Appendix C

Required Design Features

APPENDIX C
REQUIRED DESIGN FEATURES

The following conservation measures have typically been referred to as best management practices (BMPs) or recommended management practices. These conservation measures are treated in the land use plan amendment as required design features (RDFs) to ensure regulatory certainty and the conservation of Greater Sage-Grouse (GRSG).

Required design features are required for certain activities in all GRSG habitat. Required design features 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 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, a state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat;
- A specific RDF will provide no additional protection to GRSG or its habitat.

The RDFs are required for the activities associated with each heading below. In addition, all project proponents are encouraged to include any appropriate conservation measure in their proposals. The US Department of the Interior, Bureau of Land Management (BLM) will require application of all appropriate conservation measures, warranted by site-specific analysis, in order to avoid, minimize, or compensate for impacts. Conservation measures not included in project proposals and determined appropriate from the site-specific analysis will be required as conditions of approval, stipulations, terms and conditions, etcetera. Additional conditions of approval developed through consultation with other federal, state, and local regulatory and resource agencies may be applied when supported by site-specific analysis.

REQUIRED DESIGN FEATURES FOR FIRE AND FUELS

Fire Operations

- Compile District level information into state-wide GRSG 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.
- 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 who has GRSG expertise or access to GRSG expertise to all extended attack fires in or near GRSG habitat. Prior to the fire season, provide training to GRSG 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:
  - 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 decision making
- On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in GRSG habitat areas.
- During periods of multiple fires, ensure line officers are involved in setting priorities.
- To the extent possible, locate wildfire suppression facilities (e.g., base camps, spike camps, drop points, staging areas, and heli-bases) in areas where physical disturbance to GRSG habitat can be minimized. These include disturbed areas, grasslands, near roads/trails, or other areas where there is existing disturbance or minimal sagebrush cover.
- Power-wash all firefighting vehicles, to the extent possible, including engines, water tenders, personnel vehicles, and all-terrain vehicles prior to deploying in or near GRSG habitat areas to minimize noxious weed spread.
- Minimize unnecessary cross-country vehicle travel during fire operations in GRSG habitat.
- 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 fire operation activities in GRSG habitat for potential follow-up coordination activities.

Fuels Management

- Where applicable, design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns that most benefit GRSG habitat.
- Provide training to fuels treatment personnel on GRSG 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).
- Where appropriate, ensure that treatments are configured in a manner that promotes use by GRSG.
- Power-wash all vehicles and equipment involved in fuels management activities, prior to entering the area, to minimize the introduction of undesirable and/or invasive plant species.
- Design vegetation treatments in areas of high fire frequency that facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to GRSG habitat. Additionally, develop maps for GRSG habitat which spatially display existing fuels treatments that can be used to assist suppression activities.
- As funding and logistics permit, restore annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs or one of that referenced in land use planning documentation.
- Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.
- Reduce the risk of vehicle- or human-caused wildfires and the spread of invasive species by installing fuel breaks and/or planting perennial vegetation (e.g., greenstrips) paralleling road rights-of-way.
- Strategically place and maintain pre-treated strips/areas (e.g., mowing and herbicide application) to aid in controlling wildfire should wildfire occur near PPMA or important restoration areas (such as where investments in restoration have already been made).

REQUIRED DESIGN FEATURES FOR SOLID MINERALS (INCLUDING LOCATABLE MINERALS)

The following measures would be applied as RDFs for all solid minerals. They would also apply to locatable minerals consistent with applicable law.

Roads

- Design roads to an appropriate standard no higher than necessary to accommodate their intended purposes.
- Locate roads to avoid important areas and habitats (important habitats include seasonal habitats within PHMA).
- Coordinate road construction and use among right-of-way or special use authorization holders.
- Construct road crossing at right angles to ephemeral drainages and stream crossings.

- Establish speed limits on BLM system roads or design roads to be driven at slower speeds to reduce vehicle/wildlife collisions.
- Do not issue rights-of-way or special use authorizations to counties on mining development roads, unless for a temporary use consistent with all other terms and conditions including this document.
- Restrict vehicle traffic to only authorized users on newly constructed routes (e. g., use signing and gates).
- Use dust abatement practices on roads and pads.
- Close and reclaim duplicate roads by restoring original landform and establishing desired vegetation.

Operations

- Cluster disturbances associated with operations and facilities as closely as possible.
- Place infrastructure in already disturbed locations where the habitat has not been restored.
- Restrict the construction of tall facilities and fences to the minimum number and amount needed.
- Site and/or minimize linear rights-of-way or special use authorizations to reduce disturbance to sagebrush habitats.
- Bury power lines.
- Cover (e.g., fine mesh netting or use other effective techniques) all 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.
- Control the spread and effects of non-native plant species (Gelbard and Belnap 2003; Bergquist et al. 2007).
- Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007). See Required Design Features for Preventing West Nile Virus.
- Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat:
  - Overbuild size of ponds for muddy and non-vegetated shorelines.
  - Build steep shorelines to decrease vegetation and increase wave actions.
  - Avoid flooding terrestrial vegetation in flat terrain or low lying areas.
  - Construct dams or impoundments that restrict down slope seepage or overflow.
  - Line the channel where discharge water flows into the pond with crushed rock.
  - Construct spillway with steep sides and line it with crushed rock.

  - Treat waters with larvicides to reduce mosquito production where water occurs on the surface.
- Require sage-grouse-safe fences around sumps.
- Clean up refuse (Bui et al. 2010).
- Locate worker camps outside of PHMA.

Reclamation

- Include restoration objectives to meet sage-grouse habitat needs in reclamation practices/sites.
- Address post reclamation management in reclamation plans 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.
- Restore disturbed areas at final reclamation to pre-disturbance landform and desired plant community
- Irrigate interim reclamation as necessary during dry periods. Utilize mulching techniques to expedite reclamation.

REQUIRED DESIGN FEATURES FOR FLUID MINERALS

Roads

PHMA

- Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.
- Do not issue rights-of-way or special use authorizations to counties on newly constructed energy development roads, unless for a temporary use consistent with all other terms and conditions included in this document.
- Establish speed limits on BLM system roads to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.
- Coordinate road construction and use among right-of-way or special use authorization holders.
- Construct road crossings at right angles to ephemeral drainages and stream crossings.
- Use dust abatement practices on roads and pads.
- Close and rehabilitate duplicate roads.
- Locate roads to avoid important areas and habitats (important habitats include seasonal habitats (i.e., winter, nesting, breeding, and brooding habitats) within PHMA).
- Restrict vehicle traffic to only authorized users on newly constructed routes using signage, gates, etc.

GHMA

- Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.
- Do not issue rights-of-way or special use authorizations to counties on newly constructed energy development roads, unless for a temporary use consistent with all other terms and conditions included in this document.
- Establish speed limits on BLM system roads to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.
- Coordinate road construction and use among right-of-way or special use authorization holders.
- Construct road crossings at right angles to ephemeral drainages and stream crossings.
- Use dust abatement practices on roads and pads.
- Close and rehabilitate duplicate roads.

Operations

PHMA

- Cluster disturbances, operations (e.g., fracture stimulation and liquids gathering), and facilities.
- Use directional and horizontal drilling to reduce surface disturbance.
- Develop a plan to reduce vehicular traffic frequency of vehicle use through establishing trip restrictions (Lyon and Anderson 2003) or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition), unless required for safety purposes.
- Clean up refuse.
- Restrict the construction of tall facilities and fences to the minimum number and amount needed.
- Cover (with fine mesh netting or other effective techniques) all drilling and production pits and tanks regardless of size to reduce GRSG mortality.
- Equip tanks and other above-ground facilities with structures or devices that discourage nesting of raptors and corvids.
- Control the spread and effects of non-native plant species by washing vehicles and equipment (Evangelista et al. 2011).
- Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Doherty 2007).
- Place infrastructure in already disturbed locations where the habitat has not been fully restored.

- Consider using oak (or other material) mats for drilling activities to reduce vegetation disturbance and for roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.
- Apply a phased development approach with concurrent reclamation.
- Place liquid gathering facilities outside of PHMA. Have no tanks at well locations within PHMA to minimize truck traffic and perching and nesting sites for ravens and raptors. Pipelines must be under or immediately adjacent to the road (Bui et al. 2010).
- Site and/or minimize linear rights-of-way or special use authorizations to reduce disturbance to sagebrush habitats.
- Bury distribution power lines.
- Collocate powerlines, flow lines, and small pipelines under or immediately adjacent to existing roads (Bui et al. 2010).
- Design or site permanent structures which create movement (e.g. pump jack) to minimize impacts on Greater Sage-Grouse.
- Use only closed-loop systems for drilling operations and no reserve pits.
- Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat:
  - Overbuild size of ponds for muddy and non-vegetated shorelines.
  - Build steep shorelines to decrease vegetation and increase wave actions.
  - Avoid flooding terrestrial vegetation in flat terrain or low lying areas.
  - Construct dams or impoundments that restrict down slope seepage or overflow.
  - Line the channel where discharge water flows into the pond with crushed rock.
  - Construct spillway with steep sides and line it with crushed rock.
  - Treat waters with larvicides to reduce mosquito production where water occurs on the surface.
- Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.
- Fit transmission towers with anti-perch devices (Lammers and Collopy 2007).
- Locate new compressor stations outside PHMA and design them to reduce noise that may be directed towards PHMA.
- Locate worker camps outside of PHMA.

GHMA

- Cluster disturbances, operations (e.g., fracturing stimulation and liquids gathering), and facilities.
- Use directional and horizontal drilling to reduce surface disturbance.

- Develop a plan to reduce vehicular traffic frequency of vehicle use through establishing trip restrictions (Lyon and Anderson 2003) or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition), unless required for safety purposes.
- Clean up refuse.
- Restrict the construction of tall facilities and fences to the minimum number and amount needed.
- Cover (with fine mesh netting or other effective techniques) all drilling and production pits and tanks regardless of size to reduce GRSG mortality.
- Equip tanks and other above-ground facilities with structures or devices that discourage nesting by raptors or corvids.
- Control the spread and effects of non-native plant species by washing vehicles and equipment (Evangelista et al. 2011).
- Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Dougherty 2007).

Reclamation

PHMA

- Include objectives for ensuring habitat restoration meets GRSG habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plan such that goals and objectives are to improve or restore GRSG 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.
- Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.
- Irrigate interim reclamation if necessary for establishing seedlings more quickly.
- Utilize mulching techniques to expedite reclamation and to protect soils.

GHMA

- Include objectives for ensuring habitat restoration meets GRSG habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plan such that goals and objectives are to improve or restore GRSG habitat needs.

REQUIRED DESIGN FEATURES FOR PREVENTING WEST NILE VIRUS

- Increase the size of fresh-water ponds to accommodate a greater volume of water than is discharged. This will result in un-vegetated and muddy shorelines that breeding Cx. tarsalis avoid (De Szalay and Resh 2000). This modification may reduce Cx. tarsalis habitat but could create larval habitat for Culicoides sonorensis, a vector of blue tongue disease, and should be used sparingly (Schmidtmann et al. 2000). Steep shorelines should be used in combination with this technique whenever possible (Knight et al. 2003).

- Build steep shorelines to reduce shallow water (more than 60 centimeters) and aquatic vegetation around the perimeter of impoundments (Knight et al. 2003). Construction of steep shorelines also will create more permanent ponds that are a deterrent to colonizing mosquito species like Cx. tarsalis, which prefer newly flooded sites with high primary productivity (Knight et al. 2003).
- Maintain the water level below that of rooted vegetation for a muddy shoreline that is unfavorable habitat for mosquito larvae. Rooted vegetation includes both aquatic and upland vegetative types. Avoid flooding terrestrial vegetation in flat terrain or low lying areas. Aquatic habitats with a vegetated inflow and outflow separated by open water produce 5- to 10-fold fewer Culex mosquitoes than completely vegetated wetlands (Walton and Workman 1998). Wetlands with open water also had significantly fewer stage III and IV instars which may be attributed to increased predator abundances in open water habitats (Walton and Workman 1998).
- Construct dams or impoundments that restrict down slope seepage or overflow by digging ponds in flat areas rather than damming natural draws for effluent water storage, or lining constructed ponds in areas where seepage is anticipated (Knight et al. 2003).
- Line 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, thus precluding shallow surface inflow and accumulation of sediment that promotes aquatic vegetation.
- Line the overflow spillway with crushed rock, and construct the spillway with steep sides to preclude the accumulation of shallow water and vegetation.
- Fence pond site to restrict access by livestock and other wild ungulates that trample and disturb shorelines, enrich sediments with manure and create hoof print pockets of water that are attractive to breeding mosquitoes.

REQUIRED DESIGN FEATURES FOR LANDS AND REALTY

- Where technically and financially feasible, bury distribution powerlines and communication lines within existing disturbance.
- Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.
- Place infrastructure in already disturbed locations where the habitat has not been fully restored.
- Cluster disturbances, operations, and facilities.
- Micro-site linear facilities to reduce impacts to GRSG habitats.
- Locate staging areas outside GRSG habitat to the extent possible.
- Coordinate road construction and use among ROW holders.
- Restrict vehicle traffic to only authorized users on newly constructed routes using signage, gates, etc.
- Construct road crossings at right angles to ephemeral drainages and stream crossings.

- Consider placing pipelines under or immediately adjacent to a road or adjacent to other pipelines first, before considering co-locating with other ROW.
- Control the spread and effects of non-native plant species.
- New ROW structures will be constructed with perch deterrents or other anti-perching devices, where needed.

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