



Greater Sage-grouse Status Review

Renewable Energy Development

The Impact

Direct Disturbance

- Direct habitat loss and fragmentation

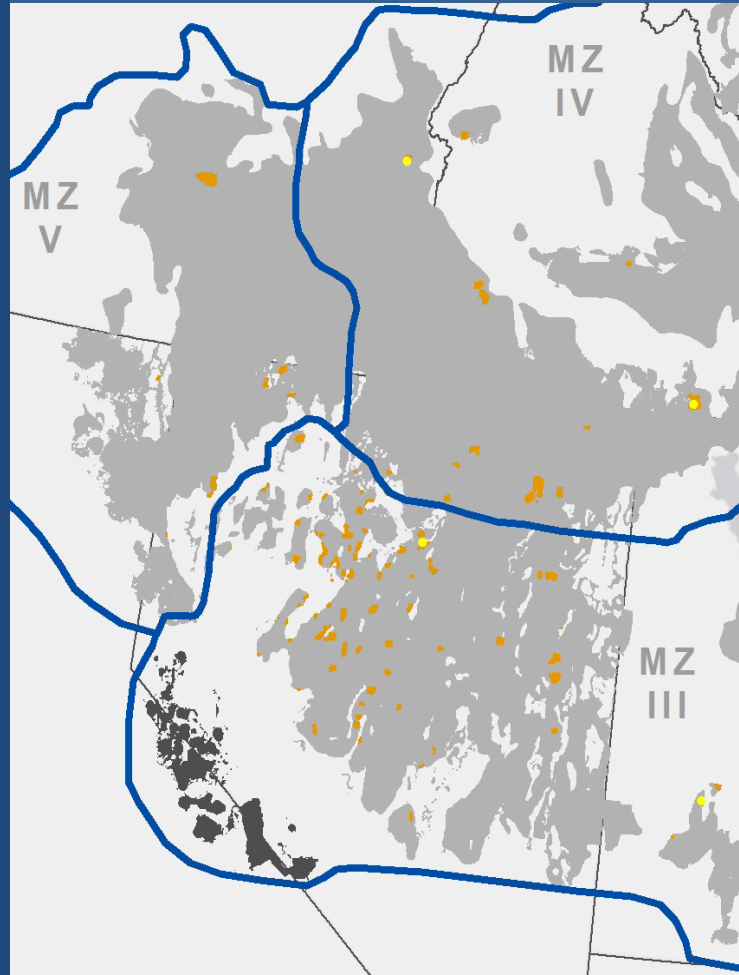
Indirect Area of Influence

- Temporary or sporadic increase in human activity
- Potential avoidance of anthropogenic development
- Potential increase predator subsidies

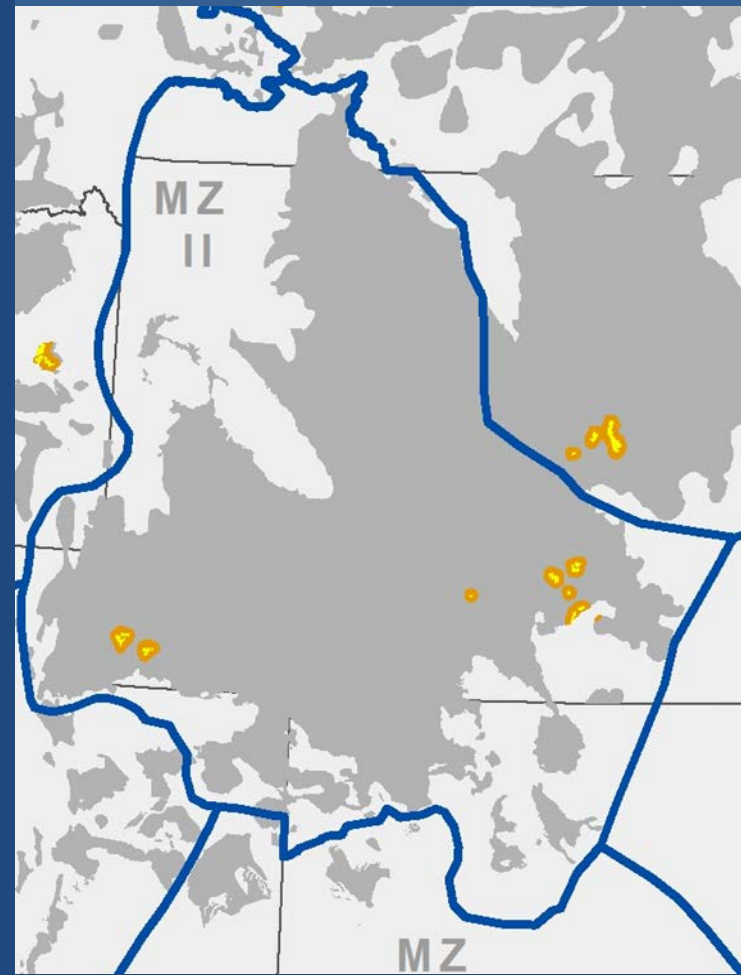


Location / Extent

GEOHERMAL

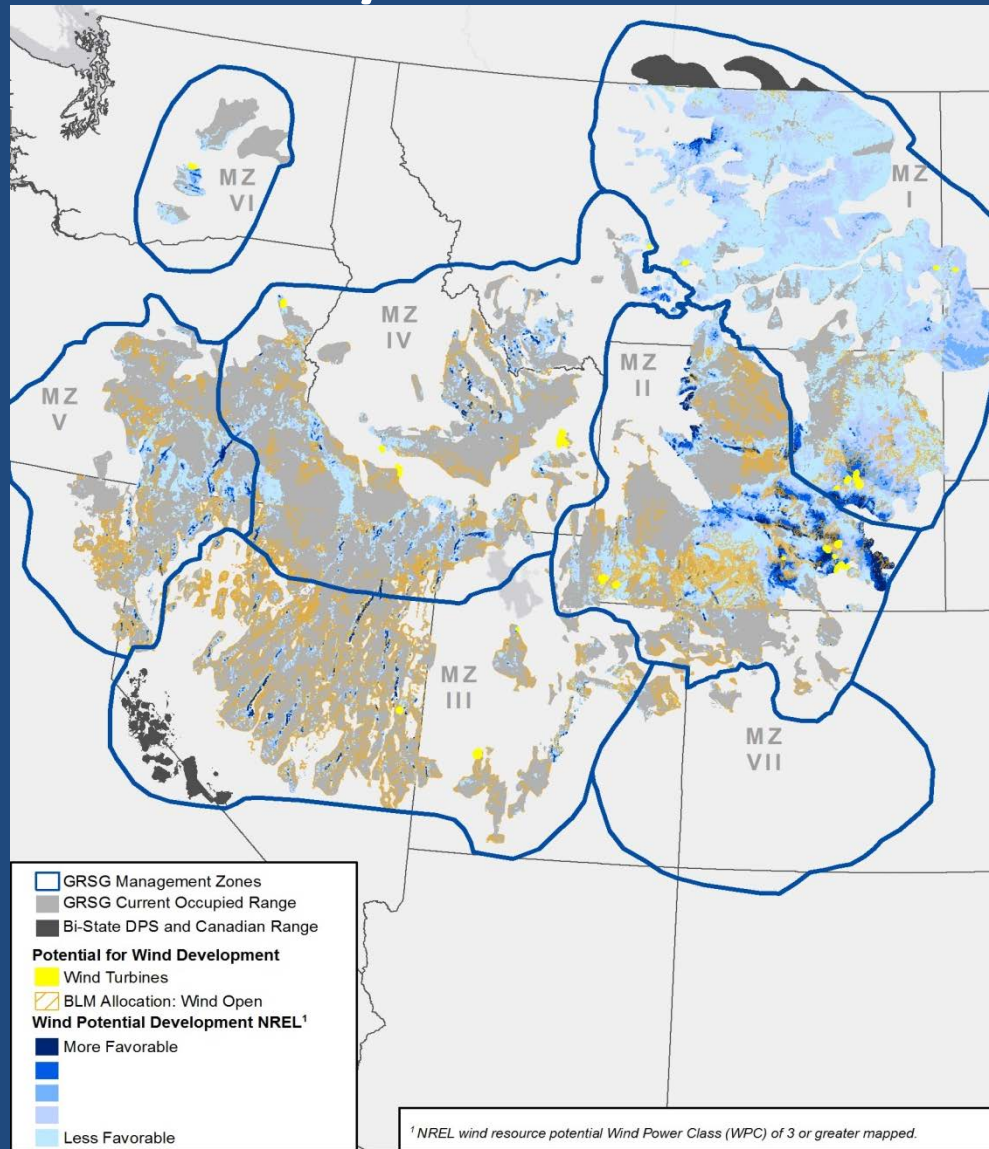


WIND



Location / Extent: Wind

MZ	No. of Turbines
I	392
II	497
III	110
IV	187



Location / Extent: Wind

- Dispersed unevenly across the range

Impact	Modeled Breeding Distribution	
Wind Energy Development	Acres of Direct Impact (%)	Acres of Potential Indirect Area of Influence (%)*
MZ I	538 (0.0)	82,890 (0.8)
MZ II	605 (0.0)	127,202 (1.1)
MZ III	0 (0.0)	5,702 (0.1)
MZ IV	33 (0.0)	8,783 (0.1)
MZ VI	0 (0.0)	11,056 (1.0)
Total		

** A 5.0-km buffer was applied to quantify area of potential indirect influence (Lebeau et al. 2014).*



Impacts to Sage-Grouse

- Direct habitat loss and fragmentation
- Increased human activity and additional anthropogenic structures may attract additional predators to the area which may forage into sage-grouse habitats (Bui *et al.* 2010)
- The aforementioned structures and activities may impact use patterns and demographics while not directly eliminating seasonal habitats
- Sage-grouse avoid anthropogenic development and increased density could result in loss of leks and/or seasonal use (Aldridge and Boyce 2007, Wisdom *et al.* 2011, Knick *et al.* 2013)



Since 2010...

- Renewable energy development increasing (primarily in MZs I and II, III) tied to tax incentives (ID, CA) and state energy goals (CO, NV) in several states.
- Research has shown decreases in nest and brood survival near turbines (Lebeau *et al.* 2014)
- BLM Wind-ROW restrictions...



Summary

- 2010: concluded that renewable energy did not significantly contribute to the destruction, modification, & curtailment of habitat & range.
- Likely a population-level impact, Federal regulations do not appear to be applied outside of the PAC/IPAs (PHMAs), and would likely have similar impacts of infrastructure (power lines) in those areas.
- We conclude that while impacts from renewable energy are not universal across the range, local areas of impacts have been realized and additional impacts are anticipated, but primarily wind, not solar or geothermal.

