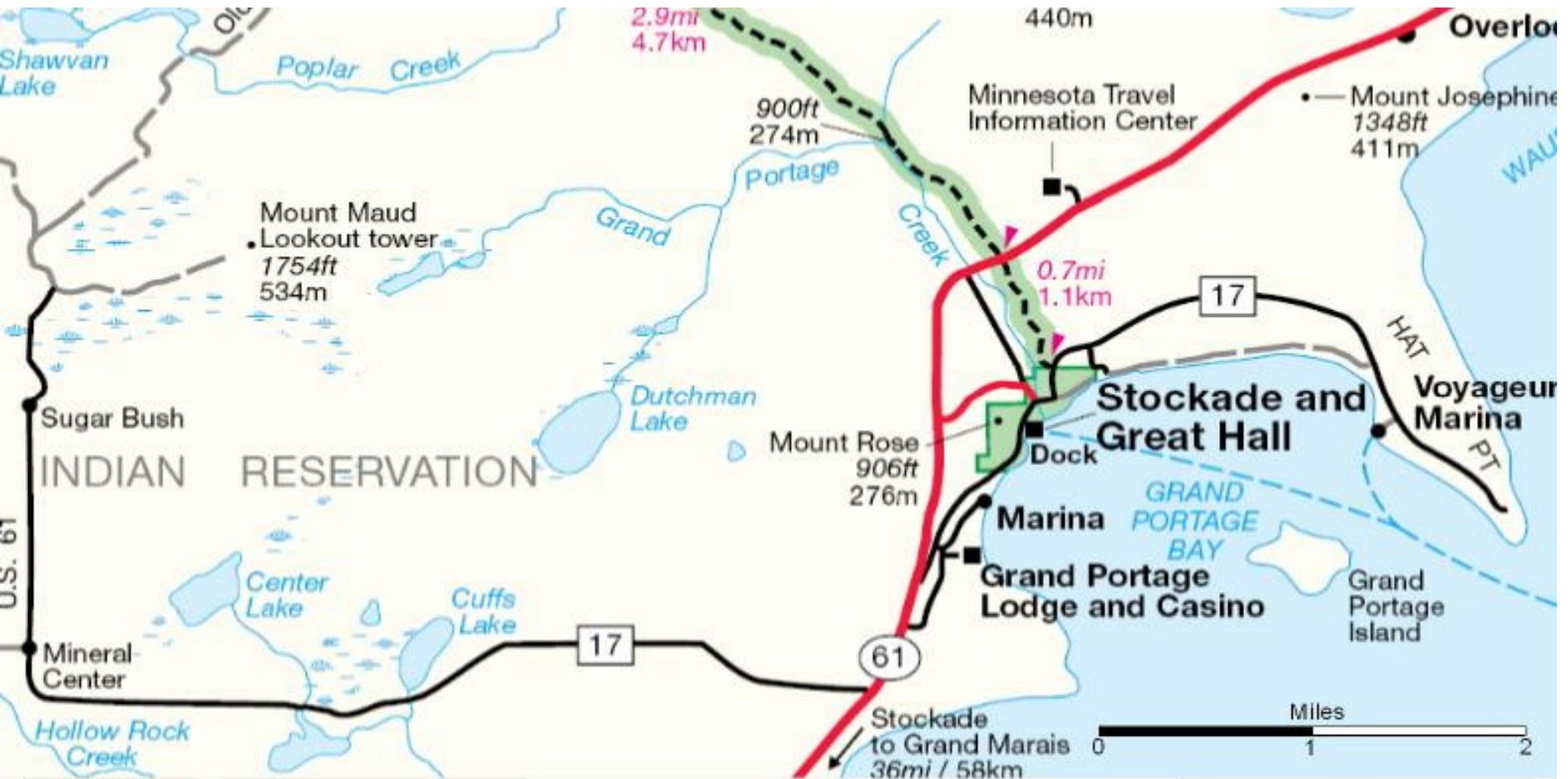


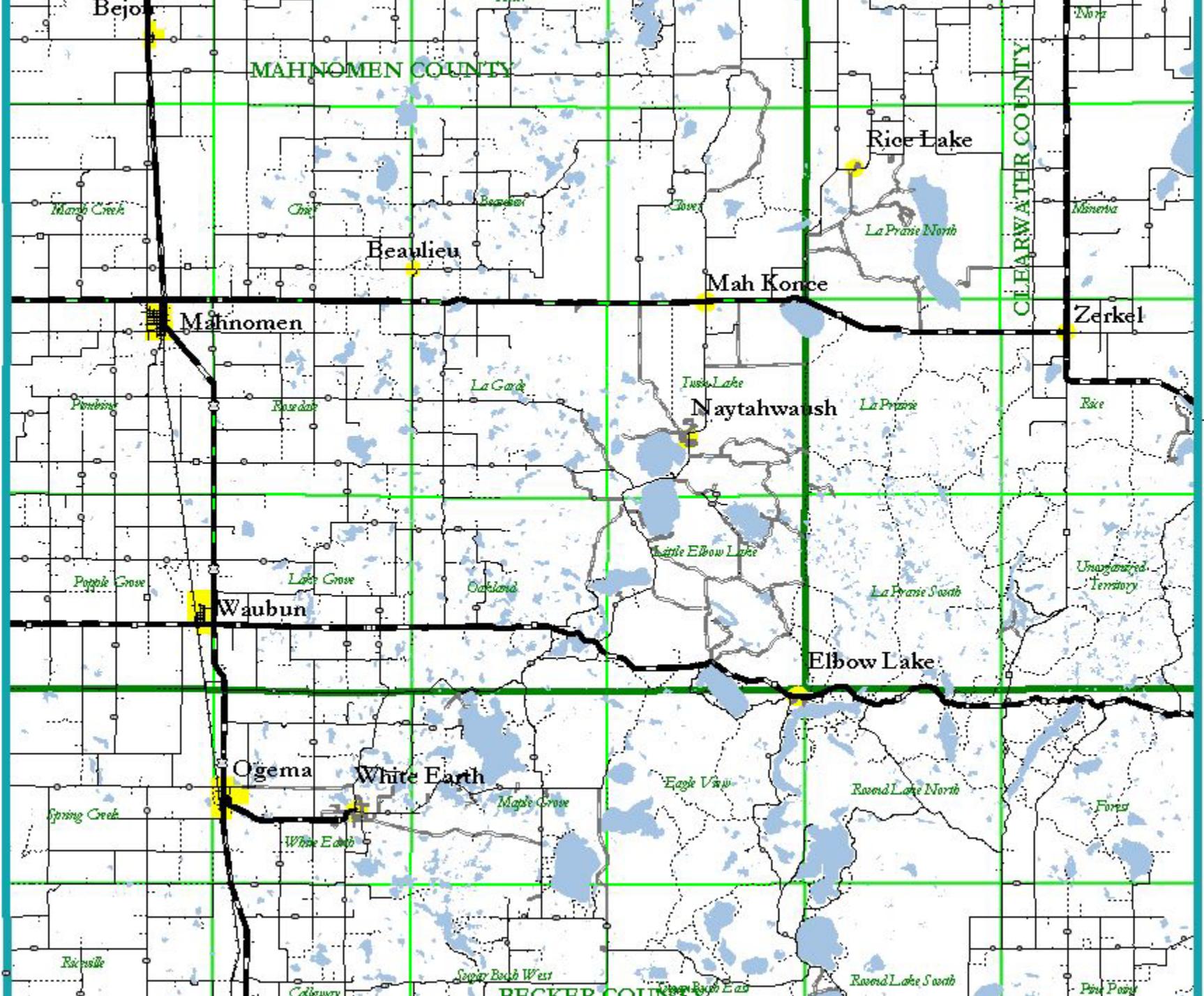
Figure 1. Map of Grand Portage

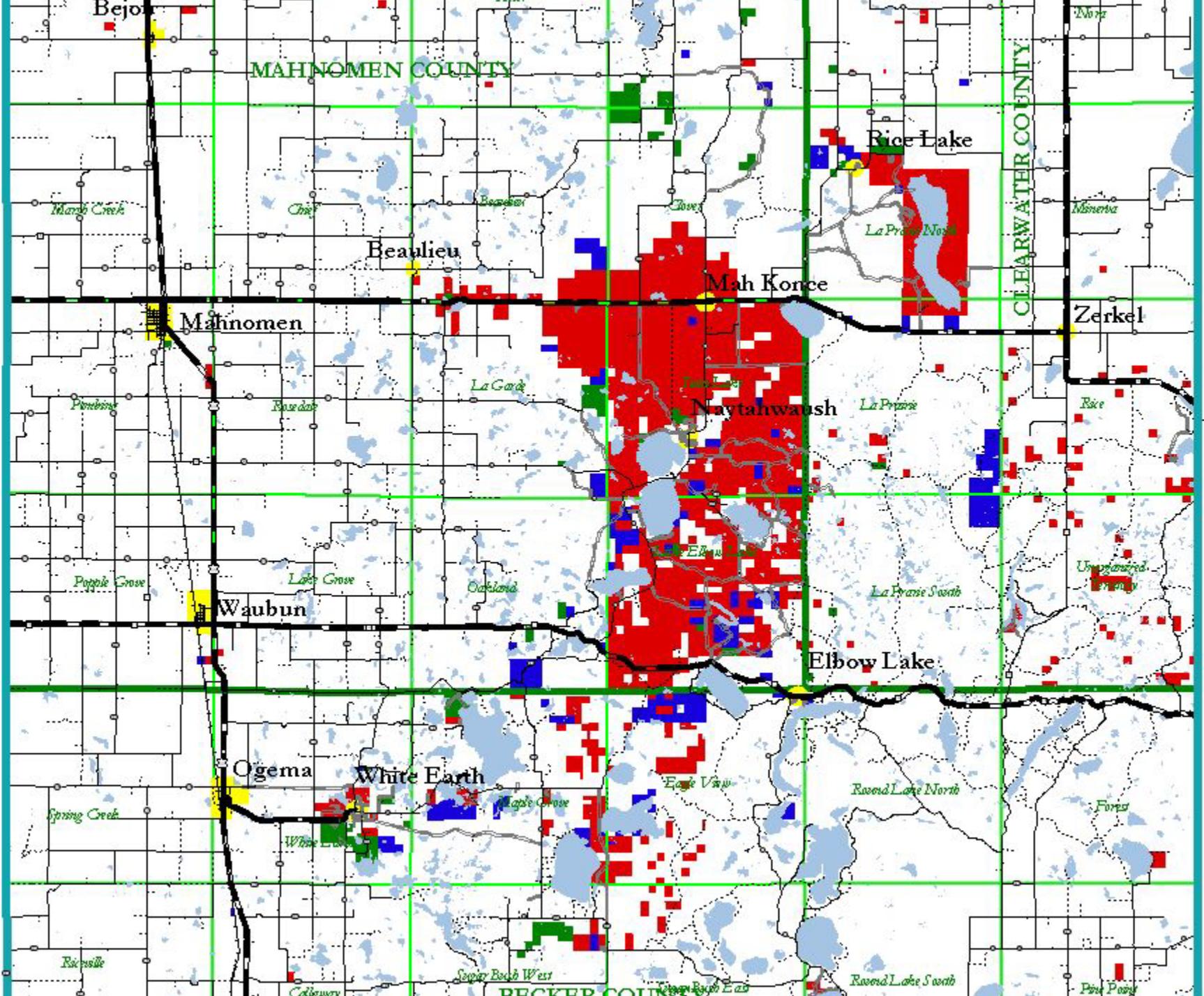
Source: www.nps.gov/applications/parks/grpo/ppmaps/GRPOmap1.pdf



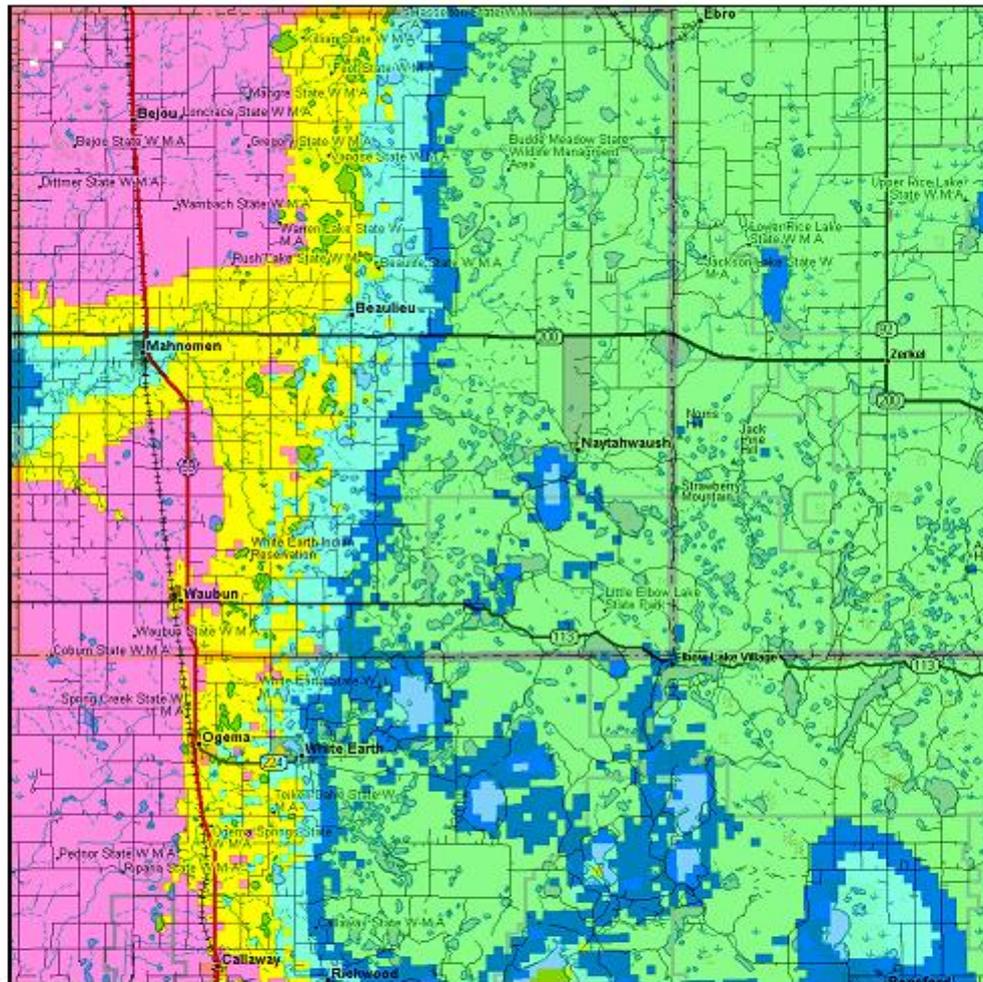
White Earth





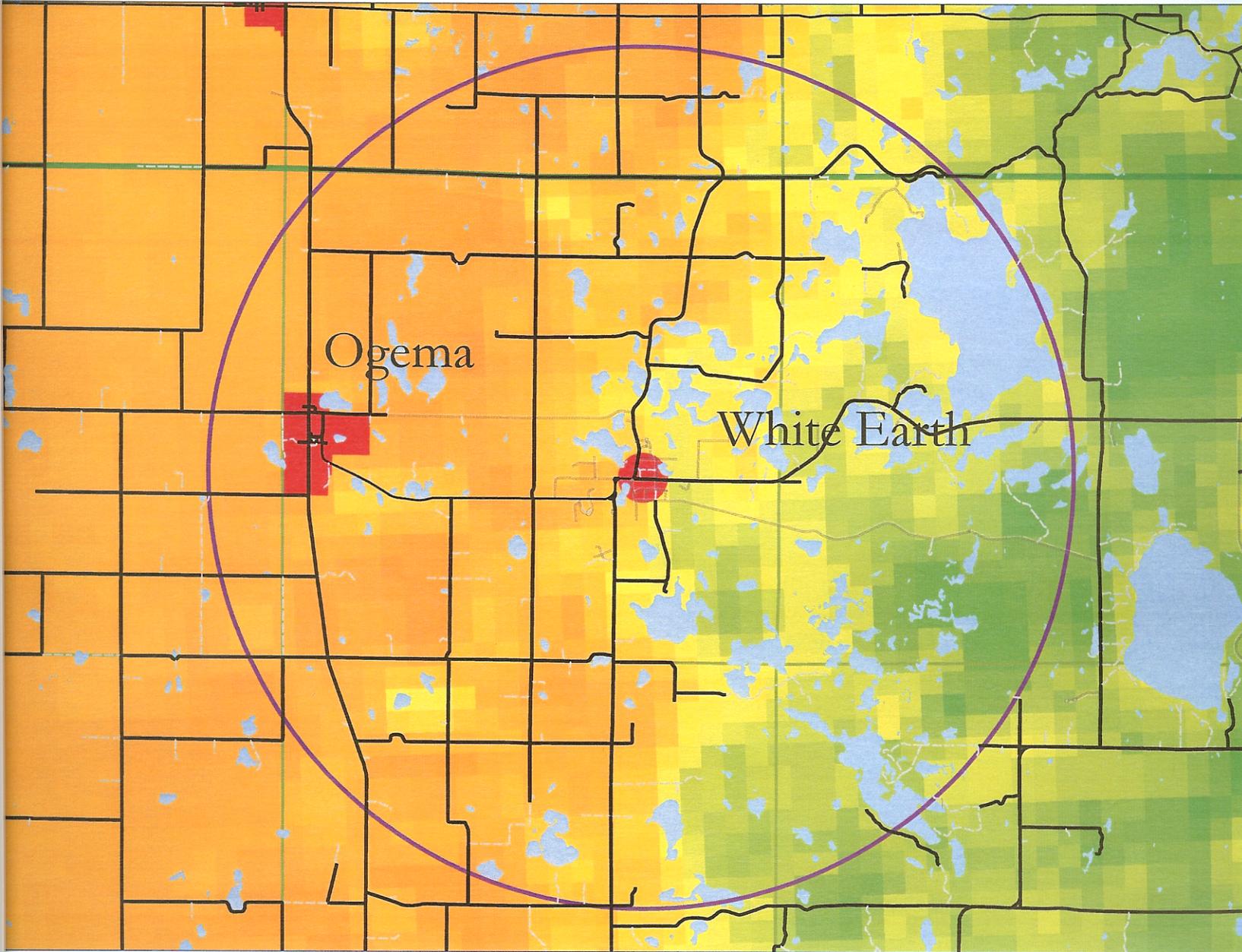


White Earth Reservation – 70 meter Wind Resource Map

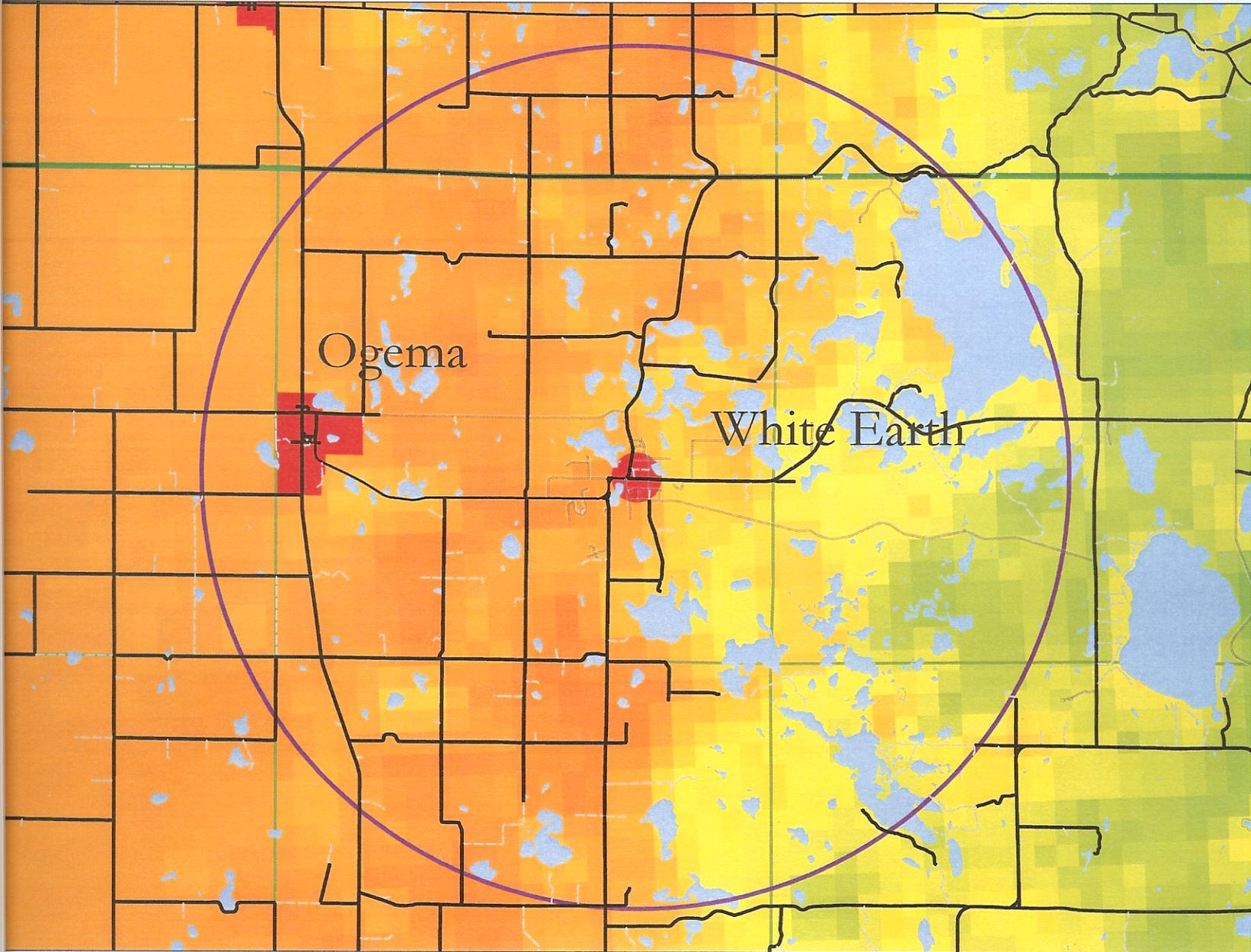


11.41 – 13.42 mph	5.1 - 6.0 m/s
13.42 – 13.87 mph	6.0 - 6.2 m/s
13.87 – 14.32 mph	6.2 - 6.4 m/s
14.32 – 14.77 mph	6.4 - 6.6 m/s
14.77 – 15.21 mph	6.6 - 6.8 m/s

White Earth Village- 30 Meter



White Earth Village- 80 Meter



Major Electricity Consumers:

 Reservation Tribal Council Bldg. - 477,320 kWh/yr

 Circle of Life School- 464,000 kWh/yr

 Community Center- 300,000 kWh/yr

 Bingo Hall - 265,000 kWh/yr

 Casino - 14,982,000 kWh/yr

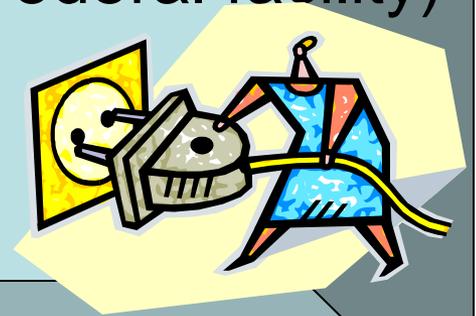
 Casino Sign - 87,000 kWh/yr

 Head Start - 36,000 kWh/yr

 WE Health Center - 1,700,000 kWh/yr (Federal facility)

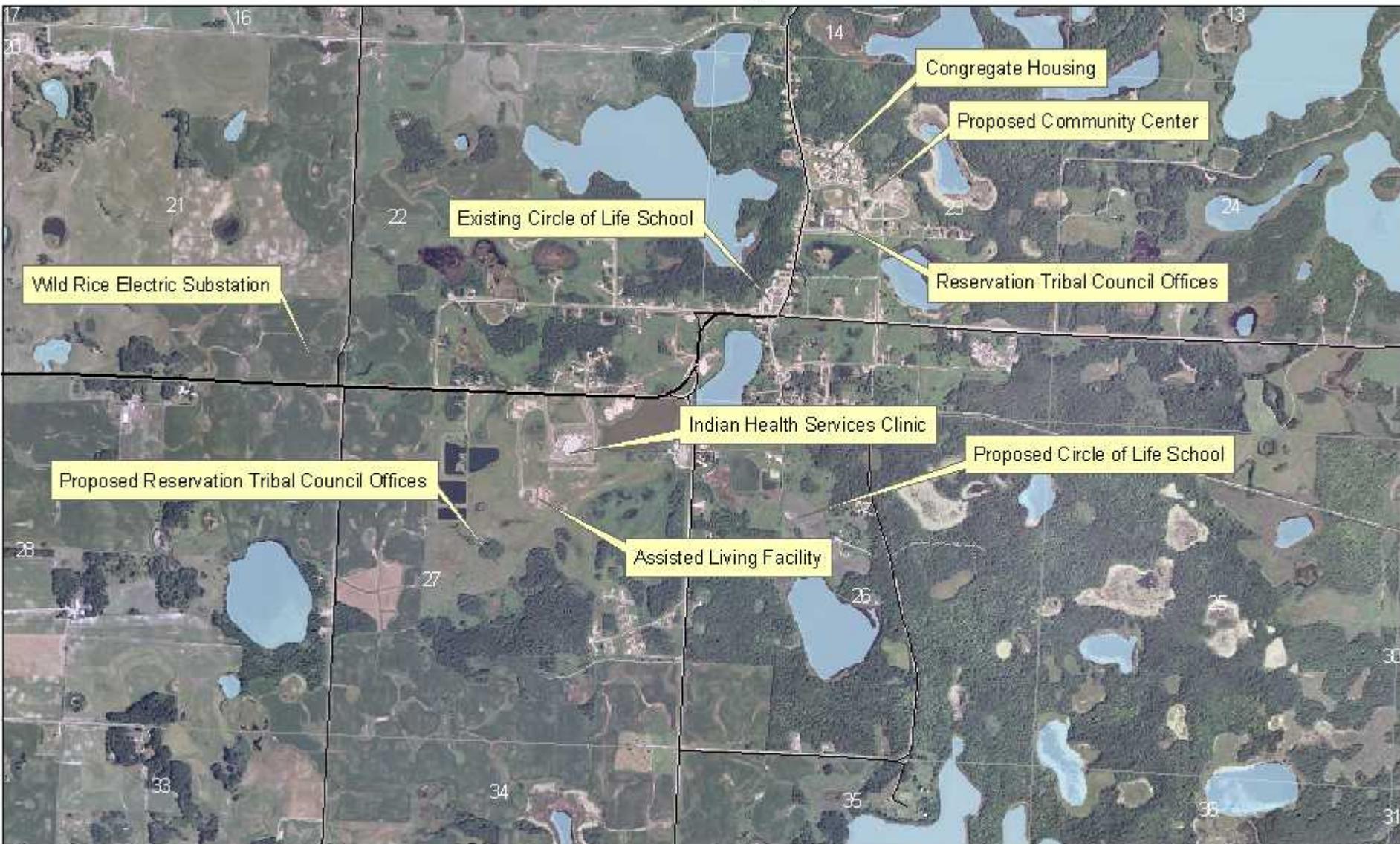
 Total: 18,311,320 kWh/yr

 Annual Cost: \$732,453.00



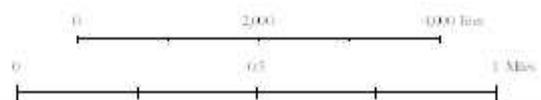
White Earth Reservation

White Earth Village



Legend

US Highway	Section Lines
State Highway	Lakes
County & Township Road	
BIA	
UPR	



White Earth Village

Facility	Annual Expenditure ('03-'04)	Location
RTC Building	\$28,799	White Earth
Circle of Life	27,043	White Earth
School	13,135	White Earth
Congregate		White Earth
Housing		White Earth
new Community		White Earth
Center		
new COL School		
new Tribal Adm.		
Bldg.		



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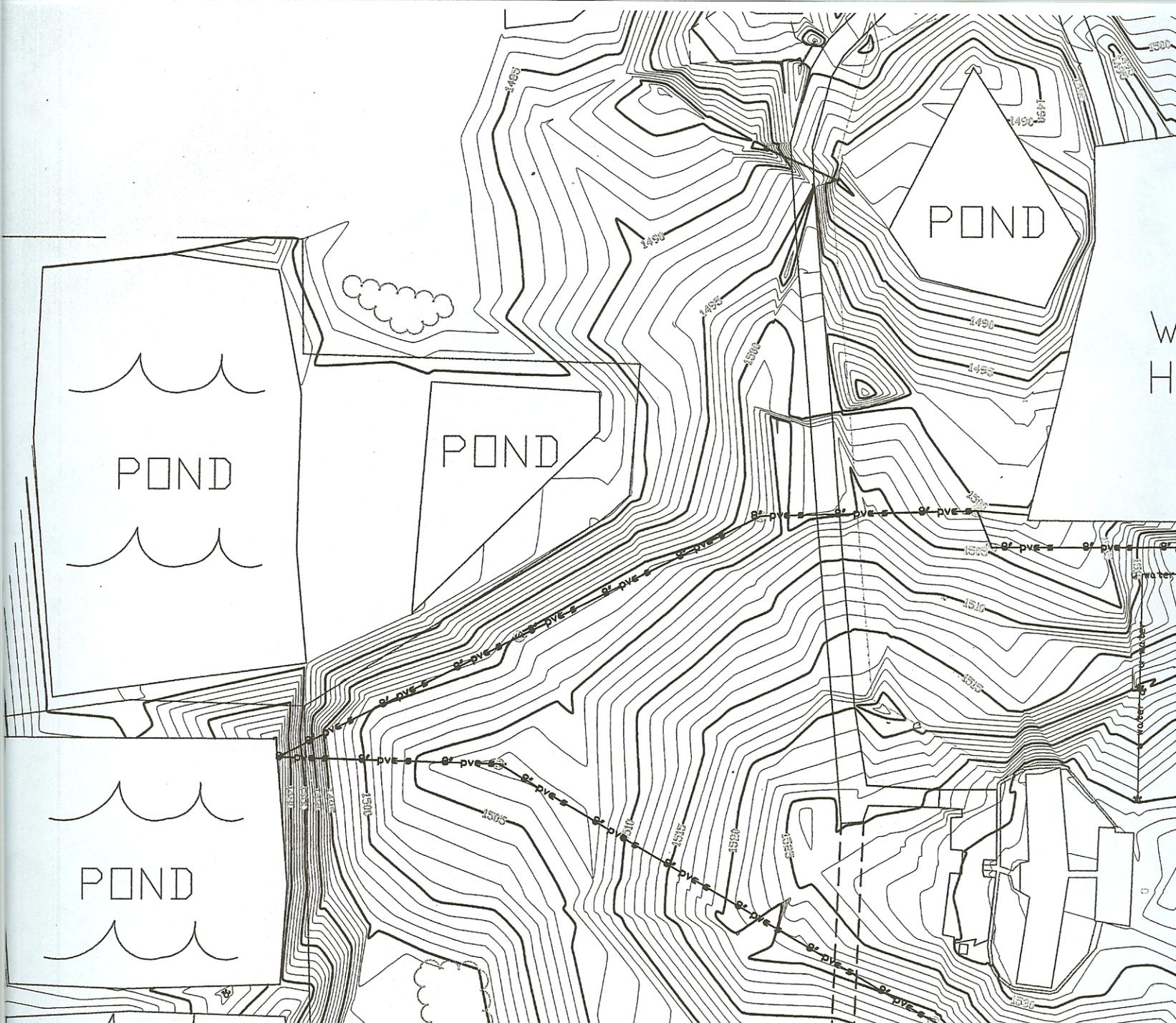
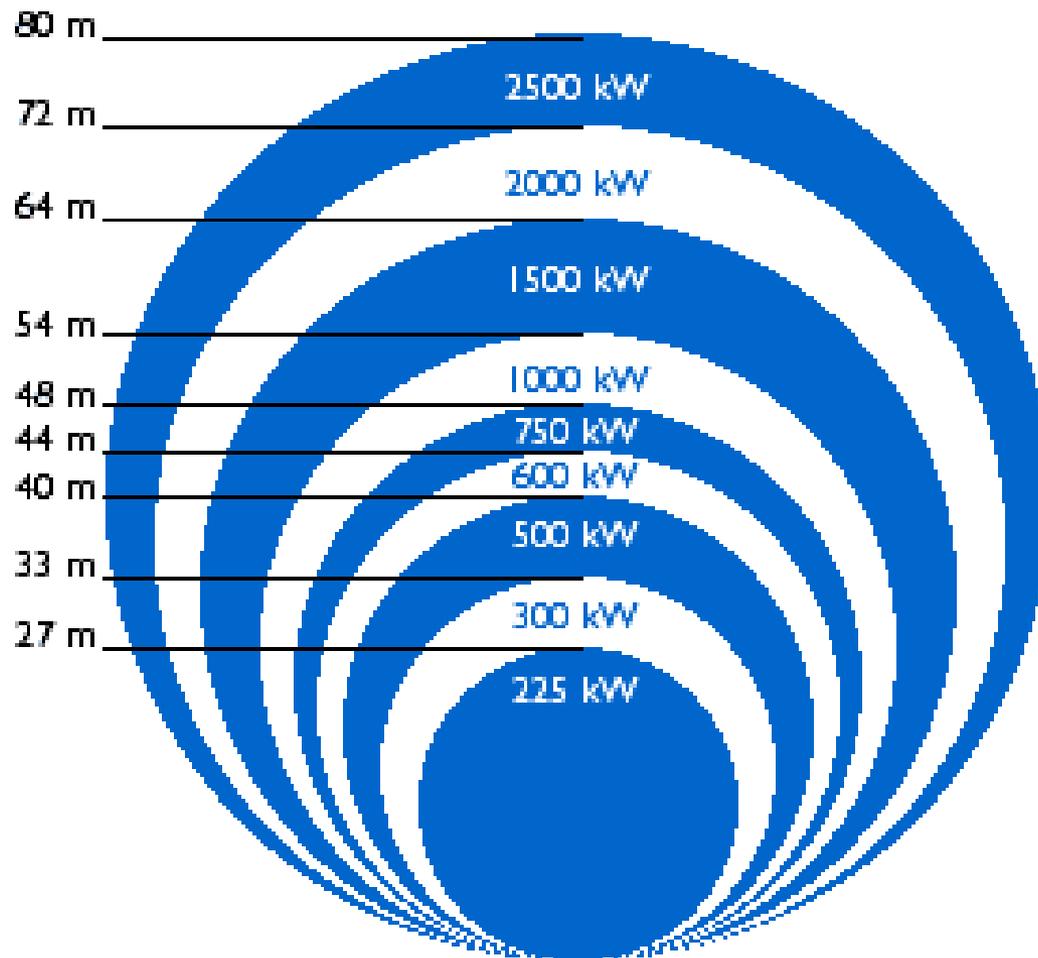


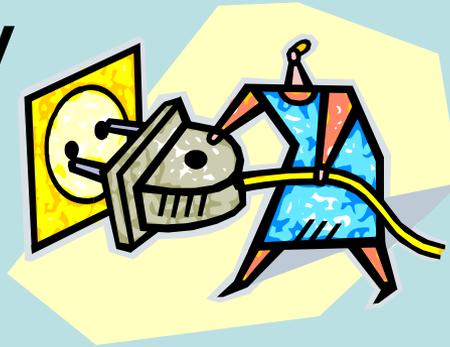
Figure 2. Swept Area Diagram



Leech Lake



Major Electricity Consumer:



Casino: 2002- 6,027,840 kW/H
2003- 6,427,320 kW/H

Annual Cost: \$385,640.00

Wind Resource

Wind Production:

Wind Data:

MPH-10

Class-2

Capacity Factor-.08

Turbine Site: Several other potential sites to be explored



Proposed Project Leech Lake

- Approximately 1MW to power fraction of casino's demand
- Community Education



Accomplishments

Wind resource evaluation

Tribal energy load assessment

Alternative energy application Assessment

Comprehensive strategic plan with implementation
recommendations

Community-based energy development financing
proformas

Educational materials

Grand Portage

- Focus on one 1-2 MW turbine
- Mount Maud site – 3-6 mile (\$200,000-\$400,000) power line
- Connect behind the meter to offset casino purchases
- 1.5 MW turbine focus
- Funding: loan from mystic lake, and green tags from native energy
- Currently assessing wind at 30, 50, 80 meters on TV communications tower since march 2007 – average wind speed of 18 mph being achieved

White Earth

- Potential for 750 – 1,000 kW turbine – governmental facilities
- Potential for several 50 KW turbines – scattered facilities
- Received \$990,000 congressional earmark
- 40 m meteorological tower in place – prime site
- Focus on white earth village – 10-14 mph average
- Wind mapping – State of MN – WindLogics – 31 % capacity at 80 m predicted for site

Leech Lake

- Focus on northern lights casino site
50 m meteorological tower in place at casino
- Completing 12 months of monitoring
- Wind speed in 10 mph range
- Turbulence is major problem