

Gaining Ground

Industry Innovation Reduces Impacts on Sage-Grouse and Big Game

The oil and natural gas industry over the past five years has undergone transformation with the rise of the shale revolution. For an industry that is driven by innovation, the advent of horizontal and directional drilling paired with hydraulic fracturing has heralded an era of new beginnings and dramatically reduced operational footprint. Companies are now able to do more with less, minimizing impacts on species and the landscapes they depend upon. Wildlife is truly gaining ground.

Healthy wildlife populations are a major part of the culture and economy of the West. The need to balance economic interests while continuing to provide quality wildlife habitat and populations continues to be a paramount concern. As responsible stewards of the land, oil and natural gas companies are actively working to protect the Greater Sage-Grouse and big game species. Technological innovations and operational practices have dramatically reduced impacts in the West and nationwide.



Technological Advances Lower Disturbance

“In 2012, the percentage reduction in landscape disturbance due to the shift from vertical to directional and horizontal drilling in Wyoming could have been 70%. This does not include the associated reduction in road, pipeline, and power line disturbance and fragmentation.”

(Applegate/Owens)

Technological advances have dramatically lowered surface disturbance, which reduces impacts on wildlife and minimizes habitat fragmentation. In Wyoming, for instance, historical impacts to species such as mule deer and sage-grouse have been documented in oil and natural gas areas such as the Jonah Field, coal bed methane (CBM) fields in the northeast Powder River Basin and the Atlantic Rim in the south central part of the state. These fields were developed using mainly multiple vertical wells or large numbers of shallow CBM wells. These densely spaced fields have been the focus of numerous studies that provided a base level of knowledge of how historic intensive developments may impact species and the habitats on which they depend.

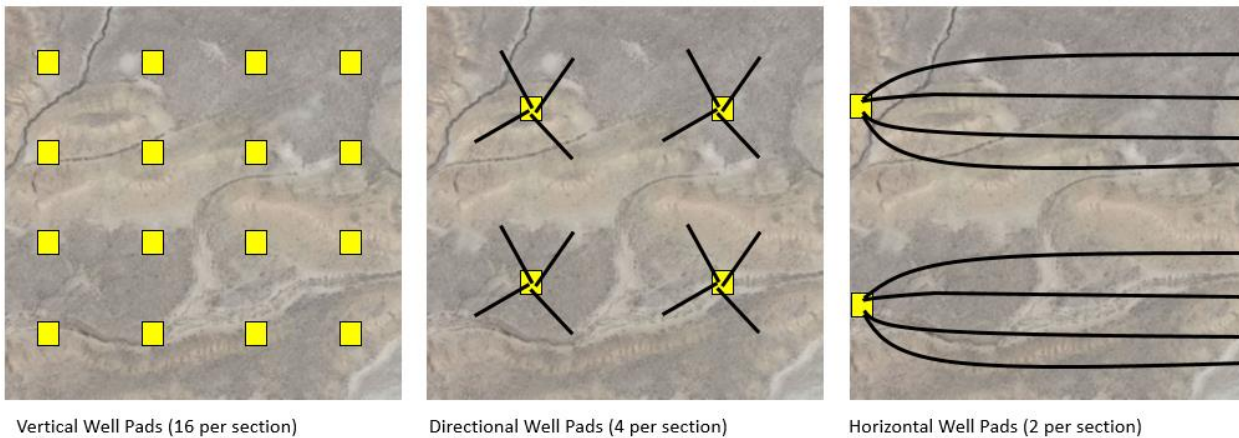


Figure 1. Typical surface footprint comparison between types of drilling operations. The well pads shown in yellow represent surface impact, while the well bores in black indicate the reach underground.

Very few studies however have captured how modern oil and natural gas operations result in a nearly 70% reduction in disturbance, until now.¹ Horizontal and directional drilling reduce surface disturbance and habitat fragmentation while at the same time increasing the rate of recovery of oil and natural gas from each well. A single horizontal well now takes the place of 8 to 16 vertical wells, dramatically reducing the impact on habitat. (Figure 1)



¹ Applegate, D.H. and Owens, N.L. 2014. [Oil and gas impacts on Wyoming's sage-grouse: summarizing the past and predicting the foreseeable future](#). *Human-Wildlife Interactions* 8(2): 284-290.

Greater Sage-Grouse and Energy Development

“In Wyoming, 75% (1,770 out of 2,356 leks) of identified leks (active and inactive) have <12 wells within a 3.2-km radius and are expected to have indiscernible impacts from oil and gas development.”

(Applegate/Owens)

Western states are leaders in the conservation of the Greater Sage-Grouse. Take the case of Wyoming. Per Governor Matt Mead’s Executive Order, core areas for the protection of key habitats have been set aside. The Sage-Grouse Implementation Team, which includes state agencies, ranchers, energy and other industries, and conservation groups, helps administer and guide the Wyoming Core Area Policy and has set standards on the density of well pads and percent of habitat that can be disturbed. Within core areas no more than one well pad per 640 acre section can be developed, and there is a cap of 5% surface disturbance per section. Sixty-four percent of Wyoming leks (1,508) are protected from impacts from oil and natural gas development due to these density and disturbance restrictions.²

Due to the combination of core area protections with the fundamental technological shift to directional and horizontal drilling, fragmentation and disturbance have been dramatically reduced, yet environmental groups continue to overstate future impacts to sage-grouse from oil and natural gas development.³ For example, a study by Doherty et al. demonstrates that with fewer than 12 wells within a two-mile radius of leks there are indiscernible impacts from oil and gas development on lek attendance.⁴ Through the use of horizontal and directional drilling, more wells can be developed with less impact on sage-grouse habitat. Modern oil and natural gas development is being done in a way that protects sage-grouse and enables both to coexist on the landscape.



² *Id.*

³ National Wildlife Federation, Natural Resources Defense Council. 2015. *Losing Ground: Energy Development’s Impacts on the Wildlife, Landscapes, and Hunting Traditions of the American West.*

⁴ Doherty, K.E., Naugle, D.E., Evans, J.S. 2010. [A currency for offsetting energy development impacts: horse-trading sage-grouse on the open market.](#) *PLoS ONE*, (5)4: e10339.

Big Game and Energy Development

Oil and natural gas companies are committed environmental stewards within the areas they operate. Industry plays an instrumental role in helping to fund and develop the science that is guiding the policy in Wyoming to manage big game migration corridors and to safeguard valuable wildlife resources for future generations. Industry employees live, work, and recreate locally and share the same conservation values as other citizens. Similar to the sage-grouse, recent research has found that robust, migratory herds of big game in Wyoming, such as mule deer, elk and pronghorn, can coexist with energy development.

Modern drilling practices, as shown earlier, provide for significantly less disturbance from oil and natural gas development. When reviewing recent studies focused on more intensive drilling practices in coal bed methane (CBM) fields, changes in migratory behavior were found to occur at density levels of five to seven well pads per square mile.⁶ Horizontal development can be accomplished with as few as one or two well pads per square mile, well below the density that might be expected to affect mule deer migration. The State of Wyoming's current policy recognizes the best available science and recommends development levels of no more than four well pads per square mile within migration corridors, not to exceed 60 acres of disturbance. In naturally occurring bottlenecks where topography limits herd movement, no surface disturbance is recommended. Industry is supportive of the policy and through the use of horizontal and directional drilling is able to meet these standards.

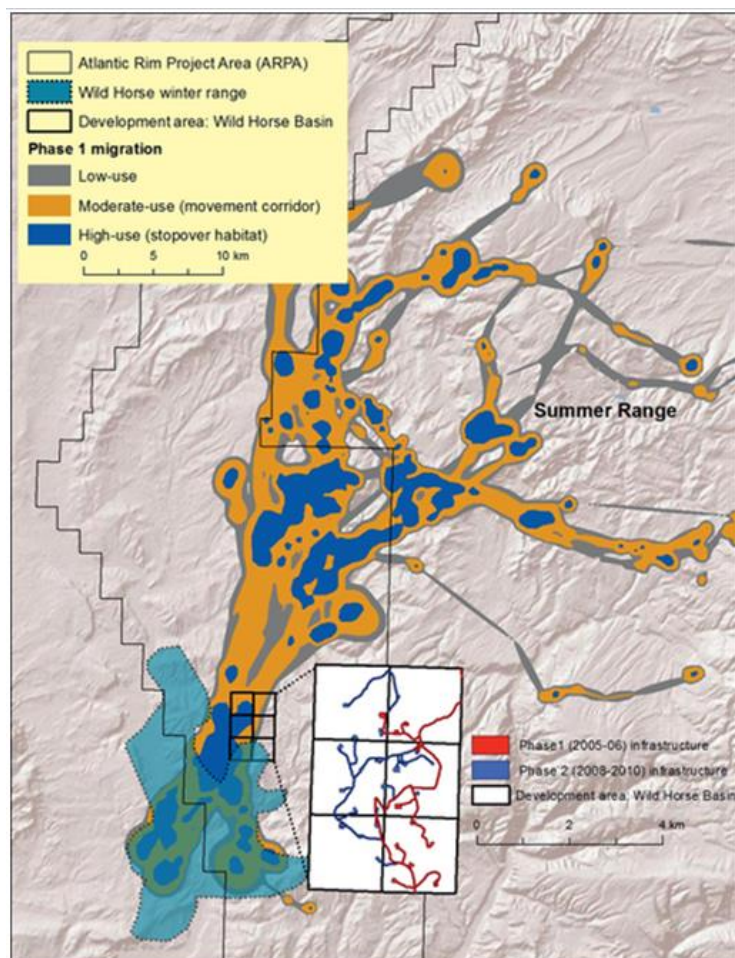


Figure 2. Infrastructure placement within a migration corridor in the Atlantic Rim CBM field where researchers discovered that mule deer can migrate through moderate levels of development without any noticeable effects on migratory behavior.⁵

⁵ Sawyer, H., Kauffman, M.J., Middleton, A.D., Morrison, T.A., Nielson, R.M., and Wyckoff, T.B. 2013. A framework for understanding semi-permeable barrier effects on migratory ungulates. *Journal of Applied Ecology*, 50: 68-78.

⁶ Copeland, H.E., Sawyer, H., Monteith, K.L., Naugle, D.E., Pocerwicz, A., Graf, N., and Kauffman, M.J. 2014. [Conserving migratory mule deer through the umbrella of sage-grouse](#). *Ecosphere*, 5(9): 1-16.

Conclusion

Innovation in the last five years has reduced the footprint of oil and natural gas development on the landscape by an impressive 70%. Wyoming is a great example, where between 2006 and 2012 vertical well permits declined 65% while horizontal and directional permits increased by 66% and 1,337%, respectively.⁷ Figure 3 shows this dramatic shift. A single horizontal well takes the place of 8 to 16 vertically drilled wells, and up to 32 directionally drilled wells can be clustered on one pad. While horizontal and directional drilling cannot be used in all geological circumstances, the surface disturbance reductions have been and continue to be significant.

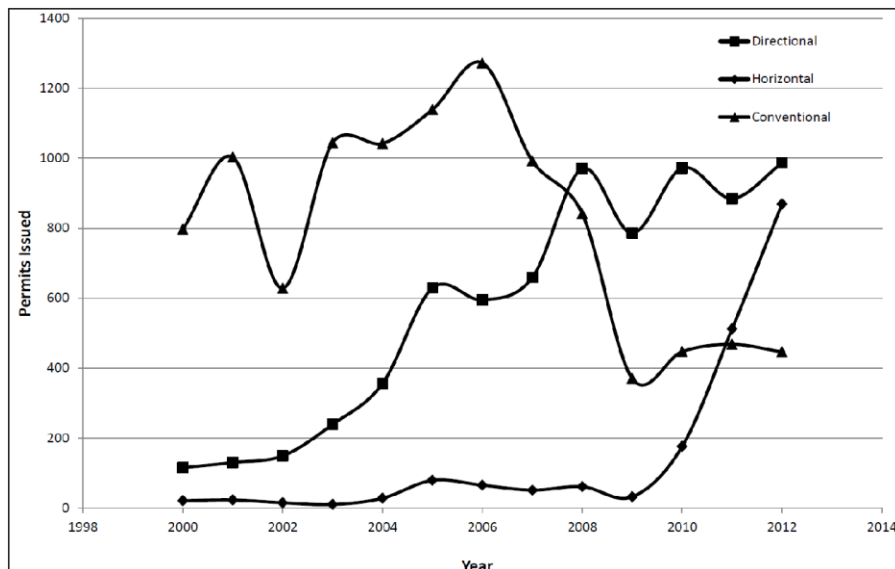
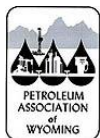


Figure 3. Wyoming Oil and Gas Conservation Commission permits issued from 2000 to 2013 (excludes CBM)

Responsible oil and natural gas development and robust wildlife populations can and do coexist. While some in the environmental movement would like the public to believe energy development and wildlife are mutually exclusive, the reality is that the industry has delivered dramatic reductions in surface disturbance and habitat fragmentation. Thanks to advancements in technology and development practices, sage-grouse and big game are truly gaining ground.

For More Information



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⁷ U.S. Fish and Wildlife Service. 2014. Unpublished data received during USFWS 2014 data call request to interested parties regarding information pertaining to the greater sage-grouse, held at USFWS Denver Regional Office.