
Appendix H

Required Design Features, Preferred Design
Features, and Suggested Design Features

APPENDIX H

REQUIRED DESIGN FEATURES, PREFERRED DESIGN FEATURES, AND SUGGESTED DESIGN FEATURES

Table H-I provides a list of preferred design features (PDFs) and required design features (RDFs) that are applicable to all alternatives in the resource management plan.

- RDFs are design features required for a specified proposal or project and are often necessary to prevent unnecessary or undue degradation of public land resources. All subsequent line items in Alternative B are RDFs. Citizens' proposal RDFs are the same as Alternative B in all line items.
- PDFs are established guidelines followed by the BLM to be incorporated into management activities where necessary, appropriate, and/or technically feasible. "Necessary" refers to the need for the PDF given the specifics of a proposal (e.g., It is not "necessary" to apply dust abatement on roads when the soil is sandy and wet.). "Appropriate" refers to the wisdom of apply the PDF (e.g., It may not be "appropriate" to locate man camps outside priority habitat because the additional vehicle miles required by a more distant location could be more detrimental to sage-grouse.). A PDF is "technically feasible" when it entails proven, or in some cases, emerging technology.
- SDFs are Suggested Design Features that apply to locatable minerals.

While the list of PDFs/RDFs/SDFs in **Table H-I** is thorough, the list is not intended to be exhaustive; additional PDFs/RDFs/SDFs could be developed and implemented to help achieve resource objectives. PDFs/RDFs/SDFs include

state-of-the-art measures applied on a site-specific basis to avoid, minimize, reduce, rectify, or compensate for adverse environmental or social impacts. They are applied to management actions to help achieve desired outcomes for safe, environmentally responsible resource development by preventing, minimizing, or mitigating adverse impacts and reducing conflicts. PDFs/RDFs/SDFs also can be proposed by project applicants for activities on public lands (e.g., for gas drilling). PDFs/RDFs/SDFs not incorporated into the permit application by the applicant may be considered and evaluated through the environmental review process and incorporated into the use authorization as conditions of approval or rights-of-way stipulations. Standard conditions of approval and rights-of-way stipulations are provided in **Appendix X**. Additional PDFs/RDFs/SDFs, conditions of approval, and rights-of-way stipulations could be developed to meet resource objectives based on local conditions and resource specific concerns.

Table H-1
Required Design Features, Preferred Design Features and Suggested Design Features¹

Alternatives B and C		Alternative D
WEST NILE VIRUS		
All Designated Habitat		
The following seven site modifications will minimize exploitation of coal bed natural gas ponds by <i>Culex tarsalis</i>:		
1	(ADH) 1. Increase the size of ponds to accommodate a greater volume of water than is discharged. This will result in un-vegetated and muddy shorelines that breeding <i>Cx. tarsalis</i> avoid (De Szalay and Resh 2000). This modification may reduce <i>Cx. tarsalis</i> habitat but could create larval habitat for <i>Culicoides sonorensis</i> , a vector of blue tongue disease, and should be used sparingly (Schmidtman et al. 2000). Steep shorelines should be used in combination with this technique whenever possible (Knight et al. 2003).	Same as Alternative B for energy-related water disposal. (ADH) When authorizing new ponds for watering livestock, evaluate the proposed design for features that reduce the potential for creating mosquito breeding habitat in conjunction with features that make the pond fit for the purpose for which it is intended.
2	(ADH) 2. Build steep shorelines to reduce shallow water (>60 cm) 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 <i>Cx. tarsalis</i> which prefer newly flooded sites with high primary productivity (Knight et al. 2003).	Same as line 98.
3	(ADH) 3. Maintain the water level below that of rooted vegetation for a muddy shoreline that is unfavorable habitat for mosquito larvae. Rooted vegetation includes both	Same as line 98.

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Alternatives B and C		Alternative D
	<p>aquatic and upland vegetative types. Avoid flooding terrestrial vegetation in flat terrain or low lying areas. <u>Aquatic habitats with a vegetated inflow and outflow separated by open water produce 5-10 fold fewer Culex mosquitoes than completely vegetated wetlands</u> (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).</p>	
4	(ADH) 4. 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).	Same as line 98.
5	(ADH) 5. 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.	Same as line 98.
6	(ADH) 6. Line the overflow spillway with crushed rock, and construct the spillway with steep sides to preclude the accumulation of shallow water and vegetation.	Same as line 98.
7	(ADH) 7. 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.	Same as line 98.
FLUID MINERAL DEVELOPMENT		
Fluid Mineral Roads Priority Habitat		
8	(ADH) Design roads to an appropriate standard no higher than necessary to accommodate the intended purpose.	Same as Alternative B.
9	(P) Locate roads to avoid important areas and habitats.	(P) PDF
10	(P) Coordinate road construction and use among ROW holders.	Same as Alternative B.

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Alternatives B and C		Alternative D
11	(P) Construct road crossing at right angles to ephemeral drainages and stream crossings.	(P) PDF
12	(P) Establish speed limits on BLM system roads to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.	(P) PDF
13	(P) Establish trip restrictions (Lyon and Anderson 2003) or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition).	(P) PDF
14	(P) Do not issue ROWs to counties on newly constructed energy development roads, unless for a temporary use consistent with all other terms and conditions included in this document.	(P) PDF/Coordinate with counties on transportation management related to sage-grouse habitat issues.
15	(P) Restrict vehicle traffic to only authorized users on newly constructed routes (use signing, gates, etc.).	(P) PDF
16	(P) Use dust abatement practices on roads and pads.	(P) PDF
17	(P) Close and rehabilitate duplicate roads.	(P) PDF
Fluid Mineral Operations Priority Habitat		
18	(P) Cluster disturbances, operations (fracture stimulation, liquids gathering, etc.), and facilities.	(P) PDF
19	(P) Use directional and horizontal drilling to reduce surface disturbance.	(P) PDF
20	(P) Place infrastructure in already disturbed locations where the habitat has not been restored.	(P) PDF
21	(P) 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.	(P) PDF
22	(P) Apply a phased development approach with concurrent reclamation.	(P) PDF
23	(P) <u>Place liquid gathering facilities outside of priority areas. Have no tanks at well locations within priority areas (minimizes perching and nesting opportunities for ravens and raptors and truck traffic). Pipelines must be under or immediately adjacent to the road</u> (Bui et al. 2010).	(P) PDF

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	Alternatives B and C	Alternative D
24	(P) Restrict the construction of tall facilities and fences to the minimum number and amount needed.	(P) PDF—Restrict the construction of facilities and fences to the minimum number and size necessary.
25	(P) <u>Site and/or minimize linear ROWs to reduce disturbance to sagebrush habitats.</u>	(P) PDF
26	(P) Place new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors.	(P) PDF
27	(P) Bury distribution power lines.	(P) PDF
28	(P) Corridor power, flow, and small pipelines under or immediately adjacent to roads.	(P) PDF
29	(P) Design or site permanent structures which create movement (e.g. a pump jack) to minimize impacts to sage-grouse.	(P) PDF
30	(P) <u>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.</u>	(P) PDF— <u>Cover all drilling and production pits and tanks regardless of size with netting or some other BLM-approved cover method.</u>
31	(P) Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids.	(P) PDF
32	(P) Control the spread and effects of non-native plant species (Evangelista et al. 2011). (E.g. by washing vehicles and equipment).	(P) PDF—Clean vehicles in a manner that prevents transport of weeds.
33	(P) <u>Use only closed-loop systems for drilling operations and no reserve pits.</u>	(P) PDF
34	(P) Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).	(P) PDF
35	(P) 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: <ul style="list-style-type: none"> • 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 	(P) PDF

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Alternatives B and C		Alternative D
	flows into the pond with crushed rock.	
	<ul style="list-style-type: none"> • 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. 	
36	(P) 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. <i>In preparation</i>).	(P) PDF
37	(P) Require noise shields when drilling during the lek, nesting, broodrearing, or wintering season.	(P) PDF
38	(P) Fit transmission towers with anti-perch devices (Lammers and Collopy 2007).	Same as Alternative B.
39	(P) Require sage-grouse-safe fences.	(P) PDF
40	(P) Locate new compressor stations outside priority habitats and design them to reduce noise that may be directed towards priority habitat.	(P) PDF—Locate new compressor stations outside priority habitat. (P) RDF—Design compressor stations and other production equipment so that noise emitted or measured in priority habitat is no more than XX .
41	(P) Clean up refuse (Bui et al. 2011).	(P) RDF
42	(P) Locate man camps outside of priority habitats.	(P) PDF
Fluid Minerals Reclamation Priority Habitat		
43	(P) 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.	(P) RDF—See Appendix F , Surface Reclamation Plan.
44	(P) Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling, and revegetating cut and fill slopes.	(P) PDF
45	(P) Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.	(P) PDF—All disturbed areas will be contoured to the original contours or at least to blend with the natural topography. Blending is defined as reducing form, line, shape, and color contrast with the disturbing activity. In visually sensitive areas, all disturbed areas shall be contoured to match the original topography. Matching is defined as

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Alternatives B and C		Alternative D
		reproducing the original topography and eliminating form, line, shape, and color caused by the disturbance as much as possible.
46	(P) Irrigate interim reclamation if necessary for establishing seedlings more quickly.	(P) PDF
47	(P) Utilize mulching techniques to expedite reclamation and to protect soils.	(P) PDF
Fluid Minerals Roads		
General Habitat		
48	(G) Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.	(ADH) Same as Alternative B.
49	(G) 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.	(ADH) Coordinate with counties on transportation management related to sage-grouse habitat issues.
50	(G) Establish speed limits to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.	(ADH) PDF
51	(G) Coordinate road construction and use among ROW holders.	Same as Alternative B.
52	(G) Construct road crossing at right angles to ephemeral drainages and stream crossings.	(ADH) PDF
53	(G) Use dust abatement practices on roads and pads.	(ADH) PDF
54	(G) Close and reclaim duplicate roads, by restoring original landform and establishing desired vegetation.	(ADH) PDF
Fluid Minerals Operations		
General Habitat		
55	(G) Cluster disturbances, operations (fracture stimulation, liquids gathering, etc.), and facilities.	(ADH) PDF
56	(G) Use directional and horizontal drilling to reduce surface disturbance.	(ADH) PDF
57	(G) Clean up refuse (Bui et al. 2010).	(ADH) RFD
58	(G) Restrict the construction of tall facilities and fences to the minimum number and amount needed.	(ADH) PDF—Restrict the construction of facilities and fences to the minimum number and size necessary.
59	(G) 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.	(ADH) PDF—Cover all drilling and production pits and tanks regardless of size with netting or some other BLM-approved cover method.

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Alternatives B and C		Alternative D
60	(G) Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids.	(ADH) PDF
61	(G) Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use.	(ADH) PDF
62	(G) Control the spread and effects from non-native plant species. (e.g., by washing vehicles and equipment).	(ADH) PDF—Clean vehicles in a manner that prevents transport of weeds.
63	(G) Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Dougherty 2007).	(ADH) PDF
Fluid Minerals Reclamation		
General Habitat		
64	(G) 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.	(ADH) RDF—See Appendix F , Surface Reclamation Plan.
LOCATABLE MINERALS		
Locatable Minerals Roads		
All Designated Habitat		
65	(ADH) SDF—Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.	(ADH) SDF—Request operators design roads to an appropriate standard no higher than necessary to accommodate their intended purpose; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
66	(ADH) SDF—Locate roads to avoid important areas and habitats.	(ADH) SDF—Request operators locate roads to avoid important areas and habitats; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
67	(ADH) SDF—Coordinate road construction and use among ROW holders.	(ADH) SDF—Request ROW holders coordinate road construction and use with other ROW holders; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
68	(ADH) SDF—Construct road crossing at right angles to ephemeral drainages and stream crossings.	(ADH) SDF—Request operators construct road crossing at right angles to ephemeral drainages and stream crossings; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
69	(ADH) SDF—Establish speed limits on BLM system roads to reduce vehicle/wildlife collisions or design roads to be driven at	(ADH) SDF—Request operators establish speed limits on BLM system roads to reduce vehicle/wildlife collisions or design roads to be

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Alternatives B and C		Alternative D
	slower speeds.	driven at slower speeds; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
70	(ADH) SDF—Do not issue ROWs to counties on mining development roads, unless for a temporary use consistent with all other terms and conditions included in this document.	(ADH) SDF—Coordinate with counties on transportation management related to sage-grouse habitat issues.
71	(ADH) SDF—Restrict vehicle traffic to only authorized users on newly constructed routes (e. g., use signing, gates, etc.).	(ADH) SDF—Request operators restrict vehicle traffic to only authorized users on newly constructed routes (e.g., use signing, gates, etc.); require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
72	(ADH) SDF—Use dust abatement practices on roads and pads.	(ADH) SDF—Request operators use dust abatement practices on roads and pads; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
73	(ADH) SDF—Close and reclaim duplicate roads, by restoring original landform and establishing desired vegetation.	(ADH) SDF—Request operators close and reclaim duplicate roads, by restoring original landform and establishing desired vegetation; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
Locatable Minerals Operations		
All Designated Habitat		
74	(ADH) SDF—Cluster disturbances associated with operations and facilities as close as possible.	(ADH) SDF—Cluster disturbances associated with operations and facilities as close as possible; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
75	(ADH) SDF—Place infrastructure in already disturbed locations where the habitat has not been restored.	(ADH) SDF—Place infrastructure in already disturbed locations where the habitat has not been restored; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
76	(ADH) SDF—Restrict the construction of tall facilities and fences to the minimum number and amount needed.	(ADH) SDF—Restrict the construction of tall facilities and fences to the minimum number and amount needed; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
77	(ADH) SDF—Site and/or minimize linear ROWs to reduce disturbance to sagebrush habitats.	(ADH) SDF—Site and/or minimize linear ROWs to reduce disturbance to sagebrush habitats; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
78	(ADH) SDF—Place new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors.	(ADH) SDF—Request that operators place new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors; require as necessary to

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Alternatives B and C		Alternative D
		prevent unnecessary or undue degradation under 43 CFR 3809.
79	(ADH) SDF—Bury power lines.	(ADH) SDF—Request that operators bury power lines; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
80	(ADH) SDF—Cover (e.g., fine mesh netting or use other effective techniques) all pits and tanks regardless of size to reduce sage-grouse mortality.	(ADH) SDF—Request that operators cover all pits and tanks regardless of size using fine mesh netting or other effective techniques to reduce sage-grouse mortality; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
81	(ADH) SDF—Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids.	(ADH) SDF—Request operators equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
82	(ADH) SDF—Control the spread and effects of non-native plant species (Gelbard and Belnap 2003, Bergquist et al. 2007).	(ADH) SDF—Request operators control the spread and effects of non-native plant species (Gelbard and Belnap 2003, Bergquist et al. 2007); require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
83	(ADH) SDF—Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).	(ADH) SDF—Request operators restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007); require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
84	(ADH) SDF—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: <ul style="list-style-type: none"> • 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 	(ADH) SDF—Request that operators adhere to the PDF/RDF provisions in this table's Section on West Nile Virus; require adherence as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.

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Alternatives B and C		Alternative D
mosquito production where water occurs on the surface.		
85	(ADH) SDF—Require sage-grouse-safe fences around sumps.	(ADH) SDF—Request operators install sage-grouse-safe fences around sumps; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
86	(ADH) SDF—Clean up refuse (Bui et al. 2010).	(ADH) SDF—Require operators to clean up refuse (Bui et al. 2010) so as to prevent unnecessary or undue degradation under 43 CFR 3809.
87	(ADH) SDF—Locate man camps outside of priority sage-grouse habits.	(ADH) SDF—Request that operators locate man camps outside priority habitat; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
Locatable Minerals Reclamation		
All Designated Habitat		
88	(ADH) SDF—Include restoration objectives to meet sage-grouse habitat needs in reclamation practices/sites. Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve sage-grouse habitat needs.	(ADH) SDF—See Appendix F , Surface Reclamation Plan.
89	(ADH) SDF—Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling and revegetating cut and fill slopes.	(ADF) No similar Action. (Interim Reclamation is a fluid mineral term that does not apply to locatable minerals)
90	(ADH) SDF—Restore disturbed areas at final reclamation to pre-disturbance landform and desired plant community.	(ADH) SDF—Request operators' reclamation plans to target pre-disturbance landform and desired plant community vegetation; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
91	(ADH) SDF—Irrigate interim reclamation as necessary during dry periods.	(ADH) No similar Action. (Interim Reclamation is a fluid mineral term that does not apply to locatable minerals).
92	(ADH) SDF—Utilize mulching techniques to expedite reclamation.	(ADH) SDF—Request operators use mulching techniques to expedite reclamation; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
93	(ADH) SDF—Do not issue ROWs to counties on mining development roads, unless for a temporary use consistent with all other terms and conditions included in this document.	(ADH) SDF—Coordinate with counties on transportation management related to sage-grouse habitat issues.

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Alternatives B and C		Alternative D
FIRE MANAGEMENT		
Fire Management—Fuels Management		
All Designated Habitat		
94	(ADH) 1. 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.	(ADH) PDF—Where applicable, design fuels treatment objective to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns to address other values-at-risk.
95	(ADH) 2. Provide training to fuels treatment personnel on sage-grouse biology, habitat requirements, and identification of areas utilized locally.	(ADH) PDF
96	(ADH) 3. Use fire prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of hydrophobicity).	(ADH) PDF
97	(ADH) 4. Ensure proposed sagebrush treatments are planned with interdisciplinary input from BLM and /or state wildlife agency biologist and that treatment acreage is conservative in the context of surrounding sage-grouse seasonal habitats and landscape.	(ADH) RFD
98	(ADH) 5. Where appropriate, ensure that treatments are configured in a manner (e.g., strips) that promotes use by sage-grouse (See Connelly et al., 2000*).	(ADH) RDF
99	(ADH) 6. Where applicable, incorporate roads and natural fuel breaks into fuel break design.	(ADH) RDF
100	(ADH) 7. 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.	(ADH) PDF
101	(ADH) 8. Design vegetation treatment in areas of high frequency to facilitate firefighting safety, reduce the risk of extreme fire behavior; and to reduce the risk and rate of fire spread to key and restoration habitats.	(ADH) RDF
102	(ADH) 9. Give priority for implementing specific sage-grouse habitat restoration projects in annual grasslands first to sites which are adjacent to or surrounded by sage-grouse key habitats. Annual grasslands are	(ADH) PDF

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Alternatives B and C		Alternative D
	second priority for restoration when the sites not adjacent to key habitat, but within 2 miles of key habitat. The third priority for annual grasslands habitat restoration projects are sites beyond 2 miles of key habitat. The intent is to focus restoration outward from existing, intact habitat.	
103	(ADH) 10. As funding and logistics permit, restore annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs.	(ADH) PDF—Restore annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs.
104	(ADH) 11. 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.	(ADH) PDF
105	(ADH) 12. Remove standing and encroaching trees within at least 100 meters 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 appropriate, and resources permit.	(ADH) PDF
106	(ADH) 13. Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.	(ADH) RDF—Prioritize suppression immediately after firefighter and public safety commensurate with the values-at-risk.
107	(ADH) 14. Reduce the risk of vehicle or human-caused wildfires and the spread of invasive species by planting perennial vegetation (e.g., green-strips) paralleling road rights-of-way.	(ADH) PDF
108	(ADH) 15. 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).	(ADH) PDF
Fire Management		
All Designated Habitat		
109	(ADH) 1. Develop state-specific sage-grouse reference information and resource materials containing maps, a list of resource advisors, contact information, local guidance, and other	(ADH) RDF—Develop state-specific sage-grouse reference and resource materials containing maps, a list of resource advisors, contact information, local guidance, and other relevant information.

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Alternatives B and C		Alternative D
	relevant information.	These state-specific sage-grouse reference and resource materials are for internal use only.
I10	(ADH) 2. Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.	(ADH) RDF
I11	(ADH) 3. Assign a sage-grouse resource advisor to all extended attack fires in or near key sage-grouse habitat areas. 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.	(ADH) PDF—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.
I12	(ADH) 4. On critical fire weather days, pre-position additional fire suppression resources to optimize a quick and efficient response in sage-grouse habitat areas.	(ADH) PDF—Pre-position fire suppression resources based on all resource values-at-risk.
I13	(ADH) 5. During periods of multiple fires, ensure line officers are involved in setting priorities.	(ADH) RDF
I14	(ADH) 6. 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 in other areas where there is existing disturbance or minimal sagebrush cover.	(ADH) PDF
I15	(ADH) 7. Power-wash all firefighting vehicles, to the extent possible, including engines, water tenders, personnel vehicles, and ATVs prior to deploying in or near sage-grouse habitat areas to minimize noxious weed spread.	(ADH) PDF
I16	(ADH) 8. Minimize unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.	(ADH) RDF—Eliminate unnecessary cross-country vehicle travel during fire operations in sage-grouse habitat.
I17	(ADH) 9. Minimize burnout operations in key sage-grouse habitat areas by constructing direct fireline whenever safe and practical to do so.	(ADH) PDF
I18	(ADH) 10. Utilize retardant and mechanized equipment to minimize burned acreage during initial attack.	(ADH) PDF

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Alternatives B and C	Alternative D
119 (ADH) 11. As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.	(ADH) PDF

¹ All Designated Habitat (ADH) includes Priority (P), General (G), and Connectivity (C) habitat.

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