

Sage-grouse and Pygmy Rabbit Habitat Best Management Practices

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Best Management Practices

This document presents best management practices (BMPs) for the conservation and protection of Greater sage-grouse and pygmy rabbit habitats. BMPs are state-of-the-art conservation and mitigation measures applied to reduce, prevent, or avoid adverse environmental consequences to sage-grouse and pygmy rabbit habitats. BMPs can be applied from the landscape to site-specific level depending on species needs. BMPs may be simple or complex in application depending on purpose and extent of application.

BMPs are presented for greater sage-grouse and pygmy rabbit habitat protection and rehabilitation in association with the Ruby pipeline construction and operation. BMPs for sage-grouse and pygmy rabbit were identified by reviewing key literature. BMPs are presented for landscape- and stand-level habitat management with associated habitat rehabilitation recommendations. Also, presented are BMPs for facility and road construction within sagebrush steppe habitat. BMPs applied to greater sage-grouse and pygmy rabbit habitats will also benefit other sagebrush-steppe dependent species.

Sage-Grouse

Sage-grouse habitat is landscape in nature. Some populations may travel over 50 miles during their annual migration utilizing a variety of seasonal habitats. Some populations are non-migratory and remain in proximity of leks and nesting areas throughout the year. A landscape level approach to sage-grouse habitat conservation and rehabilitation is required because of the migratory nature of some sage-grouse populations. Sagebrush plants provide protection and forage to sage-grouse through the year.

Landscape Level BMPs

Paige, C. and S.A. Ritter. 1999. Birds in a Sagebrush Sea: Managing Sagebrush habitats for Bird Communities. Partners in Flight Working Group, Boise, ID.

Braun, C.E. 2006. A Blueprint for Sage-Grouse Conservation and Recovery. Grouse Inc., Tucson, AZ. Unpublished report.

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to Manage Sage Grouse Populations and Their Habitats. Wildlife Society Bulletin 28(4): 967-985.

- Sagebrush-steppe landscapes should be management for no net loss of habitat. Human-induced management disturbance should be accompanied with like-manner habitat restoration and conservation elsewhere.
- Maintain and promote large, continuous areas composed of a mosaic of sagebrush habitats. Habitats would include various-aged stands of sagebrush, wet meadows, seeps, riparian vegetation, and interspaced woodlands. Sage-grouse need several thousands acres of sagebrush habitats to maintain self-sustaining populations.
- Sagebrush steppe management should focus on maintaining large (> 1 cadastral section and preferably > 20 cadastral sections in size) blocks of sagebrush habitat per Township (36 cadastral sections).
- Sage-grouse habitats are landscape in nature and natural resource agencies and private landowners must coordinate management efforts over an entire seasonal range to be effective.
- Adaptive management based on habitat monitoring is necessary for success.
- Tools to restore habitat may include prescribed fire, grazing, herbicides, and mechanical treatments with use based on quantitative knowledge of seasonal ranges and anticipated affects. Treatments selected should be the least disruptive to vegetation and have the most rapid recovery time. Propose treatments only if monitoring warrants action. Do not carry-out actions on a schedule.
- Predator control should only occur if sage-grouse nest success is < 25%, and annual hen adult survival is < 45% because of expense. Discourage non-native predator establishment.
- Reseed former winter range with appropriate sagebrush, native grasses, and native forbs.
- Where wildlife (deer and elk) herd objectives cannot be achieved through legal hunting, reintroduction and expansion of populations of large predators should be encouraged.

Population Management

- Agencies need to identify leks and determine whether populations are migratory or non-migratory and if former determine migration routes and seasonal ranges. Lek counts are necessary for population breeding assessments.
- Wing surveys are necessary to obtain estimates of sage-grouse nesting success and juvenile:adult hen ratios. Brood counts would also provide information but are not as accurate as wing surveys.
- Routine sage-grouse population monitoring is necessary to assess trends and identify problems for populations.
- Hunting seasons and bag limits should be based on careful assessments of sage-grouse population size and trends. Hunting may be additive to other causes of mortality. Stable populations that cover large areas bag limits can be liberal. If populations are declining over three-years, bag limits should be conservative. Harvest rates should not exceed 10% of the estimated fall population. Hunting should not occur if populations are less than 300 individuals.
- Lek information should generally be confidential except for 2 to 3 for public observation in an area.

Habitat Restoration

- Landscapes targeted for vegetation treatments should be first surveyed to identify areas which meet habitat shrub and herbaceous plant cover and height requirements. Management then should identify limiting habitat factors and propose treatments to mitigate insufficiencies. Post land-use activities should ensure compliance with habitat objective goals.
- Restore degraded rangelands to provide suitable breeding habitat including mixtures of sagebrush, native forbs (especially legumes), and grasses in seeding mix. Use functional non-native equivalents if native forbs and grasses are not available.
- Where sagebrush overstory is intact but understory vegetation is degraded, use appropriate techniques to open the overstory and inter-seed with native grasses and forbs to meet habitat needs.
- Prescribed fire should not be used for habitat improvement in areas prone to invasion by invasive plants such as cheatgrass unless measures are taken to replace invasive species with perennial forbs and grasses.
- Wyoming big sagebrush breeding habitats should have only < 20% treated within a 30-year period regardless of treatments used. Additional treatments should not occur until the previously treated area again provides suitable breeding habitat. Use fire

only when it can be demonstrated that it will achieve habitat management objectives. Herbicides should be used in a manner that will minimize impacts on desirable forbs.

- Mountain big sagebrush breeding habitats should have only < 20% treated within a 20-year period regardless of treatments used. Additional treatments should not occur until the previously treated area again provides suitable breeding habitat. Herbicides should be used in a manner that will minimize impacts on desirable forbs.
- All wildland fires should be evaluated immediately after suppression to determine need for reseeding. Reseed with an appropriate mix of sagebrush, forbs and grasses.

Stand and Patch level BMPs

Braun, C.E. 2006. A Blueprint for Sage-Grouse Conservation and Recovery. Grouse Inc., Tucson, AZ. Unpublished report.

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to Manage Sage Grouse Populations and Their Habitats. Wildlife Society Bulletin 28(4): 967-985.

- Vegetation treatments should not disrupt sagebrush cover if the stand meets the needs of sage-grouse.
- Prescribed fires should be no larger than 50 acres with no more than 40% of each cadastral section being burned over a 15-year period.
- Wildfires in sagebrush steppe should be vigorously suppressed except in areas with > 50 invasive conifer trees per acre.
- Livestock grazing should be deferred for 3 years following fires for recovery of herbaceous native vegetation.
- Livestock grazing should not remove more than 25–30% of the annual growth of herbaceous vegetation with grazing delayed until after 20 June. True rest rotation systems should be used and winter grazing is preferred.
- Crested wheatgrass seedings with < 5% sagebrush canopy cover should be disked and re-seeded in 65-foot wide strips for every 325 feet with alfalfa, sweet clover, native bunchgrasses, and Wyoming or mountain sagebrush. Repeat every 3–5 years. (Note: Connelly et al. [2000]; The Wyoming Greater Sage-Grouse Working Group [2003]; Rich County Coordinated Resource Management Sage-Grouse Subcommittee [2006]; The South Central Sage-Grouse Working Group [2007] and the Wyoming Game and Fish [2008] recommended native forbs for rehabilitation purposes to the extent that appropriate seed was available.)

- Reseed cheatgrass dominated land with dryland alfalfa, sweet clover, sagebrush native bunchgrasses in 65-foot alternating strips for every 325 feet. (Note: Connelly et al. [2000]; The Wyoming Greater Sage-Grouse Working Group [2003]; Rich County Coordinated Resource Management Sage-Grouse Subcommittee [2006]; The South Central Sage-Grouse Working Group [2007] and the Wyoming Game and Fish [2008] recommended native forbs for rehabilitation purposes to the extent that appropriate seed is available.)
- Pinion and juniper invasion controlled by cutting or burning individual trees. Prescribed fire over large landscapes may destroy valuable habitat. Individual tree action preserves the grass and forb understory.
- Rangeland seedings of exotic grasses should be converted using reseeded strips of native bunchgrasses, adapted subspecies or species of sagebrush, and dryland alfalfa. (Note: Connelly et al. [2000]; The Wyoming Greater Sage-Grouse Working Group [2003]; Rich County Coordinated Resource Management Sage-Grouse Subcommittee [2006]; The South Central Sage-Grouse Working Group [2007] and the Wyoming Game and Fish [2008] recommended native forbs for rehabilitation purposes to the extent that appropriate seed is available.)
- Use of chemicals to ‘manage’ sagebrush should not be permitted. If sagebrush is to be managed to reduce density or to enhance vigor, mechanical methods are preferred. Test plots should evaluate long-term effects on sagebrush stands.
- Sage-grouse have not been shown to need open water. However, water should be allowed to flow (seep) over the ground to encourage growth of succulent forbs.
- Active leks per unit of area and total number of male sage-grouse counted at prescribed (4 counts per breeding period spaced at 7–10 day) intervals should be used as the measure of success of management treatments followed by changes in percent bare ground, forb coverage, grass cover, and sagebrush canopy cover, and height of residual herbaceous vegetation.
- Sage-grouse pellet transects should be used to measure expansion of birds into vacant or former habitat.

Breeding Habitat Management

- Breeding habitat should support 15–25% sagebrush canopy cover, perennial herbaceous cover averaging > 18 cm height with > 15% grass canopy cover and > 10% forb cover during spring.
- Sagebrush habitats are variable and therefore, shrub and herbaceous height and cover requirements may vary spatially but should still be sufficient to provide concealment from predators. Local agencies need to determine height and cover requirements that are ecologically defensible.

- Breeding habitats should be designated as high priority wildfire suppression.
- Non-migratory grouse where their habitat is distributed evenly, protection and management should consider active leks the center of year-around activity and use them as management focal points. Surrounding habitat should be managed as breeding habitat within 3.2 km of occupied leks.
- Non-migratory grouse where their habitat that is not distributed evenly, should consider active leks the center of year-around activity and use them as habitat management points. Surrounding suitable habitat should be managed as breeding habitat and be protected for up to 3 miles from active leks. Monitoring should identify nesting and brood-rearing habitats for protection.
- For migratory populations, protect breeding and nesting habitats within 11 miles of leks in a similar manner as for non-migratory birds.
- Where large-scale habitat loss (> 40% of original breeding habitat) has occurred, protect all remaining habitat from additional loss. Rehabilitate degraded habitat.
- During periods of extended drought, reduce livestock numbers and/or change livestock, wild ungulates, and wild horse management in such a way as to maintain cover requirements during nesting and brooding seasons.

Summer-late brood-rearing habitat management

- Avoid land management practices which reduce soil moisture, increase erosion, cause invasion of exotic species, and reduce forb abundance and diversity.
- Avoid removing sagebrush within 985 feet of sage-grouse foraging areas along riparian zones, meadows, lakebeds, and farmlands unless necessary to achieve habitat management actions.
- Avoid the use of highly toxic insecticides (e.g., organophosphorus and carbamate) in brooding areas (Blus et al. 1989). Use less toxic insecticides.
- Avoid affecting wet meadows and springs by developing livestock watering sources unless the project is designed to provide free water and wet meadows for sage-grouse use.
- In areas with shrub-canopy cover > than 35%, use mechanical treatments (bush beating) to create strips 15–25-feet wide to create sagebrush age-class diversity.
- Prescribed fire or herbicides may be used to create a mosaic of openings in mountain sagebrush and mixed shrub communities where shrub cover is > 35%.
- Construct water developments with escape ramps in or adjacent to sage-grouse habitat if needed.

- Modify developed springs and other water sources to restore natural free-flowing water and wet meadow habitats.

Winter Habitat Management

- Maintain habitat on a landscape scale. Sagebrush stand cover of 10–30% with heights of 10–15 inches are needed. These areas are high priority for wildfire suppression.
- Protect unburned sagebrush stands within burned areas from disturbance and manipulation.
- Protect all remaining winter habitat in areas with large scale habitat loss (40% of original winter habitat).
- Reseed former winter range with appropriate sagebrush, grasses, and forbs.
- Prescribed fire should not be larger than 50 acres and only burn < 20% of habitat within any 20–30 year period.

Facility Construction within Sage-Grouse Landscapes

The Wyoming Greater Sage-Grouse Working Group. 2003. Wyoming Greater Sage-Grouse Conservation Plan. Unpublished report.

The Upper Green River Basin Sage-Grouse Working Group. 2007. Upper Green River Basin Sage-Grouse Conservation Plan. Unpublished report.

Rich County Coordinated Resource Management Sage-Grouse Subcommittee. 2006 Rich County Greater Sage-Grouse (*Centrocercus urophasianus*) Local Conservation Plan. Utah State University Extension And Jack H. Berryman Institute and Utah Division of Wildlife Resources, Salt Lake City, Utah. Unpublished Report.

The South Central Sage-Grouse Working Group. 2007. South Central Sage-Grouse Conservation Plan. Unpublished Report.

Braun, C.E. 2006. A Blueprint for Sage-Grouse Conservation and Recovery. Grouse Inc., Tucson, AZ. Unpublished report.

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to Manage Sage Grouse Populations and Their Habitats. Wildlife Society Bulletin 28(4): 967-985.

Wyoming Game and Fish. 2008. Best Management Practices. <http://gf.state.wy.us/wildlife/nongame/LIP/BestMgmtPractices/index.asp>

- Place structures and other developments as to minimize habitat fragmentation. Use currently disturbed areas and cluster structures as possible. Avoid leks and brood-rearing habitat.
- Avoid facilities in sensitive habitats such as leks, brood-rearing habitat and winter habitat. Disturb the smallest area possible to meet construction needs. Avoid disrupting continuous stands of sagebrush. Use existing facilitate sites for new construction. Minimize roads and road travel.
- Develop a plan to located structures >3.3 miles from active leks and brood-rearing habitat. Human activity should be avoided in early mornings and late evening when leks are active.
- Avoid tall structures such as powerlines that provide perch sites for raptors within 3 km of seasonal habitats. If tall structures are necessary and for existing structures use appropriate means to prevent raptor use. Construct lines in existing roads or utility corridors. Bury all lines or use fixtures to discourage raptors from perching. Un-used powerline poles should be removed.
- Develop travel management plans which would allow for seasonal closures and restrict vehicle speed in sage-grouse habitat. Avoid constructing new roads. Reclaim abandoned roads. No roads should be constructed within 3.3 miles of all active leks. Existing roads within 3.3 miles of active leks should have seasonal closures between March 1–June 20. Primary and secondary roads are problematic because of high vehicle use and high speeds. Reduce approved vehicle speed as necessary. Prohibit off-road vehicle travel.
- Only construct fences which are needed and make as visible as possible using permanent flagging on the top wire. Fences should have only 3 stands with the top and bottom being barbless wires. Metal fence posts are better than wood posts as they discourage raptor perching. Remove fences that are not needed.
- Minimize noise during breeding and brood-rearing seasons. To minimize the effects of continuous noise on bird populations, reduce noise levels to 49 dBA or less, particularly during the bird nesting season. Constant noise generators should be located far enough away from sensitive habitats such as grouse leks that the noise which reaches those habitats is less than 49 dBA.
- Contain dust from roads and other areas during sage-grouse seasonal habitats.
- Consider appropriate off-site seasonal habitat mitigation to off-set project-site construction impacts.
- Use soil-conserving practices. Stockpile topsoil for reclamation purposes. Use appropriate means to minimize wind and water erosion.

- Reclaim disturbed areas as soon as possible. Avoid planting monocultures. Carefully plan for a complex of vegetation that reflects the diversity of plant species and habitats in the surrounding area. Reseed with local genetic seed stock, if available, and avoid using nonnative plant species that compete with native species. Provide topography similar to the surrounding area to provide microsites that promote a mosaic pattern. Seed mixtures should include sagebrush (proper taxon), and native grasses and forbs.
- Develop an integrated weed management plan to abate noxious weeds and invasive plants.

Pygmy Rabbit

Pygmy rabbits are habitat specialized in that they require adequate sagebrush cover and suitable soil for burrowing. Pygmy rabbit populations are functional from the patch to stand level in spatial extent. Sagebrush plants provide protection and forage to pygmy rabbit throughout the year. Deep, sandy loam soils are necessary for burrowing.

Pygmy Rabbit Habitat Management

Chapman, J. A., J. E. C. Flux, A. T. Smith, D. J. Bell, G. G. Ceballos, K. R. Dixon, F. C. Dobler, N. A. Formozov, R. K. Ghose, W. L. R. Oliver, T. Robinson, E. Schneider, S. N. Stuart, K. Sugimurua, and Z. Changlin. 1990. Chapter 14: Conservation action needed for rabbits, hares and pikas. Pp 154–167 in J. A. Chapman and J. E. C. Flux (editors), Rabbits, hares and pikas[:] status survey and conservation action plan. International Union for Conservation of Nature and Natural Resources, Gland, Switzerland. Iv + 168 pp.

Larrucea, E.S. 2007. Distribution, Behavior, and Habitat Preferences of the Pygmy Rabbit (*Brachylagus idahoensis*) in Nevada and California. Ph.D. Dissertation, University of Nevada, Reno.

Oliver, G.V. 2004 Status of the Pygmy Rabbit (*Brachyulagus idahoensis*) in Utah. Unpublished report, Utah Natural Heritage Program, Utah Division of Wildlife Resources, Salt Lake City, Utah.

Washington Department of Fish and Wildlife. 1995. Washington state recovery plan for the pygmy rabbit. Wildlife Management Program, Washington Department of Fish and Wildlife, Olympia, 73pp.

- Habitat decline has resulted from habitat fragmentation and decline of suitable sagebrush cover from urbanization, agriculture, livestock grazing, invasive weeds, and improper wildland fire management. Habitat preservation is critical as the rabbit has a narrow niche almost exclusively dominated with big sagebrush with having deep soils. Important secondary shrubs are bitterbrush, rabbitbrush, and threetip sagebrush.

- Mapping of habits and populations is important to conservation because it helps to predict areas where the species may occur, either currently or in the future.
- Manage habitat to increase pygmy rabbit abundance and distribution. Enhance areas with existing populations to increase numbers. Expand habitats attributes outward from existing habitats. Management prime habit to reduce potential for harm by fire, livestock, hunting, and other activities. Determine the amount of habitat needed to support recovery of populations. Create areas suitable for habitat through proper restoration/rehabilitation. Develop corridors to connect populations.
- Maintain and protect habitat with mean sagebrush height of 34 inches, average cover of 32%, and average soil depth of 20 inches. High use areas have tall, dense shrub cover with thick canopy cover. Basin big sagebrush is critical.
- Rabbits spend much time within 100 feet of a burrow, especially during winter. Will venture up to 1650 feet from burrow. May disperse considerable distances during breeding season, moving > 2 miles.
- Forage preference is almost exclusively big sagebrush in winter months. Sagebrush also makes up large portions of diets during other months but it may also be supplemented with horsebrush, rabbitbrush, four-wing saltbrush, shadscale, snake weed, and grasses and forbs. In captivity, rabbits will eat a wide variety of plants.
- Critical habitats need protection from may need protection livestock grazing and agriculture development.
- Reduce risks and hazards for destructive wildfire. Ways to accomplish this includes fuels management including breaks and green strips, priority suppression areas, improve fire response readiness, and reduce fire risk.
- Conduct fall/winter burrow surveys to determine population trends. Examine areas know to have rabbits and also areas of potential rabbit occurrence. Identify areas that should be management as pygmy rabbit habitat. Monitor habitat conditions.
- Manage predators by keeping records of occurrence, numbers, and locations. Predication control may be necessary.
- Establish populations in new areas with suitable habitat using wild-caught or captive reared animals.
- Cooperate with appropriate agencies and landowners to sustain existing populations and establish new populations. Develop management plans.

Pygmy Rabbit Habitat Rehabilitation

- Sagebrush habitat needs to be restored or rehabilitated where necessary. Seedings and plant succession can be used to expand habitat of known populations and where historic populations occurred. The seeding mix should include a large proportion of big sagebrush, small mix of other shrubs, and native grasses and forbs adapted to the site.
- Habitat rehabilitation should first focus on known areas of pygmy rabbit populations. Secondary areas would be those with suitable sagebrush and soil characteristics with low population numbers. Areas with suitable soils but supporting other vegetation would be lower priority unless adjusted to occupied habitats.
- Nature preserves should be established where populations are small and fragmented. Corridors of sagebrush cover should be created to connect the preserves. Buffer areas of several acres around preserves need to be developed and maintained.
- Work cooperatively with land managers to maintain or restore habitat. Develop plans for long-term efforts.
- In areas where pygmy rabbits occur maintain, dense, tall sagebrush stands with grass understory on deep, sandy-loam soil.