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Wind Generation – Subtle Effects?

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collisions with wind turbines – direct mortality

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Wildlife habitat impacts of wind energy

- **Short term**
- **Long term**

- **Direct habitat loss**
- **Indirect habitat loss**

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Short term impacts:

During construction

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Long term impacts

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Direct loss of habitat

(<10% of site)

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Indirect loss of habitat

Due to behavioral response by wildlife to wind facilities

“Habitat Fragmentation”

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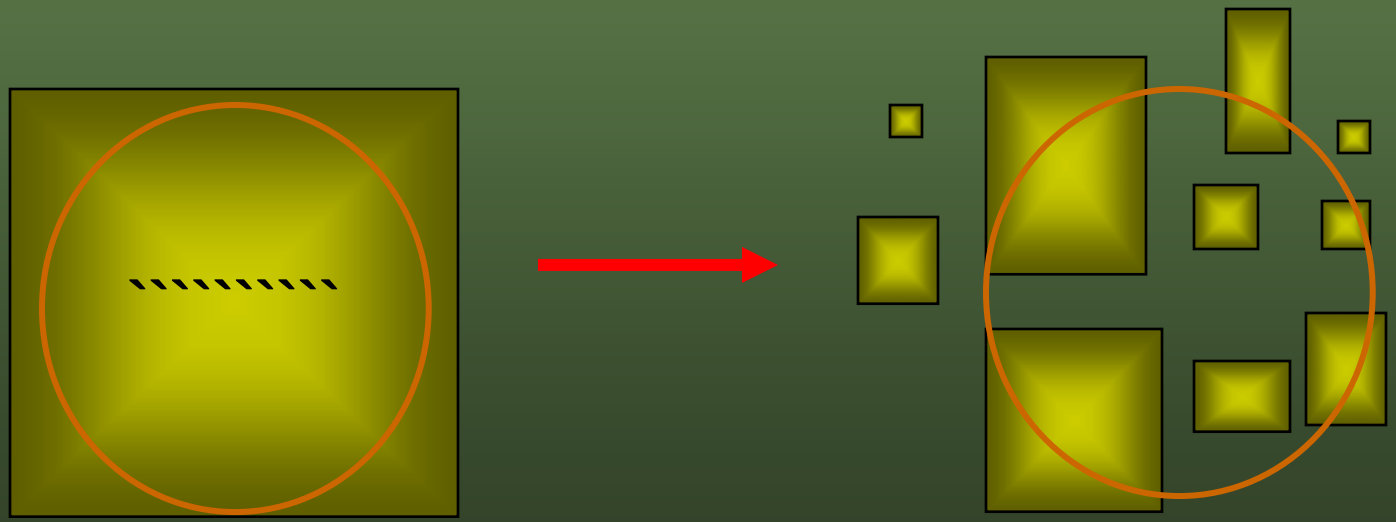
Habitat Fragmentation - a subtle issue



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Forests

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Grasslands

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V
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Structures

=

FEAR!

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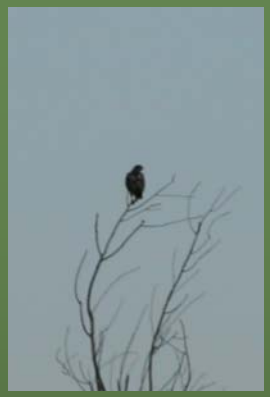

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Your neighborhood or home town

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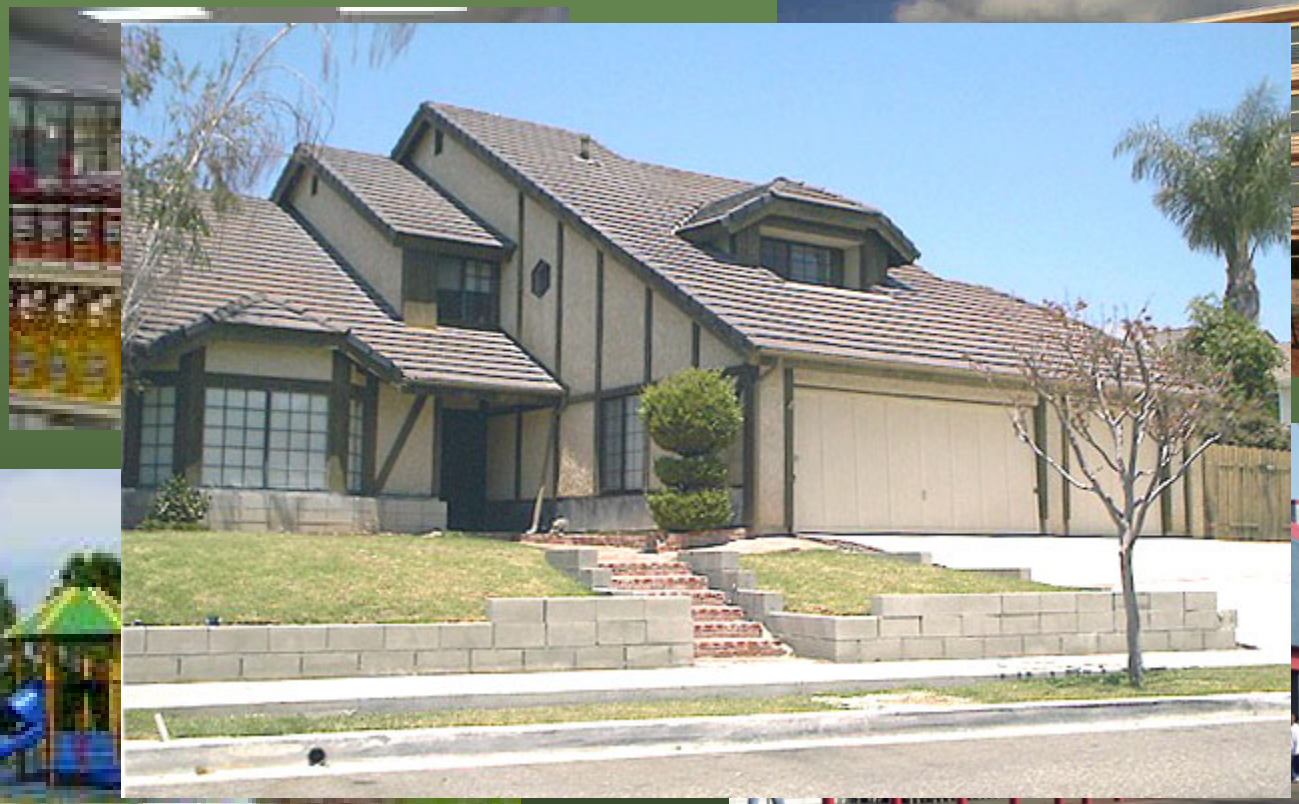

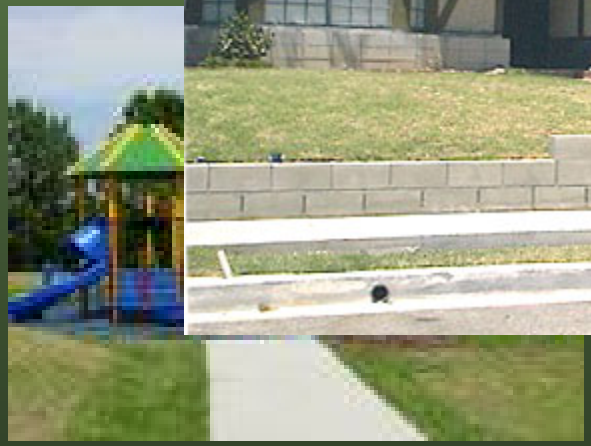

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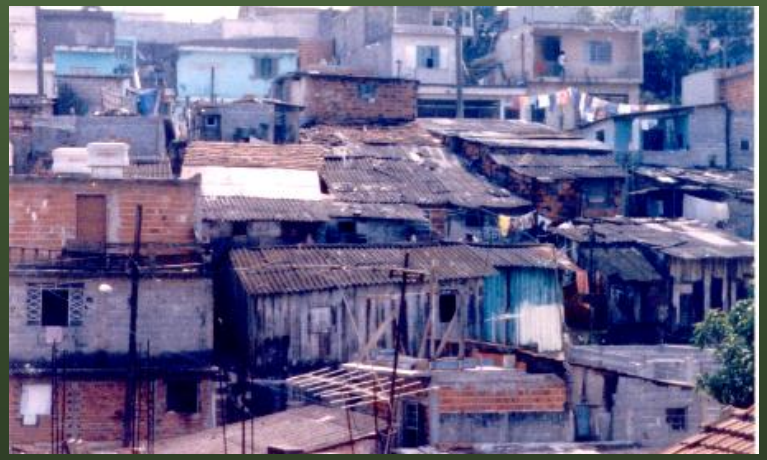

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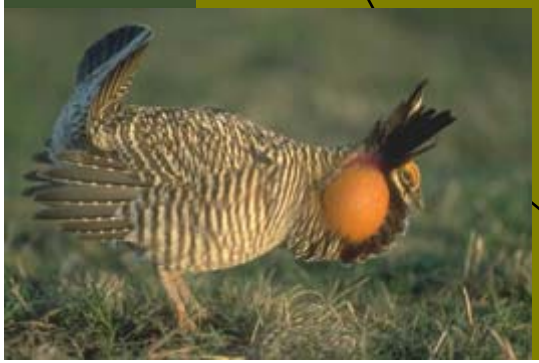
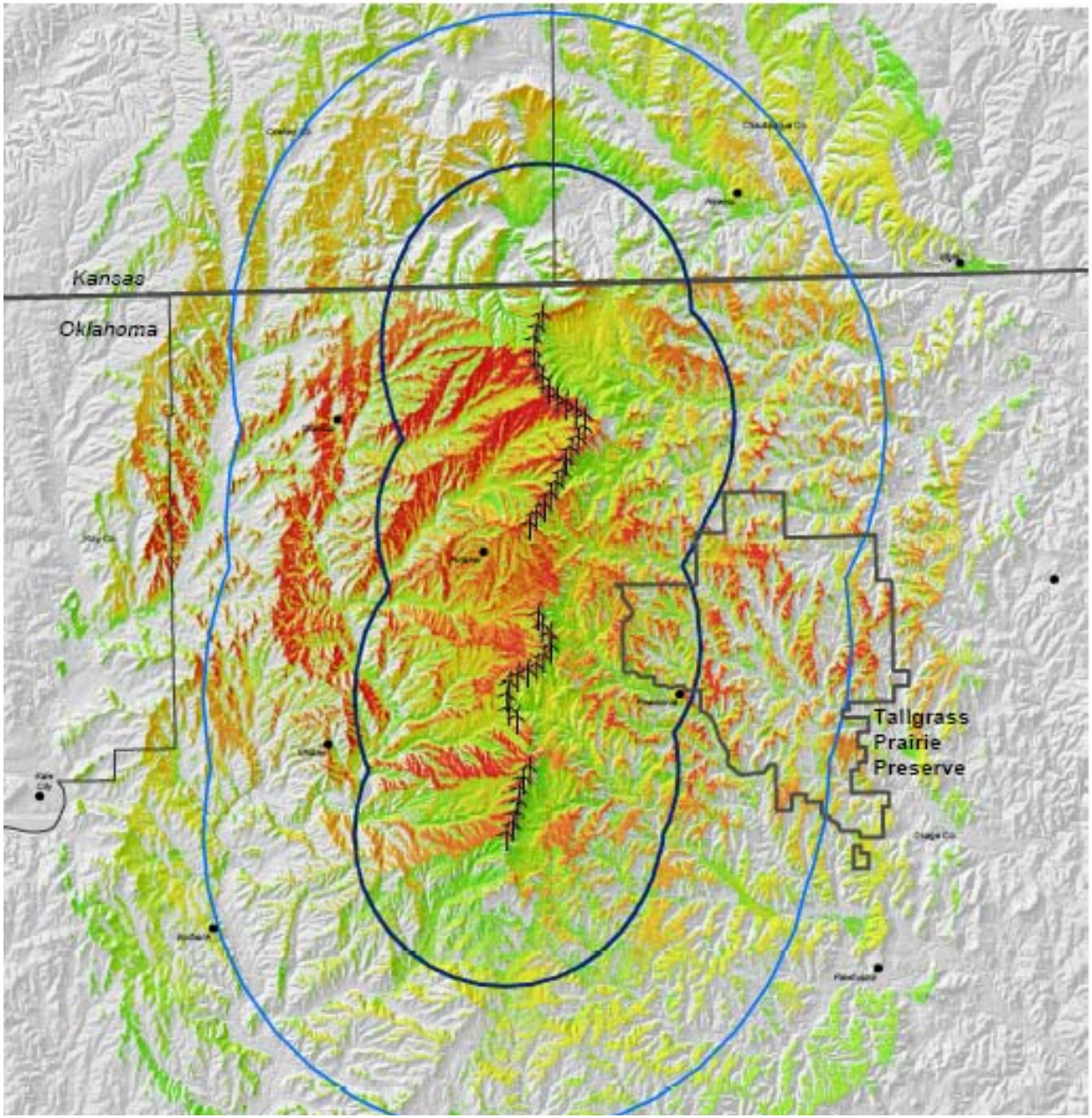
1.5 MW turbine

1 mile radius

= ~2000 ac.



Viewshed Analysis
Proposed Wind Energy Development Project
Osage County, Oklahoma



Potential turbine locations

5 miles from turbine

10 miles from turbine

turbines visible

0

1 - 4

5 - 10

11 - 15

16 - 20

21 - 25

26 - 30

31 - 35

36 - 40

N

W

E

S

0 5 10 miles

Background:

Modified from U.S. Geological Survey Digital Elevation Models

Turbine locations approximated to areas of interest delineated by Zilkha Renewable Energy in July 2004 meeting,reproduced from memory by Bob Hamilton

Viewshed analysis performed using ESRI ArcMap 8.2 3D Analyst extension
Assumed turbine height 101 meters, limit of analysis 15 miles

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Subtle and little known:

Not easily seen

Dead birds and bats stir emotions

Hard to measure

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“Flicker Effect”

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Sound of the blades cutting through the air…

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So what do we know about fragmentation effects on wildlife?

Not that much!

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Robel et al. (2005) found that adult lesser prairie chickens avoided human features, including roads, pump jacks and buildings. Nesting females avoided features by up to 1000 meters.

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O'Connell and Piorkowski (2006) found no displacement of grassland bird species as a group from a wind farm in Oklahoma.

27 of 35 species showed no avoidance, but a few did.

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Schaffer and Johnson (2007) found that 1 of 3 species (grasshopper sparrow) showed reduced density within 150m of turbines in South Dakota

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Leedy (1999) and Johnson et al. (2000) found small scale displacement (<100m) of songbirds in Minnesota

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Western Ecosystems Technology found that mountain plovers were displaced during construction at Foote Creek Rim, but this effect was clouded by the fact that there were declines at the control sites also. Possible habituation

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In Europe, some species were unaffected by turbines while certain waterfowl, shorebirds and songbirds avoided them.

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Pink-footed geese were displaced up to 600m in Europe, but Canada geese were not displaced from a facility in Iowa.

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The presence of wind turbines had an effect on the nesting of raptors in some studies; one study may have shown no effect.

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Conclusions for bird habitat effects:

- **Displacement of some grassland nesting birds is likely, but the magnitude is uncertain. It may range from 0 to several hundred meters for song birds and greater for other species.**

- **Avoidance distance for nesting may be much larger for prairie grouse**

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Cumulative impacts are very poorly understood.

Experience with prairie chickens intimates that cumulative impacts may be at play, with species declines related to cumulative effects of multiple fragmentation causes.

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What about species other than birds??

Even less is known about this!

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Pronghorn at Foote Creek Rim, WY were apparently unaffected by wind turbines.

I've seen them grazing peacefully under turbines in Texas

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Walter et al. (2006) reported that home range and dietary quality of elk at a wind farm in Oklahoma did not change adversely from before to after the turbines.

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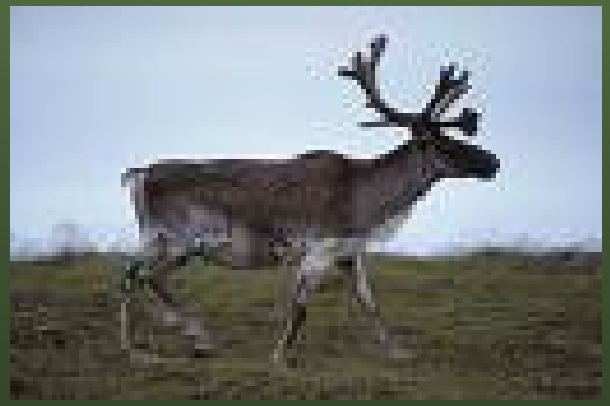
In Alaska, 10% of caribou groups that approached a road, pipeline or drill site reversed their direction and left the area.



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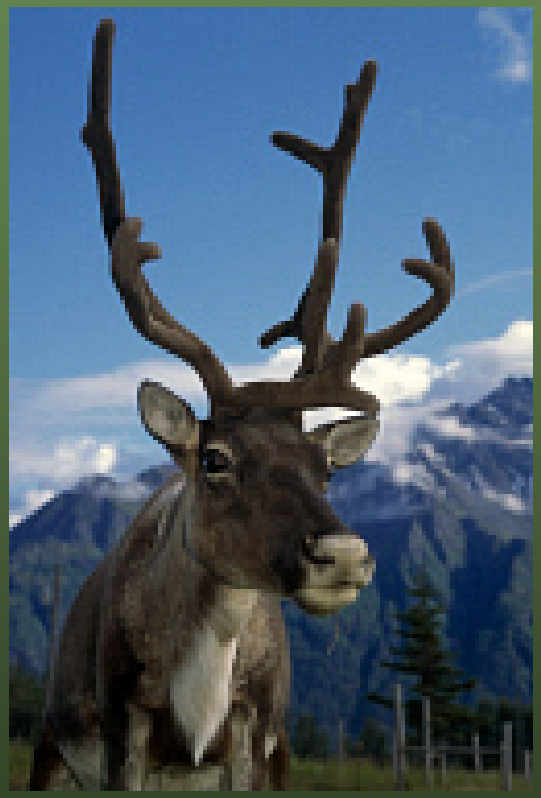
In Norway, reindeer density decreased with increasing infrastructure



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Studies on the impact of oil and gas development on ungulates suggest that shifts in use, avoidance of roads and potential declines in reproduction and abundance may occur.

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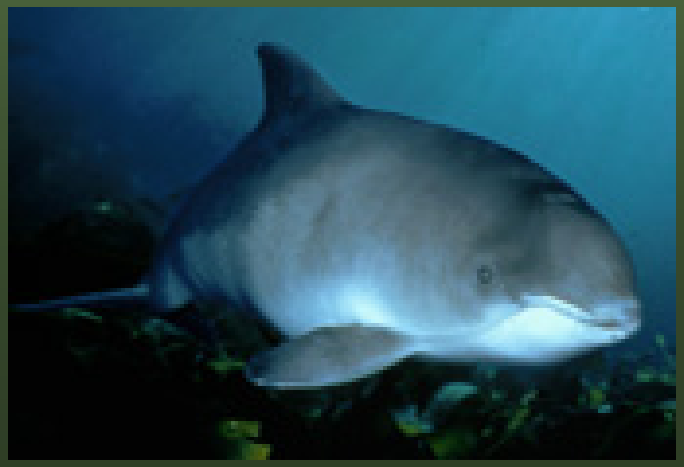
In Vancouver island, Canada, harbour porpoises and harbour seals could detect noises from off-shore wind generators



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Not much else is known from research on large mammals

There are suppositions:

- large mammals will likely leave during construction

- large mammals will likely habituate

- direct habitat loss will likely not be a significant issue

- if habitat is in short supply, fragmentation could cause significant barriers to movement

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Much of the supposition about displacement and fragmentation for large mammals is directly related to the amount of human activity taking place

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Virtually nothing is known about effects on other groups of animals such as reptiles, amphibians, small mammals and invertebrates.

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Wind energy development impacts with regard to wildlife is hugely about…

location…location…location!

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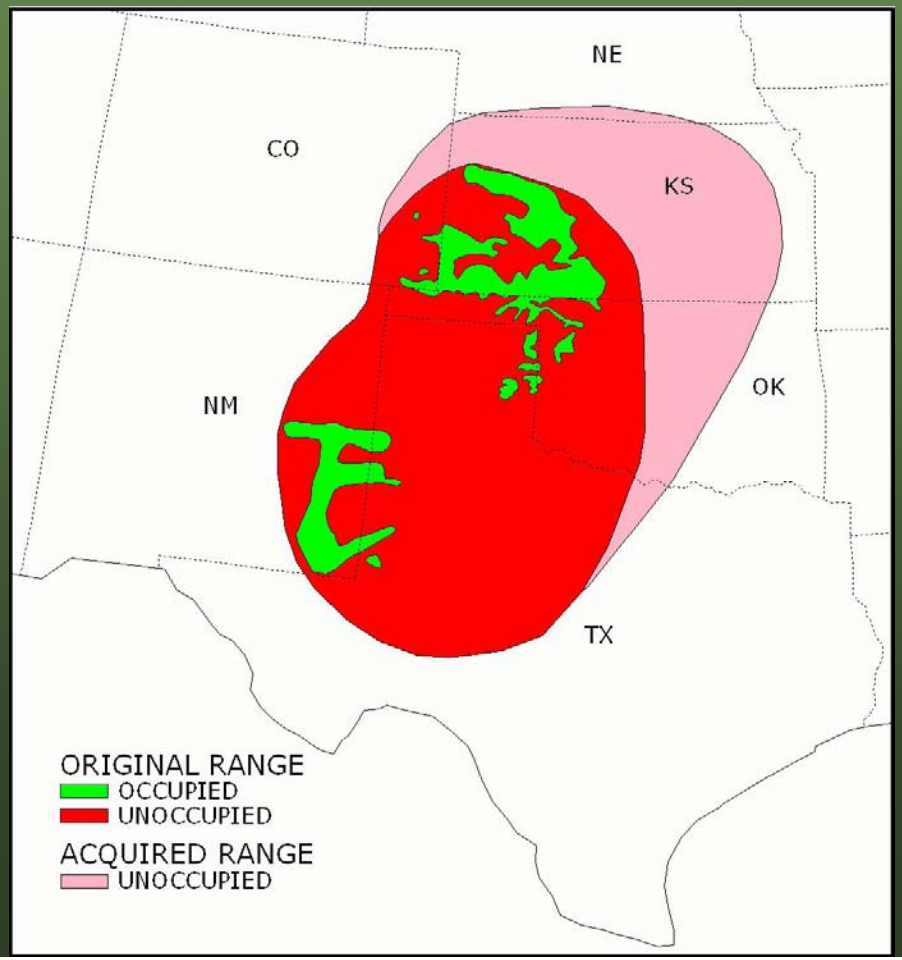
Lesser prairie chicken range

red = historical

green = current



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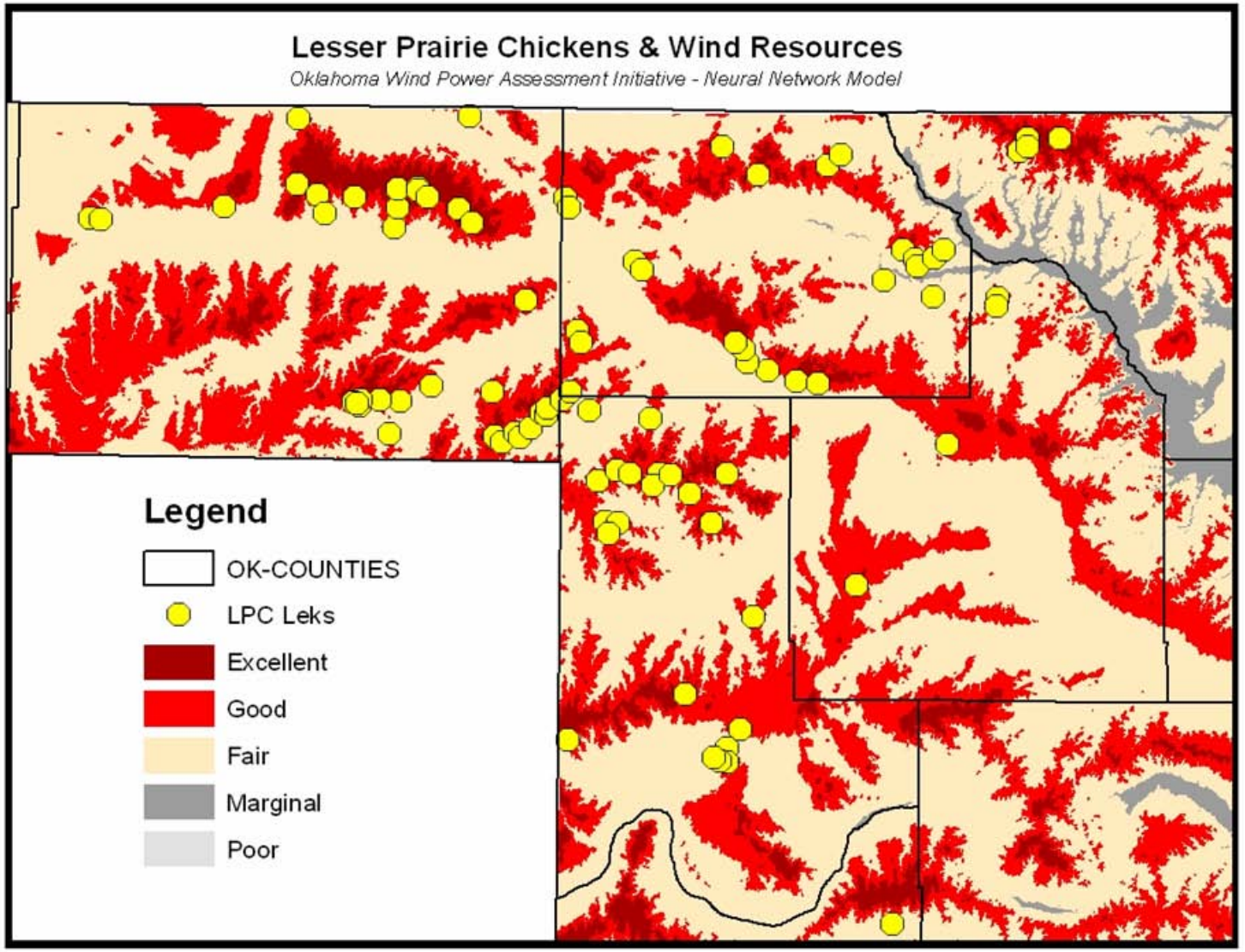

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Wind energy and wildlife CAN exist in harmony!

It's our responsibility to make that happen!

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