

APPENDIX L

**SUGGESTED MANAGEMENT PRACTICES APPLICABLE FOR OIL AND GAS
DEVELOPMENT, WITHIN LEASE RIGHTS**

Suggested Management Practices (SMP's) Applicable for Oil and Gas Development, within Lease Rights

This is a partial list of suggested management practices that may be applied to oil and gas operations, or other surface-disturbing activities, to aid in meeting the habitat guidelines outlined in Appendix G (BLM Best Management Practices for public lands are available at <http://www.blm.gov/bmp>).

1. Minimize impacts on habitat through road construction standards, design and placement in all occupied and vacant/unknown sage grouse habitat. (exploration, drilling and production)
 - A. Minimize construction of new roads
 - B. Utilize minimum construction and maintenance standards appropriate for the operation.
 - C. Minimize visual/auditory impacts by placing roads below ridgelines or along topographic features.
 - D. Place roads outside of riparian areas.
 - E. Conduct exploration along existing roads where possible.
2. Minimize impacts to sage grouse through road use (patterns) and seasonal restrictions. (exploration, drilling, production)
 - A. Sign roads to prevent off road travel.
 - B. Set seasonal closures during critical SG use periods.
 - C. Encourage remote monitoring.
 - D. Develop travel plan to minimize vehicular traffic.
 - E. Place speed bumps, dips etc. to slow traffic as needed.
 - F. Construct or maintain any roads outside of critical seasonal use periods.
 - G. Encourage road rehabilitation or realignment to minimize impacts to sage grouse.
3. Overlay lease map with Gunnison sage-grouse habitat to determine vacant and occupied leases. (drilling and production)
 - A. Add lease notice 'This lease may require a full development plan as determined by an interdisciplinary team.
4. Implement noise mitigation from research and/or state regulations.
5. Create an educational video about sage grouse habitat and ecology to increase awareness for oil and gas employees. (exploration, drilling, production)
6. Avoid or minimize impacts to riparian, wetland, or wet meadow habitats to limit impacts to brood rearing areas. (exploration, drilling, production)
 - A. Locate equipment, facilities, and roads outside of riparian zones which may serve as late brood rearing habitat (1000 ft buffer where feasible).
 - B. Drive over woody vegetation at stream crossings rather than remove it wherever possible.
 - C. Bore pipeline crossings under perennial streams rather than trenching.

7. Use reclamation standards (interim and final) that are beneficial to restoring sage grouse habitat. (drilling, and production)
 - A. Incorporate sagebrush, desired forbs and grass species into seed mix. Use native species wherever possible or non-natives when approved via state or federal biologists.
 - B. Replace soil manually for shot holes. (exploration)
 - C. rip and/or recontour and reclaim operation sites, and access roads.
 - D. Retain and ‘manage’ topsoil as appropriate for reclamation.
 - E. Reclaim riparian areas with native vegetation.
 - F. Mimic vegetation patterns during reclamation.
 - G. Develop a reclamation plan with CDOW and UDWR.
 - H. Investigate opportunities to utilize suitable produced water in accordance with state water laws.

8. Prevent or minimize raptor perching on oil and gas facilities and structures in important sage grouse habitat. (drilling and production)
 - A. Design power poles to prevent raptor perching.
 - B. Minimize height of dry hole markers in SG habitat. (flush with ground or < 1’)

9. Components of a Comprehensive Development Plan (production)
 - A. Map all road infrastructure for area to be developed.
 - B. Map seasonal sage-grouse habitat within area of development.
 - C. Consider cumulative habitat loss to date in determining future development opportunities.
 - D. Consider topographic features when recommending areas to protect for sage-grouse.
 - E. Delineate maximum wellpad spacing (e.g., “No more than 1 wellpad per 'xx' acres”) for areas when research identifies that threshold.
 - F. Establish incremental development thresholds where possible (e.g. no more than 10% breeding habitat impacted over 10 year period)
 - G. Coordinate planning among companies operating in the same field.
 - H. Cluster development where possible to minimize impacts.
 - I. Encourage alternative drilling or production methods to minimize acres of habitat directly or indirectly affected (e.g. directional drilling).
 - J. Encourage remote monitoring of production sites to reduce harassment of birds during critical seasons.

10. Develop a fire response plan for oil and gas operations within sage-grouse habitat. (production)

11. Use BTI (*Bacillus thurgensis israelis*) for mosquito control in water pits associated with oil & gas operations where appropriate. (production)
12. Implement measures to ensure water quality is maintained, and hazardous spills are minimized in sage-grouse habitat and associated riparian areas. (drilling and production)

- A. Encourage use of water tanks instead of open pits.
 - B. Line open water pits.
 - C. Minimize SG contact with produced water.
13. Design well pad, storage facilities, and site locations to minimize degradation of sage-grouse habitat and visual/actual obstructions in the area. (production)
- A. Use low profile storage tanks.
 - B. Paint wells to camouflage in background.
14. Minimize impacts on local watersheds & local water sources during local drilling and reclamation activities (includes minimizing surface & sub-surface water depletion impacts). (drilling and production)