

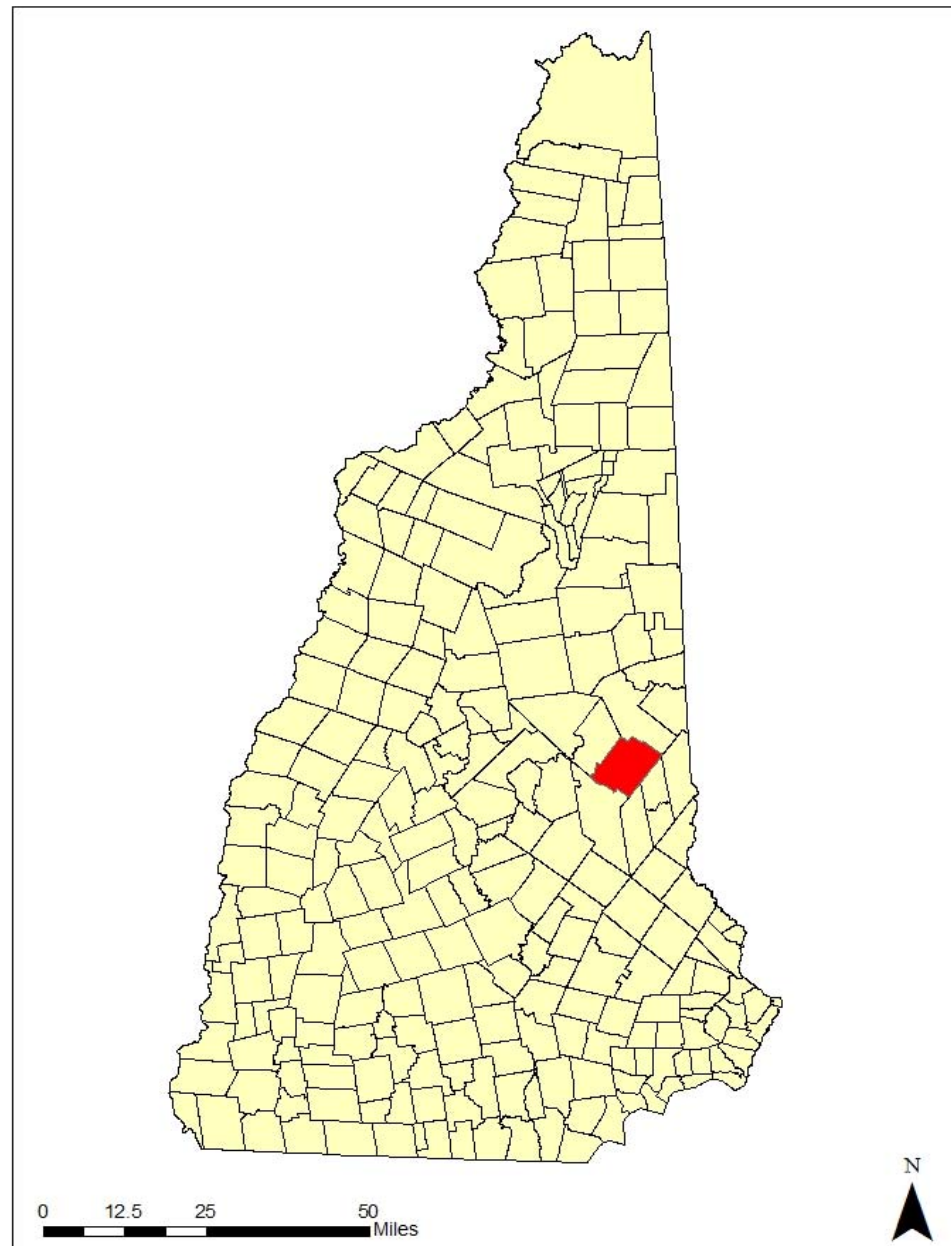
Determining Solar and Wind Potential for Wolfeboro, NH

Cody LaVack
GPH 904

Geography Department
Salem State University

Research Objective

- Determine potential wind energy production and wind turbine location
- Determine potential solar energy production



Demographics

- 2009 Population – 6602
- Located in Carrol County
- Total Houses: 2546
- Median Household Income: \$49,470
- Wolfeboro Municipal energy usage – 2,618,836 kWh

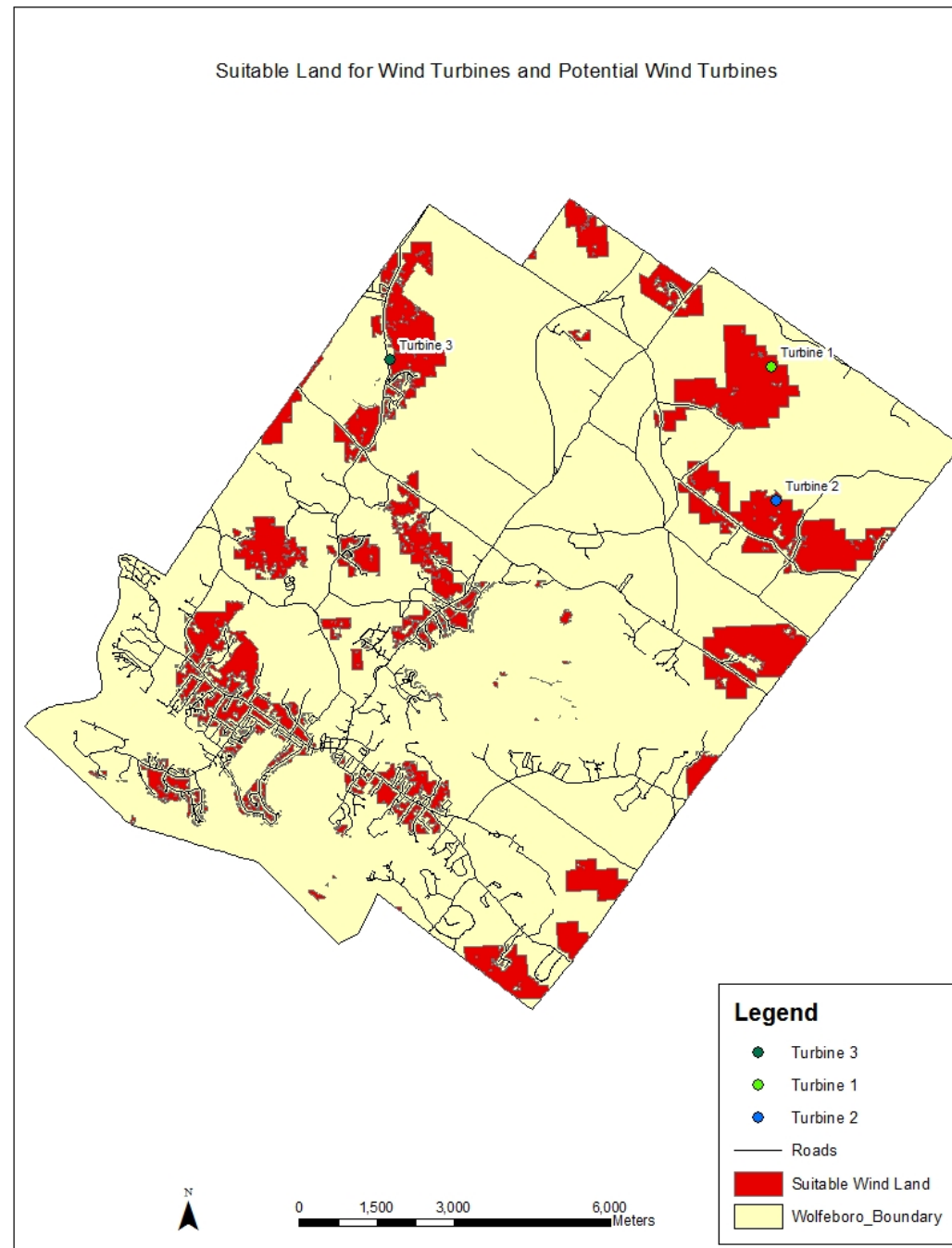
Methodology: Wind

- Turbine height – 50 meters
- 150 foot buffer around roads
- Slope less than 60 degrees
- Wind class of two or higher at 50 meters
- Excluding bodies of water or wetlands, as well as areas of protected open space or conservation

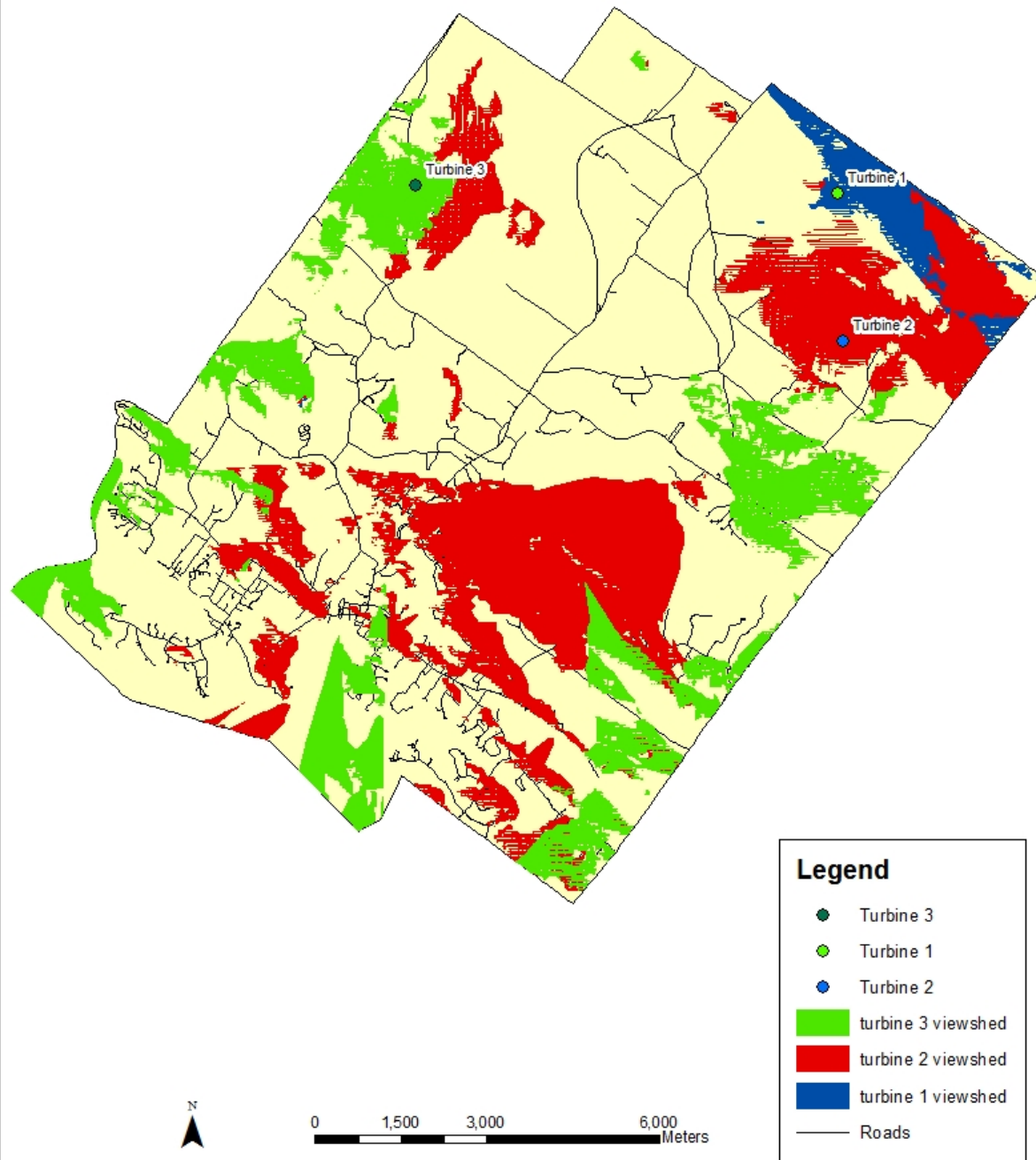
Methodology: Solar

- 101 randomly picked houses digitized
- 16% Efficiency
- Avg square footage determined
- Solar radiation values determined
- Potential solar production determined

Wind Data



Potential Wind Turbine Viewsheds



Wind Data Continued

Total Land Wolfeboro (km2)		
151.5		
	Total Area Visible (km2)	Percent of Total Land Visible (%)
Turbine 1	5.2	3.43
Turbine 2	32.2	21.25
Turbine 3	18.7	12.34
Avg Wind Speed (m/s)	Energy Output (kWh/yr)	Wolfeboro Energy Usage kWh (2007)
4.78	55846	2618836

Solar Data

Avg Roof Area	Avg Roof Area Halved	Avg. Solar Output	Half Avg. Solar Output
165.5 m2	82.75 m2	31700953	15850476.5
KWH/yr	KWH/yr Half	Avg kWh per Household	Potential Total Energy Output Houses (kWh)
31700	15850	11139	40369950

Discussions

- Each wind turbine developed in Wolfeboro, NH could account for 2% of the total energy used by the municipality.
- Significant solar energy could be established, especially with the tax incentive program in place.
- Both appear to be good sources of potential energy and I see no reason why both should be not developed in Wolfeboro, NH.

References

- <http://www.nh.gov/oep/programs/energy/RenewableEnergyIncentives.htm>
- http://www.nh.gov/oep/resourcelibrary/swes/documents/technical_bulletin.pdf
- http://nhenergy.org/images/c/c4/WEC_Intern_Final_Report.pdf
- http://www.wolfeboronh.us/Pages/WolfeboroNH_Electric/MonthlyCost.pdf
- <http://www.nh.gov/nhes/elmi/htmlprofiles/wolfeboro.html>
- <http://planetturbine.com/blue-sky-turbine-100kw.html>
- <http://ecode360.com/?custID=WO1661>