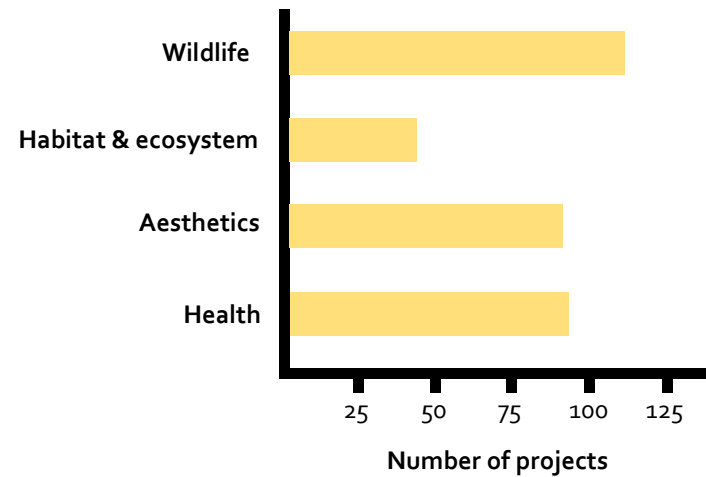


## What Wind Energy Impacts Are Referenced in the News?



Threats to wildlife are the most common impact mentioned in news articles about wind energy development. Qualitative coding was used to identify the top four impacts as shown.

## Good for Business and Good for Wildlife

- ✈ Developers should locate projects in low-risk areas to reduce the likelihood of cancellation.
- ✈ Communities and conservation organizations can influence siting through publicity.
- ✈ The Nature Conservancy should market *Site Wind Right* to help developers avoid project cancellation.

### Acknowledgments

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### References

- <sup>1</sup> Wind Vision: A New Era for Wind Power in the United States. 2015.
- <sup>2</sup> Fargione, J., Kiesecker, J., Slaats, M.J., and Olimb, S. 2012. "Wind and Wildlife in the Northern Great Plains: Identifying Low-Impact Areas for Wind Development."
- <sup>3</sup> The Nature Conservancy. 2017. "Low-Risk Wind Energy Development Areas in the Central Great Plains".
- <sup>4</sup> ABB New Entrants Report, accessed November 2018.
- <sup>5</sup> AFINN lexicon: Nielson, F. 2011. "A new ANEW: Evaluation of a word list for sentiment analysis in microblogs."

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or email us at [gp-windbelt@bren.ucsb.edu](mailto:gp-windbelt@bren.ucsb.edu)



## Where the Wind Goes

### Motivating Low Ecological Risk Wind Development

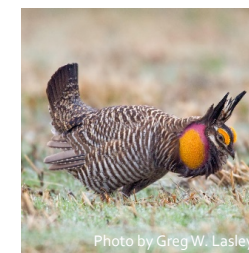
**Team:** Hanna Buechi, Alex Irvin, Delaney Roney, Margaux Sleckman, Cristina Sparks  
**Advisors:** Dr. Sarah E. Anderson, Dr. Kyle C. Meng  
**Client:** The Nature Conservancy



On the web at <http://www.bren.ucsb.edu> | Spring 2019

## The Problem with Wind Siting

Onshore wind energy could provide 35% of the total U.S. energy demand by 2050.<sup>1</sup> However, given its large spatial footprint, it can also threaten sensitive habitats and the species that call those regions home. Taking development limitations and ecological concerns into consideration, our client, The Nature Conservancy, developed a map of areas that pose a low risk to ecosystems, while still being good for development. However, these areas are not necessarily prioritized by developers; as of 2012, 70% of proposed wind power development was in non-low-risk areas.<sup>2</sup> It is possible that prioritizing these areas could benefit developers as well as ecosystems.



**Objective** ✈ Our team assessed whether locating wind power projects in areas that minimize impacts to wildlife reduces costly cancellation risk.

## Research Questions

Focusing on the 17 Great Plains and Midwestern states collectively known as the Wind Belt, our project goal was to answer the following questions:

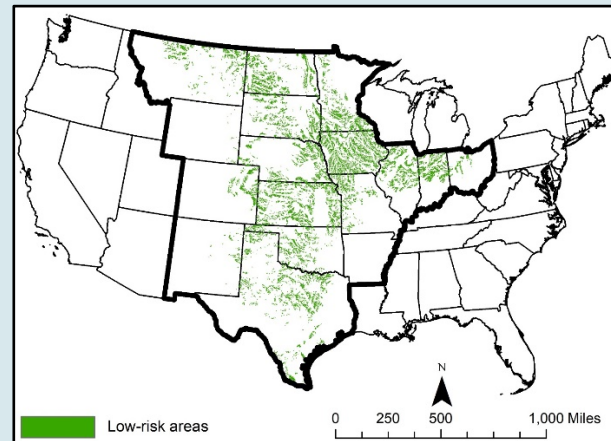
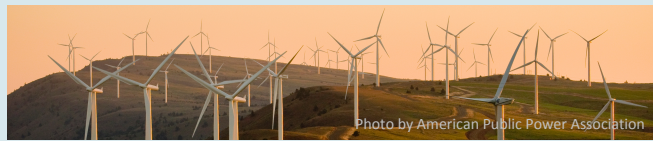
- ✈ Do wind projects sited in low-risk areas have a lower likelihood of being canceled?
- ✈ Are there other factors, such as negative publicity, that predict the likelihood of project cancellation?



## What Is Low-Risk Wind?

**Low-risk areas** avoid habitat fragmentation, endangered and threatened species, and bird and bat migration paths.

They also account for desirable wind speeds, slopes that allow for turbine construction, land availability (i.e. no development in national parks or within city limits), and other restricted areas such as flight paths.





Low-risk areas (green) that are suitable for development in the Wind Belt (black outline) as identified by TNC's *Site Wind Right* map. Other areas are called high-risk.<sup>3</sup>


## Predicting Cancellation Risk


Project cancellation is costly to developers. We used a *logistic model* to evaluate which factors influence the likelihood of project cancellation for 868 projects<sup>4</sup> within the Wind Belt region. Variables included:


 **Project location:** low-risk / high-risk


 **Environmentalism:** members of major environmental organizations by county


 **Publicity score:** automated *sentiment analysis* of words in news articles on a scale of -5 (very negative) to +5 (very positive)

 **Income:** household median income by county

 **Turbine visibility:** how many miles of major road can see the project

 **Population density:** people per square mile by county

 **Project capacity:** electricity generated (MW)

 **State:** to account for state-specific characteristics, like different regulations

## Low-Risk Siting Benefits Developers

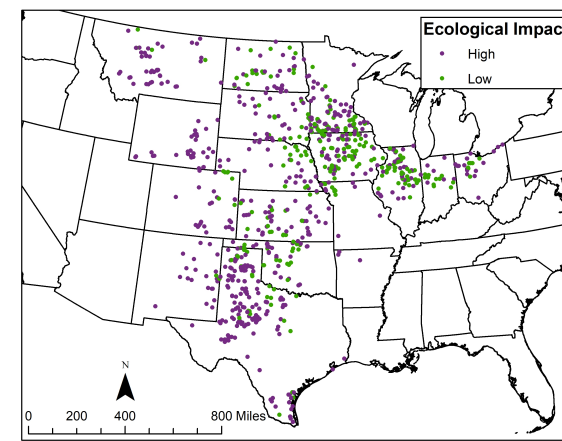
A wind project is...

**50%** Less likely to be canceled when located in a **low-risk area**

**25%** Less likely to be canceled with every 0.1 increase in **positive publicity**



## Wind Projects



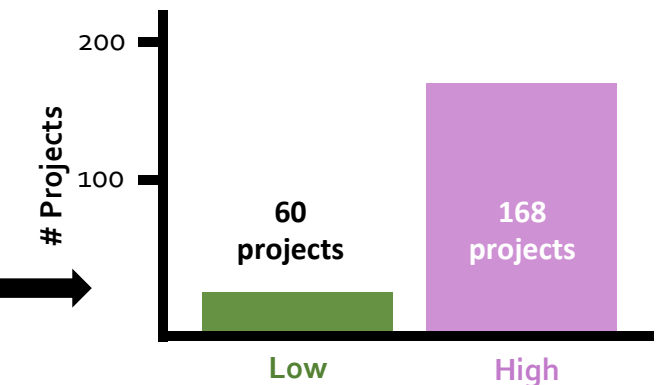
There were 298 projects in low-risk areas (green) and 570 in high-risk (purple).

Of the 868 projects in our dataset:<sup>4</sup>  
473 are operating → 185 (40%) are low-risk  
395 were canceled → 113 (28%) were low-risk

The average **operating** project has a publicity score of 0.46 and is visible from 63 miles of road.

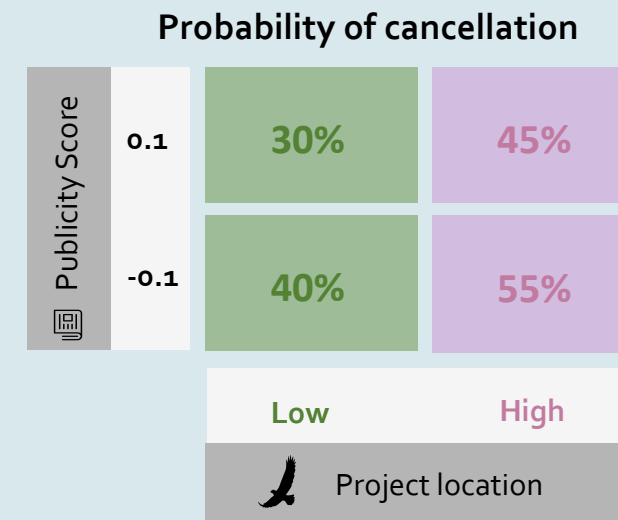
The average **canceled** project had a publicity score of 0.09 and would have been visible from 67 miles of road.

And for projects in development,<sup>4</sup> most are in **high-risk areas**.



## Siting and Publicity Influence Cancellation

Project location and publicity significantly predict cancellation risk. For an otherwise average project in our sample:



Examples of word scores aggregated to form publicity score:<sup>5</sup>

### Positive publicity

protect	+1
solution	+1
fair	+2
outstanding	+5

### Negative publicity

postpone	-1
ignore	-1
lawsuit	-2
kill	-5

In our sample, publicity scores ranged from -1.2 to 2.67.