TNC's Site Wind Right Map & Renewable Energy Strategy

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The Nature Conservancy

Our mission is to conserve the lands and waters on which *all* life depends.

The Nature Conservancy

WHY TNC?

3,600
conservationists

1,300
prominent volunteer leaders

72
countries

400
scientists

A FAR-REACHING ALUMNI NETWORK
of leaders in the conservation community

50
U.S.states

1 MILLION
dedicated members

Our Vision: Clean and Green Renewable Energy

The Buildout Challenge

Over 10x buildout of our current renewable energy capacity

Wind and solar require a lot of land

Potential for buildout conflicts — environmental, social, and land-use

This could slow progress toward a low carbon future

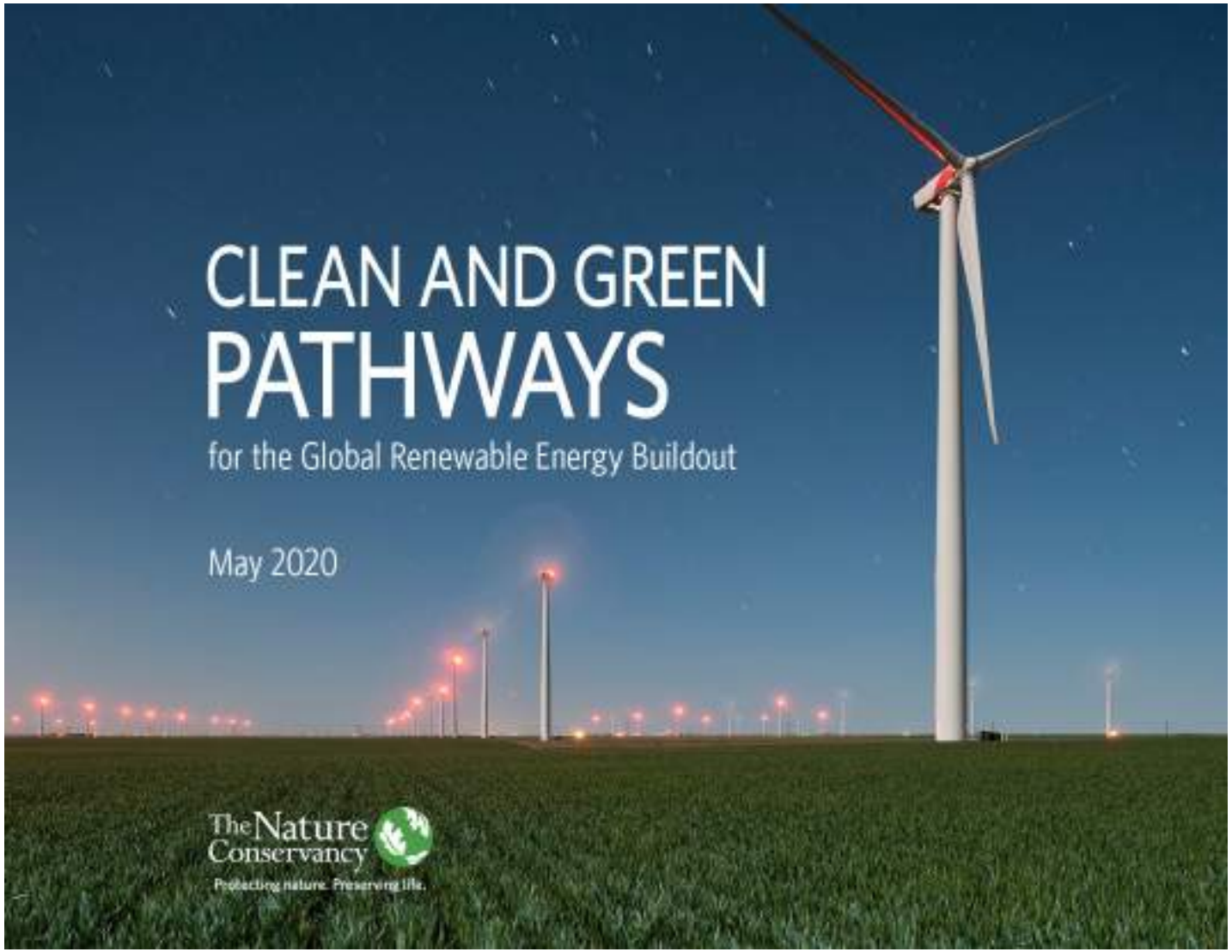

The Nature Conservancy
We can meet clean energy goals **17 times over** without disrupting natural lands.

A Better Buildout

- **Accelerates**
  Renewable Energy Development
- **Avoids**
  Loss of Carbon Storage
- **Protects**
  Wildlife and Habitat
- **Amplifies**
  Community Co-Benefits

Meets Climate and Nature Goals

Go Smart to Go Fast



Plan Renewables Right

- Decarbonization Scenarios
- Renewable Energy Buildout

Site Renewables Right

- Policies & Incentives
- Guidelines & Decision Tools

Buy Renewables Right

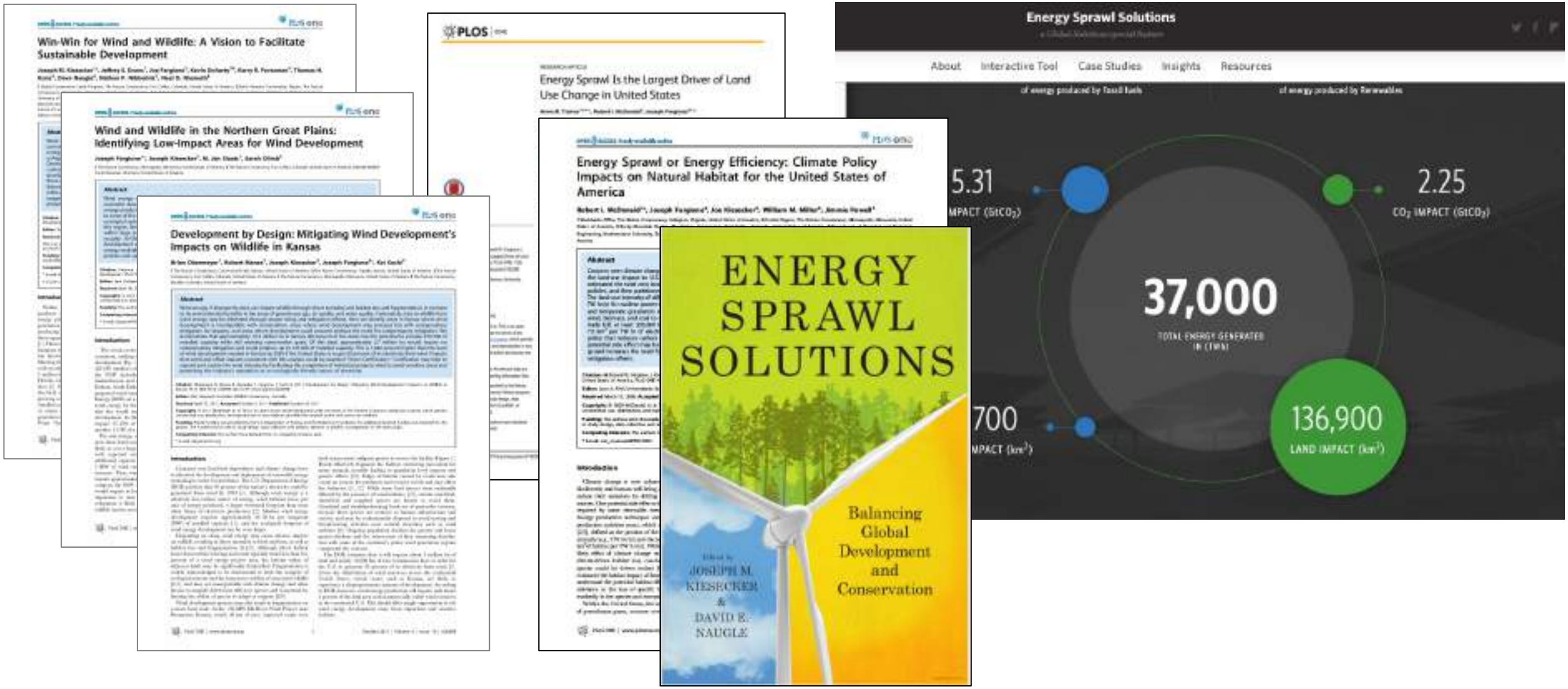
- Industry Standards
- Procurement Guidance

Site Renewables Right: Avoiding Impacts of Renewable Energy

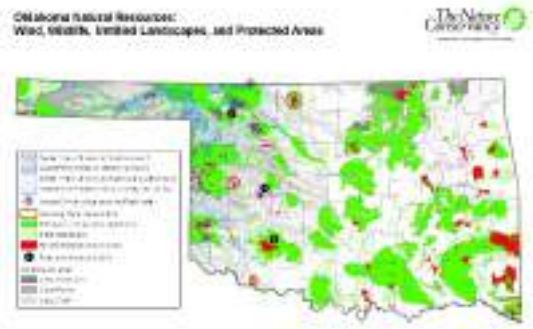
Conservation in the Great Plains

Support protection of iconic landscapes that face development threats

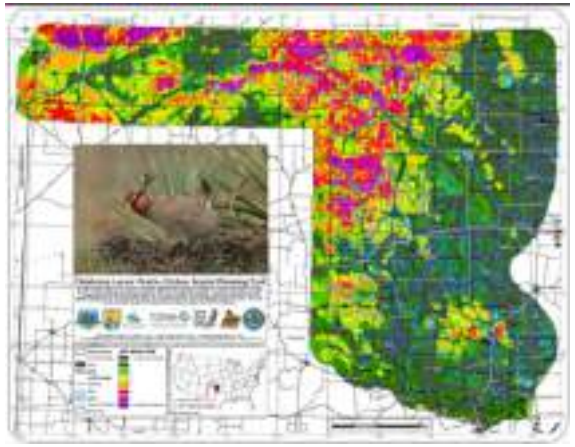
TNC Science on Energy Siting



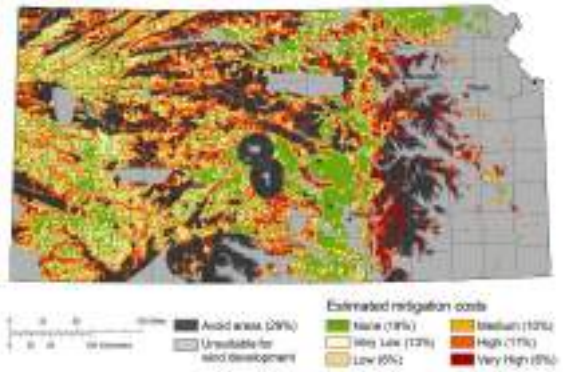
2005



2010



2011



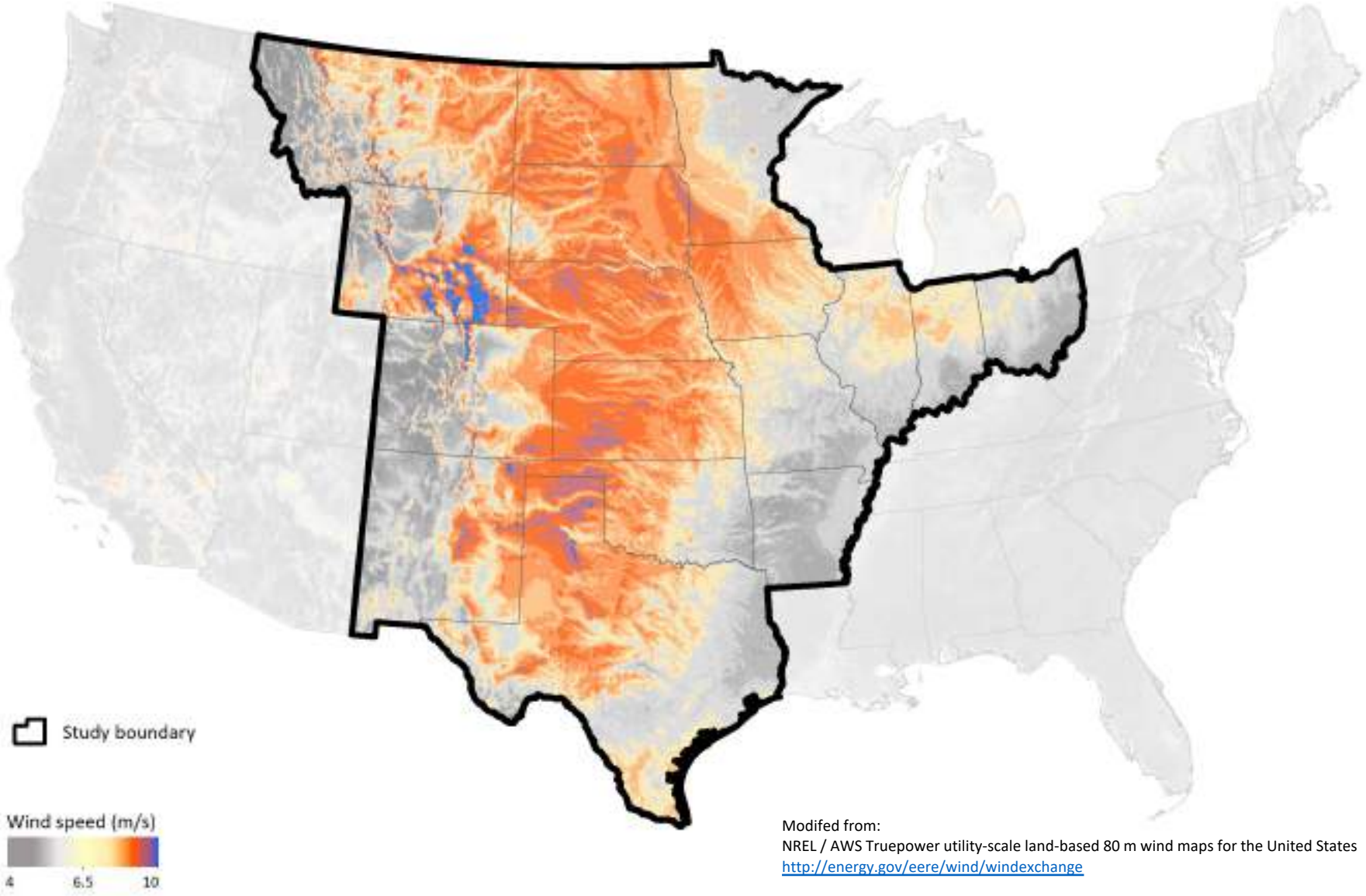
2016

Site Wind Right History

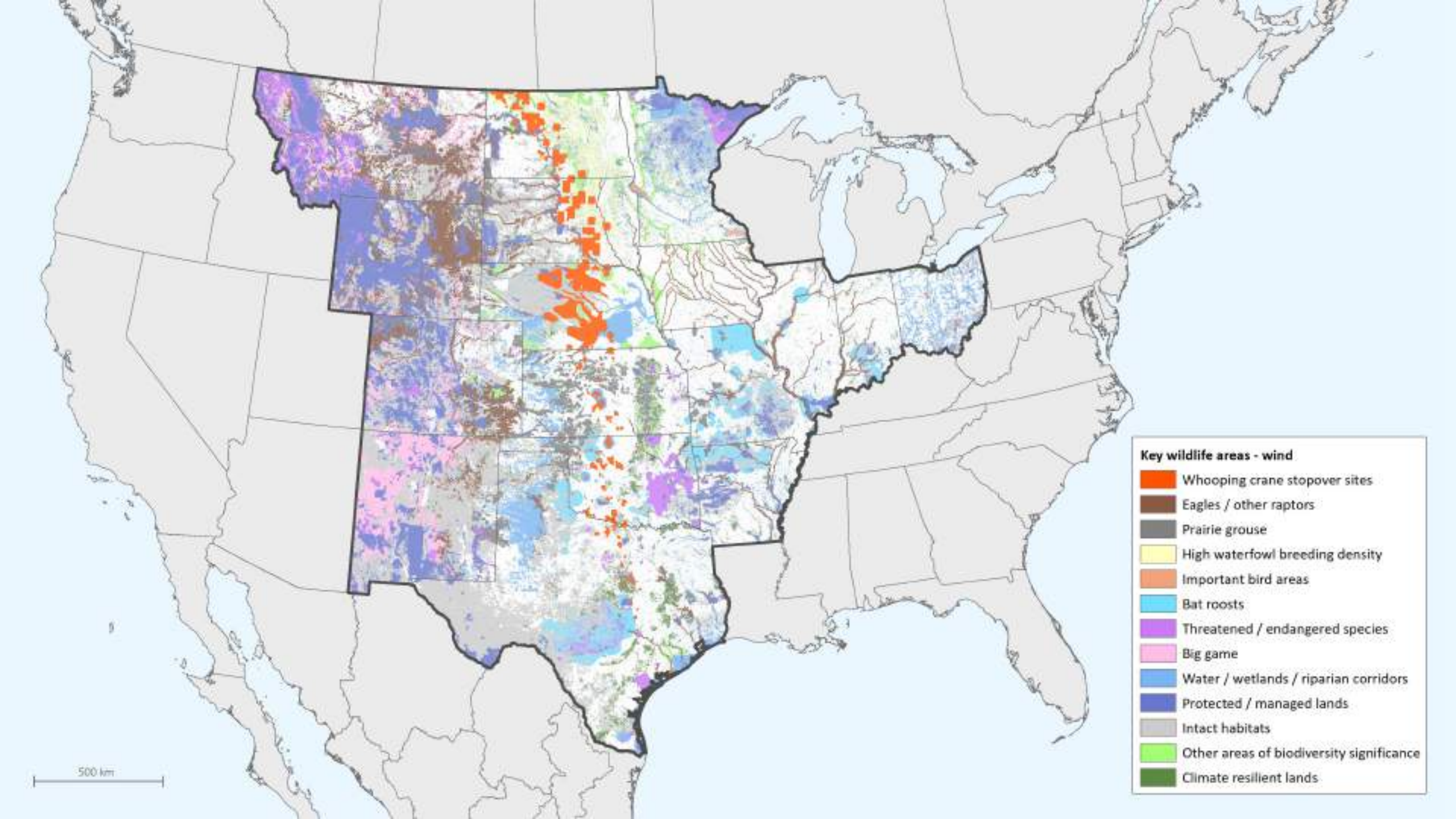
The Nature Conservancy's Site Wind Right Strategy

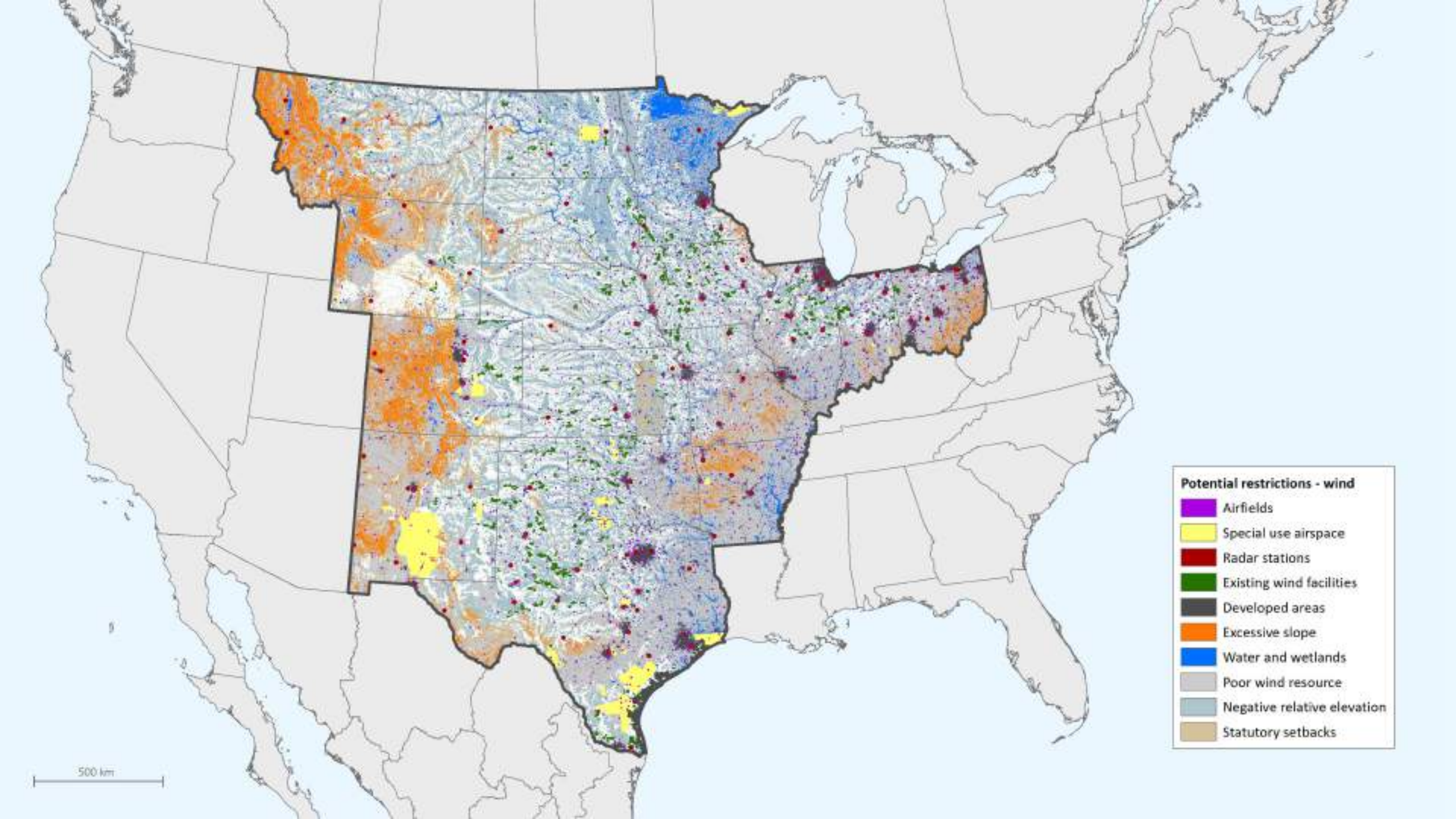
- Promote policies and incentives to accelerate low-impact renewable energy deployment
- Advance the science of low-impact siting
- Provide wind developers, off-takers, and the public with information to support low-impact siting (Site Wind Right Map)
- Pursue opportunities to work with renewable energy sector to advance good siting practices

The Central US “Wind Belt”



Modifed from:
NREL / AWS Truepower utility-scale land-based 80 m wind maps for the United States
http://energy.gov/eere/wind/windexchange


Key wildlife areas - wind
Whooping crane stopover sites
Eagles / other raptors
Prairie grouse
High waterfowl breeding density
Important bird areas
Bat roosts
Threatened / endangered species
Big game
Water / wetlands / riparian corridors
Protected / managed lands
Intact habitats
Other areas of biodiversity significance
Climate resilient lands
500 km


Potential restrictions - wind
Airfields
Special use airspace
Radar stations
Existing wind facilities
Developed areas
Excessive slope
Water and wetlands
Poor wind resource
Negative relative elevation
Statutory setbacks
500 km

>1,000 GW add'l capacity
(calculated nameplate at 3 MW/km^2)

Science-based approach

- Utilize the best-available information, some of which is proprietary
- Wildlife may still be harmed in unknown, unpredictable ways
- Some known impacts, like bat mortality, are poorly understood
- We support more and ongoing research into wind and wildlife interactions, esp. siting impacts, and will continually update our data
- Not intended as a “go/no-go” map.

Site Wind Right Development & Expansion by the Numbers

3

Years of development
The project team worked for multiple years to develop the science, external affairs engagements, and communications materials.

60

TNC staff
Contributions across TNC's North America state chapters and regional staff along with assistance from policy, corporate engagement, and global colleagues.

100+

Datasets
TNC combined over 100 datasets consisting of the best available science on habitat and wildlife interactions with renewable energy along with engineering constraints to create the final product.

FREQUENTLY ASKED QUESTIONS

What is "Site Wind Right"?

Site Wind Right is The Nature Conservancy's approach to promoting smart, renewable wind – areas that are low impact for conservation, including already developed lands. The strategy

- Promoting policies and incentives for low-impact renewable energy deployment;
- Advancing the science of low-impact siting;
- Providing the wind industry and public with information to support low-impact siting
- Pursuing opportunities to work with the renewable energy sector to advance good s

One of the resources we have developed as part of this strategy is a **Site Wind Right Map** identify areas where wind development is unlikely to encounter wildlife-related conflict, pro cost overruns. Projects in low-impact places are also less likely to be cancelled, resulting in renewable energy deployment.

Why has The Nature Conservancy developed a site wind right map?

The Nature Conservancy supports the rapid transition to clean, low-impact energy. Renewa component of this transition. Renewable energy sources, like wind and solar, provide a host beyond climate. For example, they consume less water than traditional energy systems, and pollution have significant public health benefits.

However, utility-scale wind and solar energy also requires a lot of land for development that have impacts to important habitats – by 2050, an area at least the size of Maine and possib be developed or impacted to meet the projected onshore wind and solar energy needs in the renewable energy development to low-impact areas, we can take advantage of its climate a while protecting our lands and waters for future generations.

The good news is that we can meet our climate and land conservation goals and support su wildlife and critical habitat. Worldwide, there is enough modified land to provide 19 times th needed.[1] In the Wind Belt alone, there is more than 1,000 gigawatts of low-impact wind po than 10 times current wind generation and is equivalent to total current U.S. electric generat sources.[2]

THE PROMISE

Wind energy is cost-effective, sustainable and clean. Along with improving energy efficiency and supporting a portfolio of clean energy options, developing low-impact wind energy is critical to tackling climate change.

THE CHALLENGE

Achieving the ambitious targets for wind energy development necessary to meet our climate goals will require quadrupling current capacity in the United States by 2050. Much of the new wind development is likely to occur in the ecologically-rich Great Plains region, home to many of our best remaining native grasslands and associated wildlife found nowhere else in the world, such as prairie chickens, pronghorn and bison.

When poorly sited, wind development can negatively impact at-risk species and important ecosystems in part because it requires large areas of land. These projects can also expect to face more environmental conflicts, which can lead to project delays, higher costs, and even project abandonment, wasting limited resources and time.[1] Through our Site Wind Right strategy, we can reduce the risk associated with these projects and accelerate a clean, low-impact energy future.

THE OPPORTUNITY

The good news is climate change can be addressed without irreparably impacting treasured landscapes and critical wildlife habitat. In the Central U.S. alone, which accounts for almost 60 percent of the country's current and planned onshore wind capacity, there are more than 1,000 gigawatts development. That is more than 10 times that which is generated today.

Well-sited wind energy can provide a clean, low-impact energy alternative.

IF POO DEVELO OR C

- **Loss a** from wi
- **Fragme areas** t
- **Indirect**
- **Bat and**

Site Wind Right: Accelerating Clean, Low-Impact Wind Energy in the Central United States

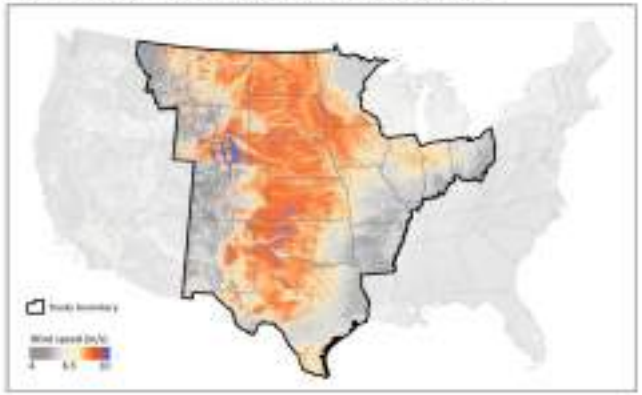
The Nature Conservancy

The Nature Conservancy,[1] July 2015. Site Wind Right: Accelerating Clean, Low-Impact Wind Energy in the Central United States. The Nature Conservancy's Great Plains Renewable Energy Initiative.
http://www.nature.org/sitewindright

Introduction

The Nature Conservancy supports the rapid expansion of renewable energy while protecting wildlife and natural habitats. This paper summarizes the data and assumptions included in The Conservancy's Site Wind Right assessment, as well as how we intend the results to be used. The Site Wind Right map was created to identify areas where wind development is unlikely to encounter significant wildlife-related conflict, project delays, and cost overruns. The map was designed to serve as an important source of information to inform screening early in the project siting process. It can be used to support application of the U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines, specifically Tier 1 and Tier 2 evaluations. By combining the Site Wind Right map with other land suitability factors, we demonstrate that over 1,000 GW of wind energy may be developed in the central U.S. exclusively in areas of low conservation impact. The results of this analysis indicate that we can accelerate a clean, low-impact energy future—one that advances energy, climate, and conservation goals.

Figure 1. The central U.S. Wind Belt (resource data modified from AWS Truepower 2009)



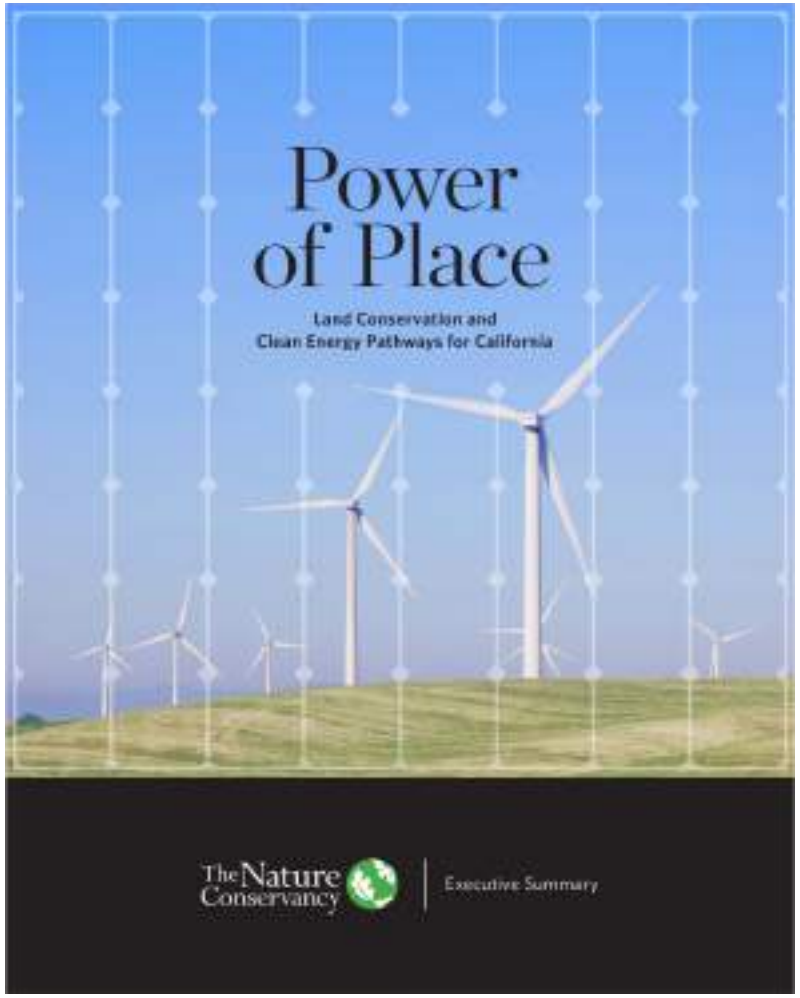
[1] Contacts

nature.org/sitewindright

Power of Place: Deep Decarbonization Pathways in the US

Power of Place – United States:
Deep Decarbonization Pathways and Conservation

- Can the **United States** scale up the clean energy needed to meet climate and energy goals, while limiting impacts on natural and working lands?
- What factors might shape the build out of America's clean electricity system in 2050?
- What are the trade-offs between cost, reliability, and environmental and social impacts?



Planning for the Future of Clean Energy

- Almost all States and Utilities use **long-range planning** to decide what power generation and transmission line investments are needed and where they should be located

- These planning processes include many factors, **don't include nature**

- When nature is missing, **investment signals** are sent to places where environmental and social impacts can create conflict and delay and damage priority conservation areas

- The PoP **innovation** is to include nature, along with more typical concerns such as cost and reliability, and change the development trajectory

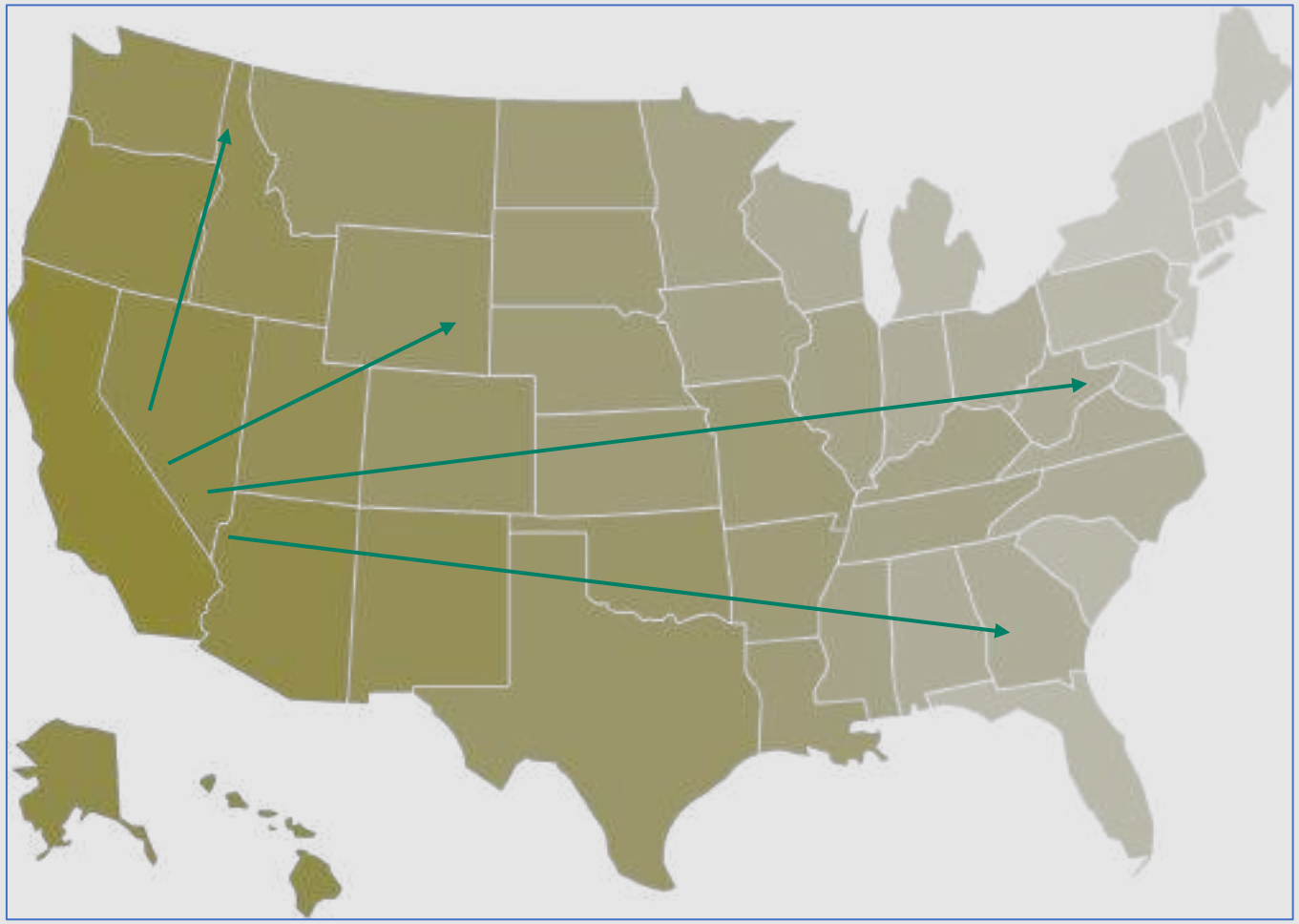
Three Environmental Exclusion Categories

- Siting Level 1: Existing legally protected lands and waters (e.g. National Parks, Wildlife Refuges, Historic Sites, etc.)

- Siting Level 2: Lands and waters with administrative designations that require higher levels of environmental assessment and review (e.g. National Forests, 100 year floodplains, habitats for Federally-listed endangered species)

- Siting Level 3: Lands and waters with no legal protection or administrative designations that have scientifically documented ecological/conservation value (e.g. intact natural areas, wildlife migration corridors, concentration of rare species, etc.)

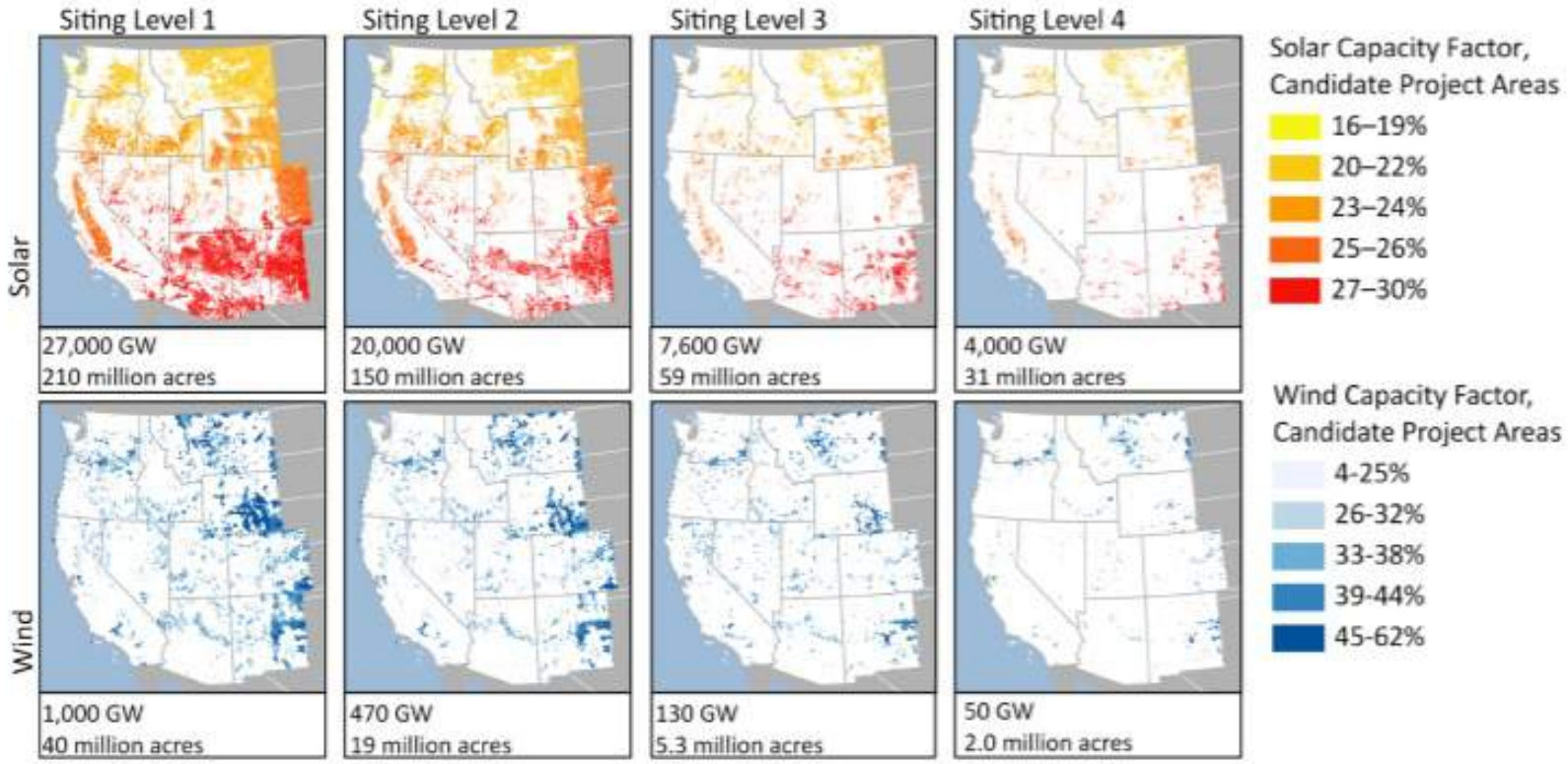
The Nature Conservancy's Power of Place Assessments



- California (2019)
- Western United States (2021)
- United States (2022)

Power of Place – California: Conclusion

California does not have to choose between decarbonizing and achieving land conservation goals



Resource Mapping (site suitability) (onshore and offshore wind)

SL1

Onshore: 1,860 GW
LCOE < $50/MWh: 486 GW
Offshore: 703

SL2

Onshore: 792 GW
LCOE < $50/MWh: 146 GW
Offshore: 572

SL3

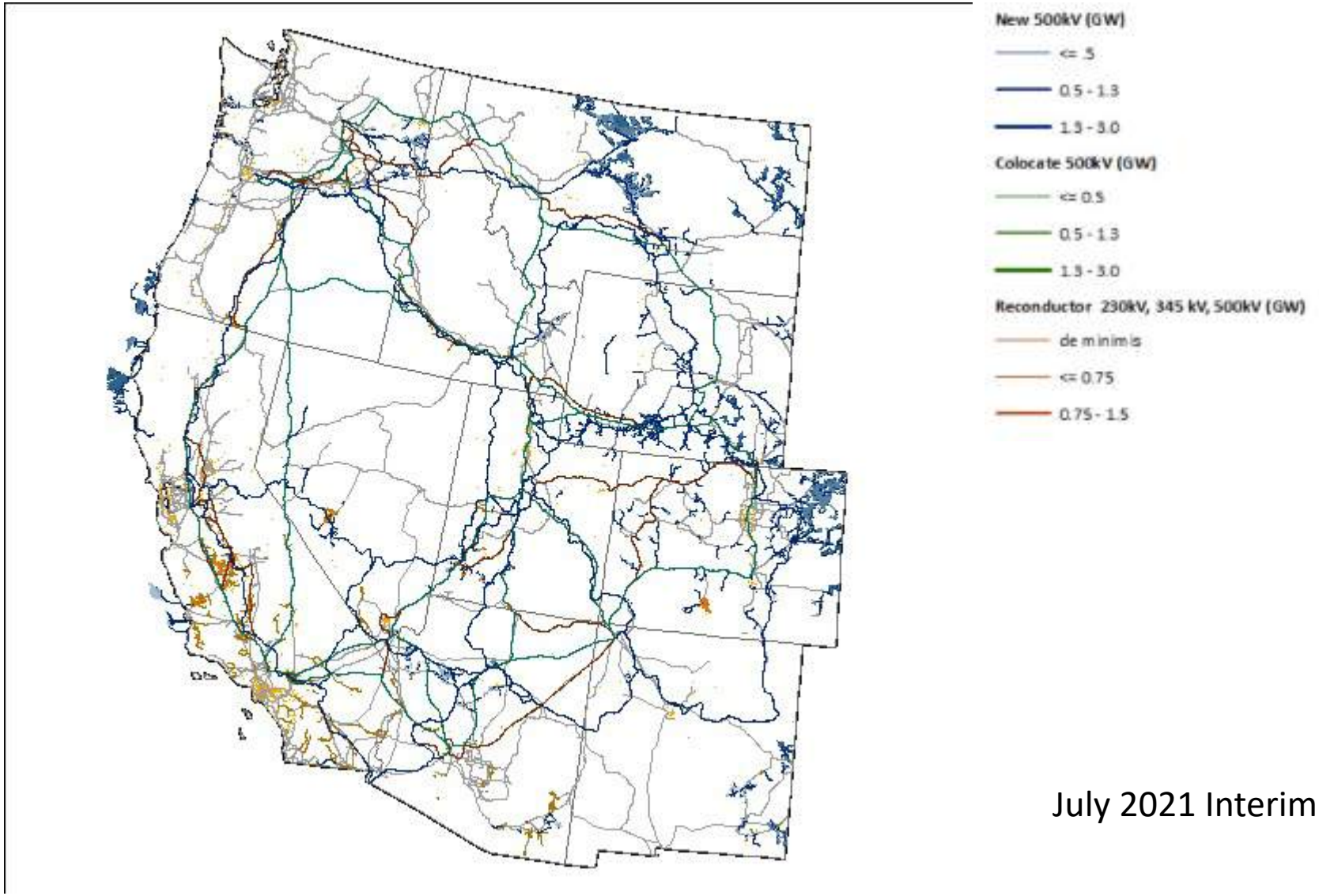
Onshore: 265 GW
LCOE < $50/MWh: 51 GW
Offshore: 288 GW

July 2021 Interim Results

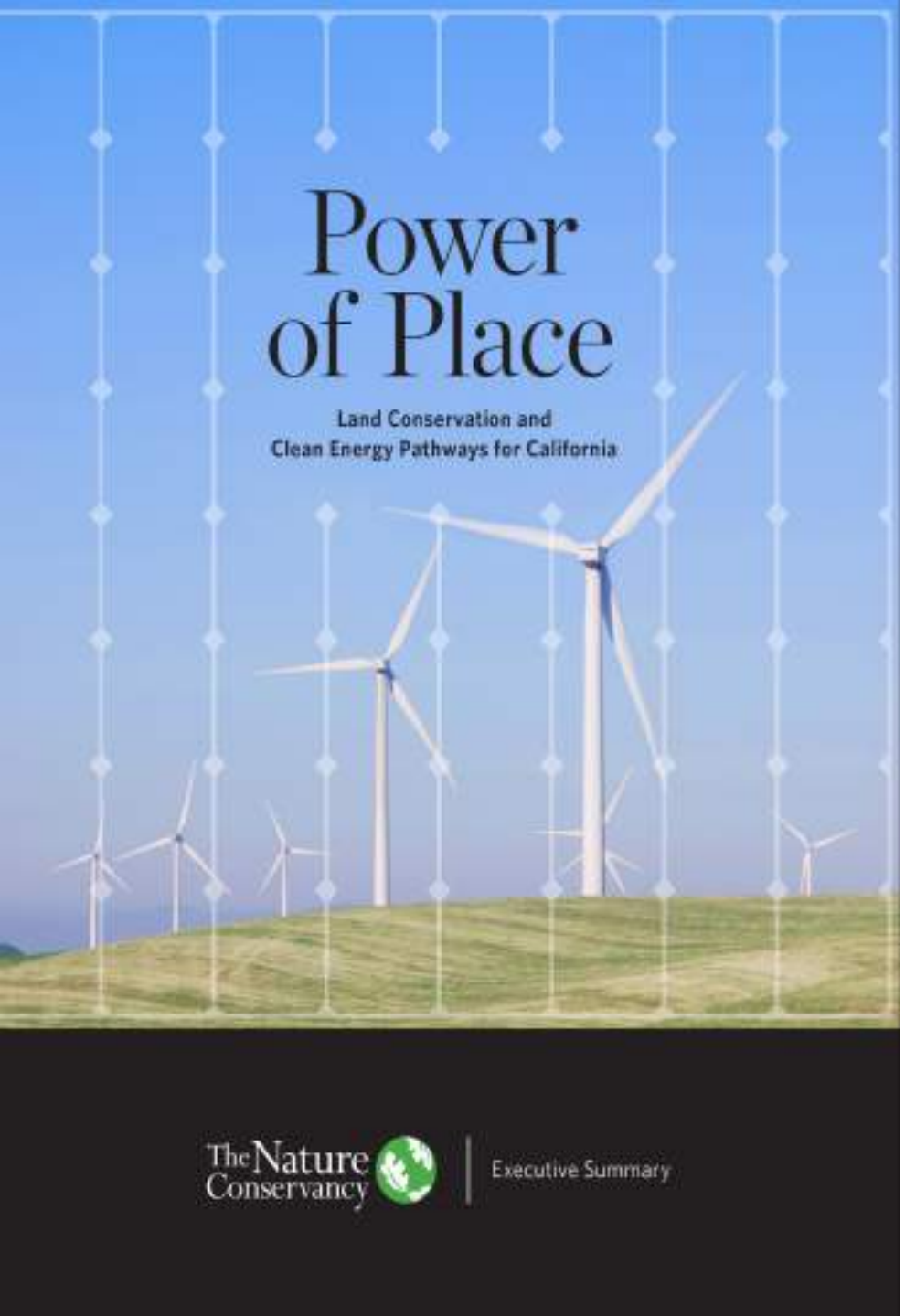
High Elec Level 3

July 2021 Interim Results

Downscaled Interzonal Transmission Line Results (preliminary)



July 2021 Interim Results



Power of Place California Assessment:

https://www.scienceforconservation.org/products/power-of-place

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Discussion