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## APPENDIX B—REQUIRED DESIGN FEATURES

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### B.1 INTRODUCTION

The following conservation measures have typically been referred to as best management practices (BMP) or recommended management practices. These conservation measures are treated in the Resource Management Plan (RMP) as required design features (RDF) to ensure regulatory certainty and the conservation of Greater Sage-Grouse. The source of these conservation measures came from Washington Office Instruction Memorandum No. 2012-044, (12/27/2011) Bureau of Land Management (BLM) National Greater Sage-Grouse Land Use Planning Strategy (IM No. WO-2012-044).

RDFs are required for certain activities in Greater Sage-Grouse habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the National Environmental Policy Act of 1969 (NEPA) analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.
- An alternative RDF is determined to provide equal or better protection for Greater Sage-Grouse or its habitat. A specific RDF will provide no additional protection to Greater Sage-Grouse or its habitat.
- Through the coal planning process it will be determined if areas are suitable for further coal leasing consideration. Sage-grouse will be protected from leasing using the coal screening process (unsuitability criteria #15 or multiple use conflict analysis (screen 3)). The coal planning process (see 43 CFR 3420.1-4 and 43 CFR 3461) will identify areas where coal leasing is not suitable or acceptable and those areas will be removed from further coal consideration for coal leasing and development (i.e., they will not be leased, so no development and no further protection needed).

Mines (particularly large surface coal mines) do not have the flexibility to move operations, so it is assumed that if a lease is ultimately offered, sold, and issued, the federal coal lessee can use the entire coal lease for mining operations once they receive their federal permit. The following measures would be applied as RDFs for all solid minerals. The measures would also apply to locatable minerals subject to valid existing rights and consistent with applicable law.

## **B.2 REQUIRED DESIGN FEATURES FOR LANDS AND REALTY, RANGE MANAGEMENT, FLUID MINERALS, COAL EXPLORATION, WILD HORSES, TRAVEL MANAGEMENT, VEGETATION MANAGEMENT, WILDFIRE AND FUELS MANAGEMENT, NOISE, AND WEST NILE VIRUS**

Priority Habitats—RDFs/BMPs are continuously improving as new science and technology become available and therefore are subject to change. Include from the following RDFs/BMPs those that are appropriate to mitigate effects from the approved action.

Evaluate and take advantage of opportunities to remove or modify existing power lines within priority sage-grouse habitat areas. When possible, require perch deterrents on existing or new overhead facilities. Encourage installation of perch deterrents on existing facilities.

Where existing leases or rights-of-way (ROW) have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features and restoring the habitat.

Locate man camps outside priority sage-grouse habitats.

Work cooperatively with permittees, lessees, and other landowners to develop grazing management strategies that integrate both public and private lands into single management units.

Coordinate RDFs/BMPs and vegetative objectives with the Natural Resources Conservation Service (NRCS) for consistent application across jurisdictions where the BLM, Forest Service, and NRCS have the greatest opportunities to benefit Greater Sage-Grouse, particularly as it applies to the NRCS's National Sage-Grouse Initiative ([http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/farmland/initiatives/andcid=stelde\\_vb1027671](http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/farmland/initiatives/andcid=stelde_vb1027671)).

Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to priority sage-grouse habitats to determine if they should be restored to sagebrush or habitat of higher quality for sage-grouse. If these seedings are part of an Allotment Management Plan/Conservation Plan, or if they provide value in conserving or enhancing the rest of the priority habitats, then no restoration would be necessary. Assess the compatibility of these seedings for sage-grouse habitat or as a component of a grazing system during land health assessments (Davies et al. 2011). For example, some introduced grass seedings are an integral part of a livestock management plan and reduce grazing pressure in important sagebrush habitats, or serve as a strategic fuels management area.

Where the federal government owns the surface, and the mineral estate is in non-federal ownership, apply appropriate BMPs to surface development.

### **B.2.1 Roads**

Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.

Locate roads to avoid important areas and habitats.

Coordinate road construction and use among federal fluid mineral lessees and ROW or special use authorization (SUA) holders.

Construct road crossings of ephemeral, intermittent, and perennial streams to minimize impacts to the riparian habitat, such as by crossing at right angles to ephemeral drainages and stream crossings.

Establish slow speed limits on BLM and Forest Service system-administered roads or design roads for slower vehicle speeds to reduce sage-grouse mortality.

Establish trip restrictions (Lyon and Anderson 2003) or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition).

Do not issue ROWs or SUAs to counties on energy development roads, unless for a temporary use consistent with all other terms and conditions including this document.

Designate all newly constructed routes for authorized use only (using signage, gates, etc.).

Apply dust abatement on roads, well pads, and other surface disturbances.

Close and rehabilitate duplicate roads by restoring original landform and establishing desirable habitat conditions.

## **B.2.2 Operations**

Conduct reclamation on unused roads as soon as possible using appropriate sage-grouse seed mixes.

Reclaim the permitted ROWs used in the construction of the running surface immediately.

Site and/or minimize linear ROWs or SUAs to reduce disturbance and fragmentation of sagebrush habitats.

Place new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors.

Bury distribution power lines to the extent technically feasible.

Cover all fluid-containing pits and open tanks with netting (maximum 1.5-inch mesh size) regardless of size to reduce sage-grouse mortality.

Equip tanks and other above-ground facilities with structures or devices that discourage nesting and perching of raptors and corvids.

Control the spread and effects of invasive non-native plant species (Evangelista et al. 2011), including treating weeds prior to surface disturbance and washing vehicles and equipment at designated wash stations when constructing in areas with weed infestations.

Require sage-grouse-safe fences (Christiansen, T. 2009; Stevens, B.S. 2011).

Clean up refuse (Bui et al. 2010).

Eliminate sumps; if the sump is absolutely necessary, then construct sage-grouse-safe fences around the sump (Christiansen, T. 2009; Stevens, B.S. 2011).

Cluster disturbances, operations (hydraulic fracture stimulation, liquids gathering, etc.), and facilities. If the geology is exploratory and there is the potential that subsequent wells may not be drilled, do not disturb additional habitat until geology has proven additional wells can go on the pad and it is necessary to do so.

Use directional and horizontal drilling to the extent feasible as a means to reduce surface disturbance in relation to the number of wells.

Place infrastructure in already disturbed locations where the habitat has not been fully restored.

Apply a phased development approach with concurrent reclamation.

Place liquid gathering facilities outside priority areas. To reduce truck traffic and perching and nesting sites for ravens and raptors, do not place tanks at well locations within priority habitat areas.

Pipelines must be under or immediately adjacent to the road (Bui et al. 2010).

Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use (Lyon and Anderson 2003).

Restrict the construction of tall facilities, distribution power lines, and fences to the minimum number and amount needed.

Design or site permanent structures to minimize impacts to sage-grouse, with emphasis on locating and operating facilities that create movement (e.g., pump jacks) or attract frequent human use and vehicular traffic (e.g., fluid storage tanks) in a manner that will minimize disturbance of sage-grouse or interference with habitat use.

Use only closed-loop systems for drilling operations, with no reserve pits.

Consider using oak (or other material) mats for drilling activities where topography permits to reduce vegetation disturbance and for temporary roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.

### **B.2.3 West Nile Virus**

Artificial water impoundments will be managed for the prevention and/or spread of West Nile virus where the virus poses a threat to sage-grouse. This may include but is not limited to: (a) the use of larvicides and adulticides to treat waterbodies; (b) overbuilding ponds to create non-vegetated, muddy shorelines; (c) building steep shorelines to reduce shallow water and emergent aquatic vegetation; (d) maintaining the water level below rooted vegetation; (e) avoiding flooding terrestrial vegetation in flat terrain or low-lying areas; (f) constructing dams or impoundments that restrict seepage or overflow; (g) lining the channel where discharge water flows into the pond with crushed rock, or use a horizontal pipe to discharge inflow directly into existing open water; (h) lining the overflow spillway with crushed rock and construct the spillway with steep sides to preclude the accumulation of shallow water and vegetation; and (i) restricting access of ponds to livestock and wildlife (Doherty 2007). This does not apply to naturally occurring waters.

Field offices should consider alternative means to manage produced waters that could present additional vectors for West Nile virus. Such remedies may include re-injection under an approved Underground Injection Control permit, transfer to single/centralized facility, etc.

Water impoundments will be managed to prevent the spread of West Nile virus where analysis shows the virus poses a threat to sage-grouse and in consideration of potential negative impact to other species of concern.

Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).

## **B.2.4 Noise**

Limit noise to less than 10 decibels above ambient measures (20-24 dBA) at sunrise at the perimeter of a lek during active lek season (Patricelli et al. 2010, Blickley et al. 2012).

Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.

Locate new compressor stations outside priority habitats and design them to reduce noise that may be directed towards priority habitat.

## **B.2.5 Reclamation**

Include objectives for ensuring habitat restoration to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post-reclamation management in reclamation plan such that goals and objectives are to protect and improve sage-grouse habitat needs.

Maximize the area of interim reclamation on long-term access roads and well pads, including reshaping, topsoiling, and revegetating cut-and-fill slopes where practicable; material used for irrigation must be removed thereafter.

Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.

Implement irrigation during interim or final reclamation for sites where establishment of seedlings has been shown or is expected to be difficult due to dry conditions.

Use mulching, soil amendments, and/or erosion blankets to expedite reclamation and to protect soils.

Identify and work with partners to increase native seed availability and work with plant material centers to develop new plant materials, especially the forbs needed to restore sage-grouse habitat.

Consider potential changes in climate (Miller et al. 2011) when proposing seedlings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed (Kramer and Havens 2009).

Use Ecological Site Descriptions (ESD) or other protocols (e.g., Terrestrial Ecological Unit Inventory or Lands System Inventory) to identify the understory species and sagebrush subspecies needed to restore desirable habitat conditions.

## **B.2.6 Vegetation Treatments/Fire and Fuels Management**

During vegetation management project design, consider the utility of using livestock to strategically reduce fine fuels (Diamond et al. 2009), and implement grazing management that will accomplish this objective (Davies et al. 2011, Launchbaugh et al. 2007). Consult with ecologists to minimize impacts to native perennial grasses.

Provide planning vegetation treatments information to personnel on sage-grouse biology, habitat requirements, and identification of areas utilized locally.

Use vegetation treatment prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable plant species and reduce risk of hydrophobicity).

Ensure that treatments are configured in a manner (e.g., strips) that promotes use by sage-grouse (See Connelly et al. 2000).

Design vegetation treatments in areas of high fire frequency which facilitate firefighter safety, reduce the potential acres burned and the fire risk to sage-grouse habitat. Additionally, develop maps for sage-grouse habitat which spatially display existing fuels treatments that can be used to assist suppression activities.

Restore prior perennial grass/shrub plant communities infested with invasive species to a species composition characterized by perennial grasses, forbs, and shrubs as outlined in ESDs.

Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.

Reduce the risk of vehicle or human-caused wildfires and the spread of invasive species into sage-grouse habitats. This could be minimized by planting perennial vegetation (e.g., green-strips) paralleling road ROWs. (This RDF could be applied to BLM and Forest Service linear ROW authorizations.)

Strategically place and maintain pre-treated strips/areas (e.g., mowing, herbicide application, and strictly managed grazed strips) to aid in controlling wildfire, should wildfire occur near key habitats or important restoration areas (such as where investments in restoration have already been made).

As appropriate, utilize existing fuel breaks, such as roads or discrete changes in fuel type, as control lines to minimize fire spread.

Design vegetation treatments in sage-grouse habitats to strategically reduce wildfire threats in the greatest area. This may involve spatially arranging new vegetation treatments with past treatments, vegetation with fire-resistant serial stages, natural barriers, and roads in order to constrain fire spread and growth. This may require vegetation treatments to be implemented in a more linear versus block design (Launchbaugh et al. 2007).

Design post-Emergency Stabilization and Rehabilitation (ES&R) and Burn Area Emergency Rehabilitation (BAER) management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horses, travel management, etc., to achieve and maintain the desired condition of ES&R and BAER projects to benefit sage-grouse (Eiswerth and Shonkwiler 2006). Include sage-grouse habitat parameters as defined by Connelly et al. (2000), Hagen et al. (2007) or if available, state sage-grouse conservation plans and appropriate local information in habitat restoration objectives. Maintain these objectives, within priority sage-grouse habitat areas, as a high restoration priority.

Make reestablishment of sagebrush and desirable understory plant cover (relative to ecological site potential) a high priority for restoration efforts. Write specific vegetation objectives to reestablish sagebrush cover and desirable understory cover.

Where applicable, design fuels treatment objective to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns which most benefit sage-grouse habitat.

Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas utilized locally.

Use burning prescriptions which minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of annual grass invasion).

Ensure proposed sagebrush treatments are planned with full interdisciplinary input from the BLM/Forest Service (pursuant to NEPA) and coordination with state fish and wildlife agencies, and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.

Power-wash all vehicles and equipment involved in vegetation treatment and fuels management activities prior to entering the area to minimize the introduction of undesirable and/or invasive plant species.

Give priority for implementing specific sage-grouse habitat restoration projects in annual grasslands, first to sites which are adjacent to or surrounded by priority/core habitat or that reestablish continuity between priority habitats. Annual grasslands are a second priority for restoration when the sites are not adjacent to priority/core habitat but within two miles of priority/core habitat. The third priority for annual grassland habitat restoration projects is sites beyond two miles of priority/core habitat. The intent is to focus restoration outward from existing, intact habitat.

As funding and logistics permit, restore annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs or one of those referenced in land use planning documentation.

Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.

Remove standing and encroaching trees within at least 110 yards of occupied sage-grouse leks and other habitats (e.g., nesting, wintering, and brood rearing) to reduce the availability of perch sites for avian predators, as resources permit.

Design fuel treatments that would increase fire suppression efficiencies to protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas. Where applicable, incorporate roads and natural fuel breaks into fuel break design.

Develop state-specific sage-grouse reference information and resource materials containing maps, a list of resource advisors, contact information, local guidance, and other information relevant to agency administrators and fire suppression resources.

During periods of multiple fires, ensure line officers are involved in setting priorities.

Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.

Assign a resource advisor with sage-grouse expertise or who has access to sage-grouse expertise to all extended attack fires in or near sage-grouse habitat. Prior to the fire season, provide training to sage-grouse resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals. Involve state wildlife agency expertise in fire operations through the following:

- Instructing resource advisors during preseason trainings
- Qualification as resource advisors
- Coordination with resource advisors during fire incidents
- Contributing to incident planning with information such as habitat features or other key data useful in fire decisionmaking.

On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.

Locate wildfire suppression facilities (i.e., base camps, spike camps, drop points, staging areas and heli-bases) in areas where physical disturbance to sage-grouse habitat can be minimized. These include disturbed areas, grasslands, near roads/trails, or other areas where there is existing disturbance or minimal sagebrush cover.

Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.

Minimize burnout operations in key sage-grouse habitat areas by constructing a direct fire line whenever safe and practical to do so.

Utilize retardant, mechanized equipment, and other available resources to minimize burned acreage during initial attack.

As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.

Adequately document the fire operation activities in sage-grouse habitat for potential follow-up coordination activities.

Compile the District/Forest-level information into state-wide sage-grouse tool boxes. Tool boxes will contain maps, listing of resource advisors, contact information, local guidance, and other relevant information for each District/Forest, which will be aggregated into a state-wide document.

## **General Greater Sage-Grouse Habitat**

### **Best Management Practices**

Make applicable BMPs mandatory as Conditions of Approval within general sage-grouse habitat. BMPs are continuously improving as new science and technology become available and therefore are subject to change. At a minimum include the following BMPs:

#### **Roads**

- Design roads to an appropriate standard, no higher than necessary, to accommodate their intended purpose.
- Do not issue ROWs to counties on energy development roads, unless for a temporary use consistent with all other terms and conditions included in this document.
- Establish speed limits to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.
- Coordinate road construction and use among ROW holders.
- Construct road crossing at right angles to ephemeral drainages and stream crossings.
- Use dust abatement practices on roads and pads.
- Close and reclaim duplicate roads by restoring original landform and establishing desired vegetation.

#### **Operations**

- Cluster disturbances, operations (fracture stimulation, liquids gathering, etc.), and facilities.

- Use directional and horizontal drilling to reduce surface disturbance.
- Clean up refuse (Bui et al. 2010).
- Restrict the construction of tall facilities and fences to the minimum number needed.
- Cover (e.g., fine mesh netting or use other effective techniques) all drilling and production pits and tanks regardless of size to reduce sage-grouse mortality.
- Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids.
- Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use.
- Control the spread and effects from non-native plant species. (e.g., by washing vehicles and equipment).
- Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Dougherty 2007).

**Reclamation**

- Include restoration objectives to meet sage-grouse habitat needs in reclamation practices/sites (Pyke 2011). Address post-reclamation management in reclamation plan such that goals and objectives are to enhance or restore sage-grouse habitat.

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