Some initial thoughts for drafting a proposal for:

A Decision Support System
for Wildlife Friendly Operation of Wind Farms

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for Wildlife Friendly Operation of Wind Farms

Pat Heglund, Eileen Kirsch - UMESC

Bob Klaver, **Manuel Suarez - EDC**

Bill Labiosa - WGSC

Rafal Angryk, Reggie Mead, John Paxton - MSU

Robb Diehl - USM

A **decision support system** is an interactive, computer-based system designed to help **decision makers solve poorly structured problems**. Using a combination of models, analytical techniques, and information retrieval, such systems help **develop and evaluate appropriate alternatives**. Decision support systems should **reduce the uncertainty faced by managers** when they need to make decisions regarding future options.

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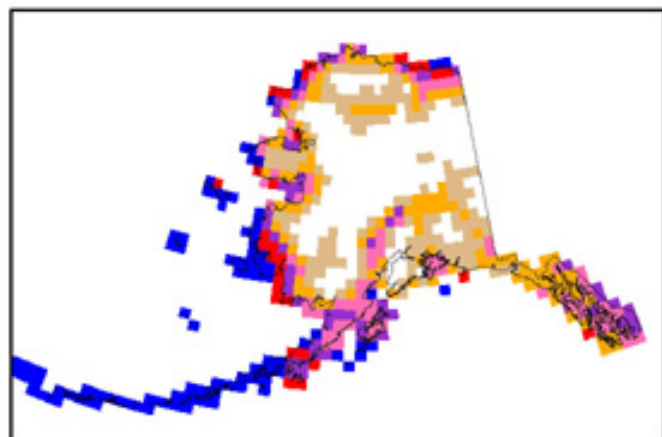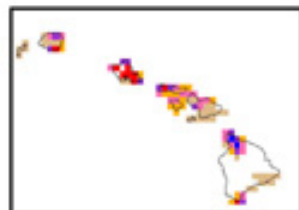Chapman and Hall. New York, New York. 363 pages.

Sprague, R. H., Jr. and E. D. Carlson. 1982.
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United States - Wind Resource Map
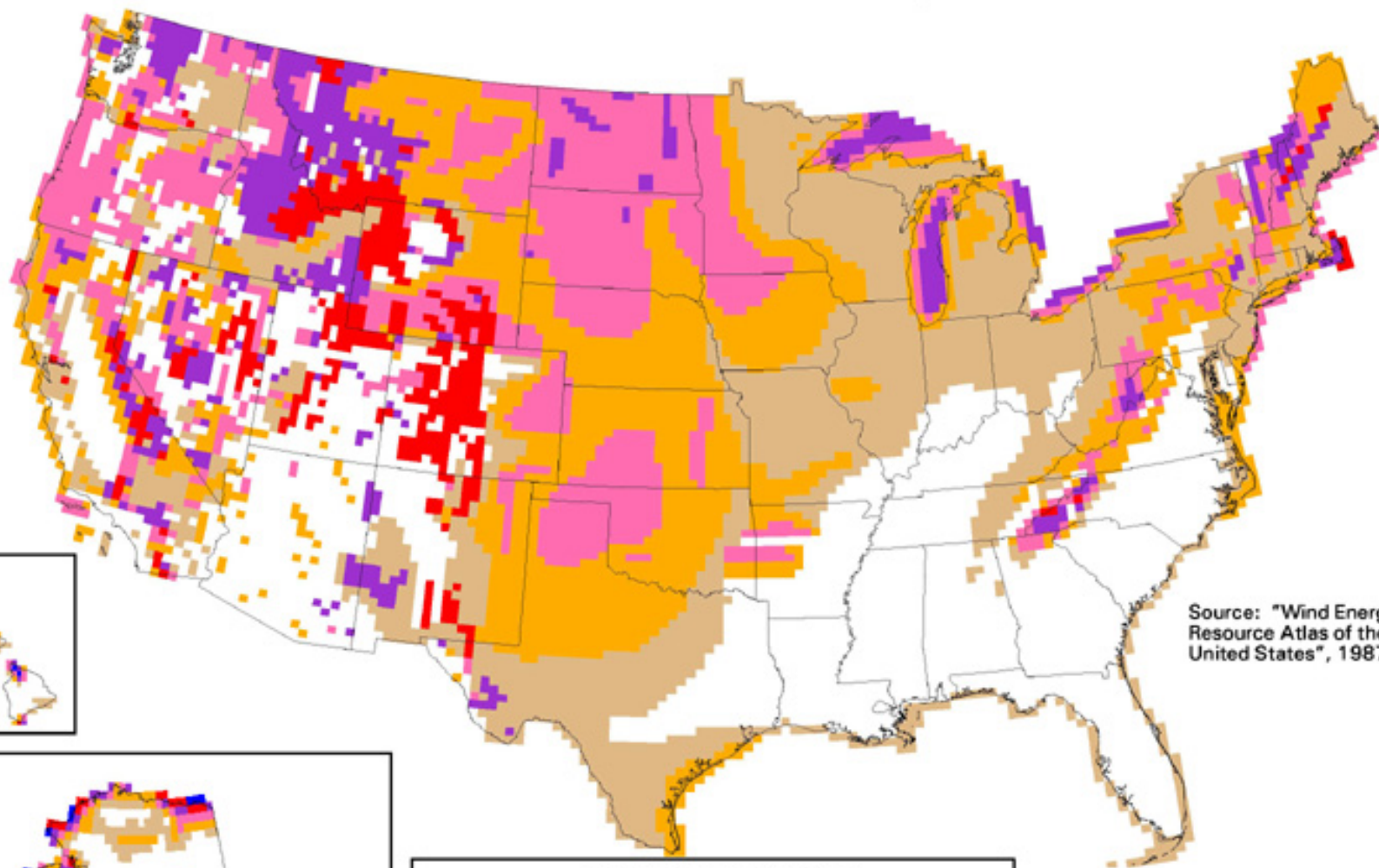
Source: "Wind Energy Resource Atlas of the United States", 1987

Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m^2	Wind Speed[a] at 50 m m/s	Wind Speed[a] at 50 m mph
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

[a] Wind speeds are based on a Weibull k value of 2.0

U.S. Department of Energy
National Renewable Energy Laboratory

NREL

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We propose to assemble existing scientific information regarding the operation of turbines to lessen the mortality of birds and bats while implementing a system for collecting new information to improve future decisions.

This would specifically address the research needs identified in the USDI-Fish and Wildlife Service's "Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines" dated 13 May 2003, Appendix 4."

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Three objectives are proposed:

1. Database

2. Carcass surveys

3. Turbine operation

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Develop a database and associated GIS of operational projects and existing data:

❖ topography, DOQQs, NAIP imagery, NWI

❖ habitat maps

❖ radar information, when available

❖ turbine locations, characteristics, and operation schedules

❖ wind characteristics, including turbulence

❖ carcass survey data (may be for future data, only)

❖ local meteorological data

❖ other

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Provide guidance for carcass surveys:

❖ sampling in time and space over the entire year, yet concentrate on migration seasons

❖ real-time notification/alerts/prediction of unique weather events to maximize the opportunity to focus on mortality episodes

❖ field data input via PDA/GPS

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Provide suggestions for turbine operation with modules for:

❖ lighting

❖ color

❖ on/off/feathering

❖ other deterrents

❖ DSS based using artificial intelligence methods such as Influence Diagrams (Bayesian belief networks); Case-based Reasoning; Expert Systems; Fuzzy Logic

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…the whole idea is to combine the database of turbine and site characteristics with mortality data to suggest siting and operation options that minimize bird (and bat) mortality as the data develops over time.

We view this very much as a collaboration, and these are only our initial thoughts. So, we need your input on:

❖ what decisions field biologists are making regarding wind power that need more scientific input

❖ critique of what I have presented so far

❖ what offices/biologists are committed to moving this forward

❖ if we move forward, what funding mechanisms can we identify for database and decision support system development

❖ funding approaches for continuing the NEXRAD prototype

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