THE (LEGAL) PLIGHT OF THE GREATER SAGE-GROUSE

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Greater sage-grouse are symbolic of the vast, open lands between the Rocky Mountains and the Sierra Nevada and Cascade ranges.[1] But sage-grouse are in trouble. As many as 16 million of these iconic birds once ranged across 297 million acres of sagebrush grasslands, an area of western North America so vast it is sometimes called the Sagebrush Sea.[2] Over the past 200 years, agriculture and development have reduced the bird's range by nearly half, and sage-grouse abundance has steadily declined to perhaps fewer than 50,000 birds today.[3] Scientists believe that the fate of the greater sage-grouse may be a harbinger for hundreds of other species dependent upon the West's sagebrush habitats.[4] And the sage-grouse's survival has been the focus of intense and wide-ranging legal battles for the last 16 years.

In 2002, the U.S. Fish and Wildlife Service (USFWS) received the first of several petitions asking the agency to list the greater sage-grouse as threatened or endangered under the Endangered Species Act (ESA).[5] In 2005, despite known threats to the bird's persistence, outlined by both state and federal agencies,[6] the USFWS decided that protection under the ESA was "not warranted" for the species.[7] A federal district court in Idaho reversed that finding due to improper political interference with the listing process and because the USFWS had arbitrarily ignored the best available science.[8] The court remanded the matter to the agency to make a new determination.

In 2010, the USFWS determined that ESA protection was "warranted" for greater sage-grouse because of loss and fragmentation of sagebrush habitat and the inadequacy of the various state conservation plans then in place.[9] This time, the agency relied upon a newly published monograph commissioned by the U.S. Geological Survey—*Ecology and Conservation of Greater Sage-Grouse: A Landscape Species and its Habitats*—regarding the imperiled status of the sage-grouse and its habitat. The monograph collected unprecedented new research on the bird's life history, habitat needs, and threats to its survival and recovery. Much of the new research showed that sage-grouse are affected by habitat disturbance on far greater spatial scales than previously recognized.[10]

Although the sage-grouse "warranted" protection under the ESA, the USFWS explained that an immediate listing was "precluded by higher priority" work.[11] Again conservationist groups challenged the USFWS's decision, this time securing a settlement requiring the USFWS to make a final listing decision by the end of fiscal year 2015.[12] By 2013, a team of state and federal experts described "an urgent need to 'stop the bleeding' of continued population declines and habitat losses by acting immediately to eliminate or reduce the impacts contributing to population declines and range erosion."[13]

In 2015, the Bureau of Land Management (BLM) and U.S. Forest Service unveiled a series of sweeping plans—amending 98 land-use plans across 10 western states—to protect greater sage-grouse and their sagebrush habitats on public lands throughout the West.[14] The new federal plans represented an important step forward for sage-grouse conservation and were the main factor cited by the USFWS in revising its earlier decision and determining in late 2015 that an ESA listing was now "not warranted" for the greater sage-grouse.[15] Then Secretary of the Interior Sally Jewell described the new plans as an "epic conservation effort [that] will benefit westerners and hundreds of species that call this iconic landscape home, while giving states, businesses, and communities the certainty they need to plan for sustainable economic development."[16]

The federal plans spawned a steady stream of lawsuits from industry groups and state and local governments.[17] In general, the groups were concerned that the plans place too many restrictions on activities such as oil and gas development, mining operations, and livestock grazing. Some of these plaintiffs reprised a theme that the new plans unfairly imposed top-down management from Washington, D.C., ignoring local conditions and local input.[18] In all of these lawsuits, the plaintiffs have asked the courts to enjoin implementation of and vacate the BLM's sage-grouse plans.

Concerned that this would leave the bird unprotected save for inconsistent state plans generally not binding on federal public lands, several conservation groups moved to intervene in the anti-grouse plan suits. Several other conservation groups filed their own lawsuit highlighting alleged shortcomings in the federal plans.[19] These groups argue that the plans do not adequately identify and protect priority habitats—failing, for example, to identify winter concentration areas and essential migratory corridors. The groups also point to the plans' failure to adopt larger disturbance buffers around all-important breeding areas, to impose more concrete standards for sagebrush habitat integrity, and to eliminate vegetation treatments that degrade sagebrush habitat.

For some time, Oregon was the only state whose BLM sage-grouse plan was not subject to any direct challenge in federal court. Among other reasons, BLM's plan for Oregon resulted in large measure from collaborative work undertaken by the governor of Oregon's Sage Grouse Conservation Partnership, or "SageCon."[20] The SageCon group sought to coordinate federal, state, and local efforts to address the multiple threats to sage-grouse across the eastern Oregon sagebrush landscape, while also expressly supporting community sustainability. A broad cross-section of stakeholders—including state and local governments, ranchers, landowners, conservation groups, and others—worked to create a plan that most felt was an important first step in the difficult task of saving the greater sage-grouse from extinction.

Eventually, however, not even the Oregon plan would escape challenge. Whether greater sage-grouse survive in Oregon and beyond ultimately will depend on how federal and state agencies, and the courts, address the threats to this bird's unique adaptation to the landscape in which it lives.

Sage-Grouse Ecology

The greater sage-grouse is a sagebrush "obligate," meaning it cannot survive without a healthy sagebrush ecosystem to provide its food, cover, and varying seasonal habitats year-round.[21] The bird also is described as a "landscape-scale species" because it requires vast, contiguous areas of sagebrush for long-term persistence.[22] Because of the region's harsh and arid conditions and the bird's reliance on different features of the land at different times of the year, home or migratory ranges for sage-grouse can span up to hundreds of square miles.[23]

The sage-grouse's life cycle revolves around the seasons. In the early spring, sage-grouse breed in relatively open sites of low grasses called "leks." The males perform an eye-catching courtship dance, which involves spreading their spiked tail feathers and then inflating brightly colored air sacs on their chest, generating a popping sound that can be heard from nearly two miles away.[24] Like salmon returning from the ocean to spawn in the very stream in which they hatched years before, sage-grouse faithfully attend the same leks year after year.[25]

Sage-grouse hens then disperse to nest, some traveling more than 12 miles from the lek. They nest under taller stands of sagebrush, which are vital both as food sources and for concealment from predators. After chicks hatch in May, they eat flowering plants and insects throughout the early brood-rearing period. As the summer progresses and conditions become hotter and drier, sage-grouse move from sagebrush uplands to lower, wetter sites like natural springs and wet meadows. By the late-summer and fall, as other plants and grasses wither or are consumed by other creatures, sage-grouse shift their diet entirely to sagebrush.[26]

The birds continue to depend on sagebrush throughout the winter for both food and cover. They select winter sagebrush stands based on topography and the availability of sagebrush protruding from the snow.[27] At high-elevation sites—where deep snow might otherwise bury sagebrush and preclude over-wintering—sage-grouse seek out windswept ridges where high winds prevent heavy snow accumulation, leaving sagebrush exposed.[28] Sage-grouse typically live between three and six years, but researchers have recorded individuals up to nine years of age.[29]

Importantly, the birds not only move among these seasonal habitats centered around leks, but also migrate across so-called "connectivity corridors" to reach neighboring areas of habitat they need to survive.[30] Migration across these corridors allows local sage-grouse populations to intermix—which is key to promoting genetic diversity and protecting against inbreeding that is detrimental to the species's survival.[31]

Scientists have identified two remaining strongholds of contiguous sagebrush habitat left in North America—one centered on the area where southeastern Oregon, southwestern Idaho, and northern Nevada meet, and a second centered on southern Wyoming.[32] The USFWS has explained that, like maintaining habitat connectivity, conservation of these stronghold areas is "essential for the long-term persistence of greater sage-grouse."[33]

Recent studies have confirmed this. Consider, for example, the sage-grouse that live on Steens Mountain deep in southeastern Oregon's high desert. Nearly 10,000 feet high and 60 miles long, this massive fault-block mountain is part of an expansive landscape punctuated by the high mountains, broad valleys, and desert playas that characterize the Great Basin. Steens Mountain's precipitous eastern escarpment towers more than a mile above the prehistoric playa of the Alvord Desert. Less than a million years ago, alpine glaciers on top of the Steens carved dramatic gorges thousands of feet deep.[34]

The greater sage-grouse on Steens Mountain belong to the biologically defined Western Great Basin population, one of the most important core populations within the species' western stronghold.[35] The 2011 sage-grouse monograph contained an unprecedented population viability analysis that showed a 100 percent probability that this population will decline below 500 birds—the minimum size to maintain population viability—in just 100 years if the lands' carrying capacity continues to decline.[36]

An update of this research in 2015 concluded that the Western Great Basin population had an estimated minimum population size of just 1,934 males—a 69 percent decline from the reconstructed estimate of 6,327 males based on 2007 surveys.[37] The intervening years showed a decline to "abundances lower than ever observed before and approximately 16 percent of average values close to 11,765 males counted in the 1970s and 1980s."[38] The authors bluntly described the Western Great Basin population as experiencing "an extinction vortex."[39]

Unfortunately, this is not an uncommon story. In its annual monitoring report in 2017, the Oregon Department of Fish and Wildlife (ODFW) concluded that sage-grouse populations throughout Oregon continue to decline.[40] The state agency estimated that the 2017 spring population in Oregon was 20,510 individuals. This was a 7.7 percent decline from 2016, and the 2017 population remained 30 percent below the 2003 baseline population estimate of 29,237 individuals.[41] Other states have reported similar declines.[42]

Threats to the Sage-Grouse

The sagebrush ecosystem is among the most vulnerable in North America.[43] The sage-grouse is in danger of extinction from fragmentation and loss of its sagebrush habitat and increasing isolation of populations due to human activities, including livestock grazing, energy development and transmission, and ever-expanding motorized transportation networks.[44] Fragmentation takes many forms, from habitat conversion (e.g., elimination of food and cover as weeds spread and replace sagebrush), to wildfires and livestock grazing, to construction of roads, fences, power lines, energy facilities, and other human developments.[45] Any land use that subdivides blocks of intact sagebrush causes fragmentation.[46]

Livestock grazing, for example, is one of the most ubiquitous threats to the sage-grouse.[47] Grazing cattle consume native plants, trample and destroy soils and fragile spring and riparian areas, and increase the spread of sagebrush-replacing weeds.[48] Cattle grazing in nesting areas during the April-May nesting season can cause sage-grouse hens to abandon their nests.[49] The infrastructure of watering systems and barbed wire fencing needed to manage large herds of cattle in the desert also fragment and destroy sagebrush habitat, artificially concentrating cattle in important sage-grouse habitat areas, dewatering natural springs and water courses, and creating thousands of potential breeding grounds for West Nile virus-carrying mosquitoes as water stagnates in reservoirs, troughs, and even cattle hoofprints.[50] The virus is 100 percent fatal to sage-grouse.[51]

Energy facilities and the power lines needed to transmit electricity to the grid also harm the sage-grouse. According to the USFWS, power lines directly affect the birds "by posing a collision and electrocution hazard, and can have indirect effects by decreasing lek recruitment, increasing predation, fragmenting habitat, and facilitating the invasion of exotic annual plants."[52] Power poles afford perches for raptors and ravens that "increase a raptor's range of vision, allow for greater speed during attacks on prey, and serve as territorial markers."[53] In the sagebrush sea, where natural perches are limited in areas of relatively low, desert vegetation, raptors are quick to populate new stretches of power lines.[54]

Indeed, whether predators actually move into a developed area, and even where healthy sagebrush remains intact around project infrastructure, these types of human activities will result in a "functional" fragmentation and loss of habitat. This is because sage-grouse exhibit strong avoidance behavior toward vertical structures such as power lines or wind turbines.[55] Scientists believe sage-grouse avoid these structures instinctively because the birds know they may provide perches and hunting corridors for predators.[56] The USFWS has concluded that power lines are "a particularly strong barrier to movement."[57]

Finally, fire is a chief factor associated with sage-grouse declines because it kills many of the sagebrush ecosystem's native plants and recovery requires many decades.[58] It is one of the most significant predictors of whether sage-grouse will abandon their ancestral breeding areas. Studies show that sage-grouse are likely to abandon leks as far as an astounding 33.5 miles from areas that have burned.[59] Thus, even "small increases" in area burned have a "large influence on the probability of lek abandonment."[60] The frequency and intensity of wildfires in the West has increased dramatically in recent decades in response to many factors (and is exacerbated by Earth's changing climate)—for example, the invasion of exotic annual grasses such as cheatgrass, which out-compete sagebrush and other native plants and burn easily.[61]

Sage-Grouse Conservation

One of the great challenges of sage-grouse conservation is to understand and protect not only the seasonal habitat areas the bird needs to survive and reproduce each year—lek sites and nesting, brood-rearing, and over-wintering habitats—but also the bird's migratory and population-level movements.[62] Loss of connectivity between neighboring populations increases population isolation and, therefore, "the probability of loss of genetic diversity and extirpation from stochastic events" such as wildfire or drought.[63] Scientists understand that protecting core regions and maintaining genetic connectivity with more isolated sage-grouse populations "may help reverse or stabilize the processes of range contraction and isolation that have resulted in long-term population declines."[64]

Experts at the U.S. Geological Survey determined that populations centered around leks within 11 miles of each other are biologically connected.[65] They discovered that even small disruptions in lek connectivity resulted in "large increases" in probability of lek abandonment.[66] Ultimately, the scientists concluded that maintaining connectivity is "essential for sage-grouse persistence."[67]

Some state wildlife agencies have built upon that research. For example, the ODFW based its state-level conservation plan for greater sage-grouse on what it described as a "core areas" framework.[68] Similar to the U.S. Geological Survey's work, the ODFW drew circles around lek sites in order to identify statistically significant areas of sage-grouse habitat in Oregon. These are the "areas of greatest biological importance to the persistence [of] sage-grouse populations."[69] By identifying the most important breeding areas, the core areas approach allows land managers "to map and analyze the risks and necessary conservation measures" for each core area.[70]

But the agency recognized that the core areas approach tells only part of the story. The ODFW's research showed that this approach, focused solely on local populations' breeding areas, does not capture the sage-grouse's distinct winter habitat areas, or the corridors used by neighboring populations to intermix.[71] Thus, the agency also developed a complimentary approach focusing on "connectivity corridors" that link local and regional sage-grouse populations.[72] The agency identified just eight corridors in all of eastern Oregon.[73]

These corridors are among the places that the USFWS has described as "large areas of relatively unfragmented sage-dominated landscapes which are important for maintaining long-term connectivity" between sage-grouse populations.[74] According to the Department of the Interior's (DOI) National Technical Team, connectivity corridors (along with winter concentration areas) are among the "priority habitats" that "have the highest conservation value to maintaining or increasing sage-grouse populations."[75] Ultimately, protecting these areas is crucial for sage-grouse to continue moving easily in response to disturbances such as wildfire, disease, or the spread of invasive plant

species that can overwhelm the sagebrush ecosystem.[76]

Revisiting the 2015 Sage-Grouse Plans

Given the complexities of the sage-grouse's habitat requirements and the vast geography and mixed ownership of the landscapes where the bird lives, it is no surprise that building a rangewide conservation plan is no easy—and certainly no uncontroversial—task.

In June 2017, new Secretary of the Interior Ryan Zinke issued an order directing the DOI to "review" the federal sage-grouse plans approved just two years earlier.[77] A departmental review team issued a report, commonly referred to as the "Zinke Report," identifying a series of short- and long-term options to generally weaken or remove protections or processes established in the 2015 plan amendments.[78] And, in October 2017, the BLM published a notice of intent to reopen the public comment period and then again amend greater sage-grouse conservation measures in land-use plans across the West.[79]

Now, aside from the state of Idaho's lawsuit, which was dismissed for lack of standing,[80] all of the challenges to the 2015 plan amendments are stayed while the DOI embarks on this new round of environmental review. Indeed, even before the end of the first public comment period, the anti-plan amendment plaintiffs already gained significant rollbacks from the 2015 plans. Secretary Zinke announced in October 2017 that he was canceling a 10-million-acre mining withdrawal that had been proposed as part of BLM's 2015 decisions.[81] And in December, he rescinded several BLM policies on mitigation, including eliminating "compensatory" mitigation that would allow the agency to charge fees where, for example, an energy development would result in lost acres of habitat.[82]

There is more than a little tension between the USFWS's listing decision and the secretary's decision to revisit the plans. In its 2015 "not warranted" determination, the USFWS relied upon the habitat protections the BLM was amending into its land-use plans, including restrictions on oil and gas development and mining, disturbance caps, lek buffers, required design features intended to mitigate impacts, and a net conservation benefit mitigation standard.[83] The USFWS explained that these provisions, among others, would provide the required "adequate regulatory mechanisms" (one of the ESA listing factors) to reduce the threats of human-caused habitat disturbance on the most important remaining sage-grouse habitats.[84] Conservation groups have signaled that weakening or removing these mechanisms puts the USFWS right back to where it was in 2010—when it was left with no choice but to issue a "warranted" determination.[85]

Now, the BLM has sought additional comment on the 2015 plans' designation of Sagebrush Focal Areas, mitigation standards, lek buffers, disturbance and density caps, habitat boundaries "to reflect new information," and "reversing adaptive management responses when the BLM determines that resource conditions no longer warrant those responses."[86] The BLM also has sought comment on state-specific issues, including "whether the planning effort should occur through state-by-state amendment processes" instead of the biologically based, landscape-scale approach that generally undergirds the 2015 plans.[87]

In Oregon, for example, the Zinke Report questions whether the BLM's decision to remove livestock grazing from a handful of Research Natural Areas is consistent with the Oregon Sage-Grouse Action Plan.[88] In the BLM's sage-grouse plan for Oregon, the agency identified "key" Research Natural Areas that had been previously designated in underlying land-use plans to protect "intact representative native plant communities" and which today are recognized as being important for greater sage-grouse both for (1) their high habitat value (lying within designated Priority Habitat Management Areas and containing essential breeding, nesting, brood-rearing, foraging, breeding, or wintering habitat) and (2) their high management value, in terms of gauging plan effectiveness.[89]

The BLM stated that these areas "provide baseline vegetation information to document successional changes, to serve as areas for comparison to treated areas, and to document future vegetation shifts in the plant communities from changes in precipitation and temperature (climate change)."[90] Arguably, the only way the BLM can assess whether the resource plan amendments have been effective in conserving sage-grouse habitats and populations is to set aside key baseline areas like these in order to measure natural succession and recovery in the absence of human-caused degradation.

This is consistent with the Oregon Sage-Grouse Action Plan's emphasis on providing for "working lands" where appropriate, but steering human-caused disturbance activities away from the most important or "best of the best" habitat areas.[91] The BLM sage-grouse plan amendments explained that, on BLM-managed lands in Oregon, 12,083,622 acres will continue to be available for livestock grazing in greater sage-grouse habitat, while just 22,765 acres is unavailable to grazing in key Research Natural Areas.[92] This extraordinarily modest initial withdrawal of areas available to grazing is critical to an environmental baseline against which BLM can assess whether the new sage-grouse conservation plan is working.

Looking Ahead

Just how dramatically Secretary Zinke decides to revise the federal plans for greater sage-grouse remains to be seen—as is the willingness of local BLM offices to continue implementing the existing plans unless and until they are amended. It seems certain that legal action will continue to play a pivotal role as conservation, industry, state and local government, and other interests continue to jockey for often incompatible objectives. Concurrent with its sage-grouse plan revisions, BLM also has announced two wide-ranging proposals to study the use of fuel breaks, fuels reduction, and rangeland restoration actions to restore sagebrush habitats throughout the West. The year 2020 looms as potentially significant for the bird. That is when the USFWS will undertake a formal status review of the species to assess whether the 2015 plans (as amended) are working—if indeed they are still in place.[94] That also happens to be the next presidential election year. ⊙

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Endnotes

[1]Steven T. Knick & John W. Connelly, *Greater Sage-Grouse and Sagebrush: An Introduction to the Landscape*, *in* Greater Sage-

Grouse: Ecology and Conservation of a Landscape Species and its Habitats 1, 1 (Steven T. Knick & John W. Connelly eds., 2011).

[2]12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocerus urophasianus*) as Threatened or Endangered, 75 Fed. Reg. 13,910, 13,920-21 (Mar. 23, 2010); *see also The Sagebrush Sea*, PBS (May 19, 2015), *available at* http://www.pbs.org/wnet/nature/sagebrush-sea-about/12170.

[3]Edward O. Garton et al., Greater Sage-Grouse Population Dynamics and Probability of Persistence 21 & Fig. 8 (Mar. 18, 2015), http://www.pewtrusts.org/~/media/Assets/2015/04/Garton-et-al-2015-Greater-SageGrouse-Population-Dynamics-and-Persistence-31815.pdf (current rangewide population estimates based on reconstructing most recent data from each state in the range of the greater sage-grouse); *see also* 75 Fed. Reg. at 13,917-23 (USFWS's 2010 estimate of about 535,000 birds left rangewide).

[4]Steven E. Hanser & Steven T. Knick, *Greater Sage-Grouse as an Umbrella Species for Shrubland Passerine Birds: A Multiscale Assessment*, *in* Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats 475, 476-77 (Steven T. Knick & John W. Connelly eds., 2011) (discussing sage-grouse as an "umbrella species" for purposes of developing conservation measures that can benefit other species).

[5]*See* 75 Fed. Reg. at 13,910.

[6]*See, e.g.*, John W. Connelly et al., Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (2004), *available at* https://wdfw.wa.gov/publications/01118.

[7]12-Month Finding for Petitions to List the Greater Sage-Grouse as Threatened or Endangered, 70 Fed. Reg. 2244 (Jan. 12, 2005). In determining whether a species should be listed as threatened or endangered, the USFWS evaluates five factors. 16 U.S.C. § 1533 (a)(1) (listing (1) the "present or threatened destruction, modification, or curtailment" of the species' habitat or range; (2) "overutilization for commercial, recreational, scientific, or educational purposes"; (3) "disease or predation"; (4) "inadequacy of existing regulatory mechanisms"; and (5) "other natural or manmade factors affecting its continued existence").

[8]*W. Watersheds Proj. v. U.S. Fish & Wildlife Serv.*, 535 F. Supp. 2d 1173 (D. Idaho 2007).

[9]75 Fed. Reg. at 13,910; *see also Oregon Nat. Desert Ass'n v. Jewell*, 840 F.3d 562, 565-66 (9th Cir. 2016).

[10]Knick & Connelly, *supra* note 1, at 2.

[11]75 Fed. Reg. at 13,910.

[12]*In Re Endangered Species Act Section 4 Deadline Litigation - MDL No. 2165*, No. 1:10-mc-00377-E65 (D.D.C. July 12, 2011) (Dkt # 42-1).

[13]U.S. Fish & Wildlife Serv., Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report (2013), http://www.sagegrouseinitiative.com/wp-content/uploads/2013/07/USFWS_ConservationObjectives-report.pdf.

[14]This article focuses on the BLM plans because that agency manages almost half of the land currently occupied by greater sage-grouse—and more than three-quarters of the bird's range on federally managed public lands—with smaller portions managed or owned by tribes, states, the U.S. Forest Service and other federal agencies, and private landowners. *See* 12-Month Findings on a Petition to List Greater Sage-Grouse (*Centrocerus urophasianus*) as an Endangered or Threatened Species, 80 Fed. Reg. 59,858, 59,866 (Oct. 2, 2015).

[15]*Id*. at 59,871, 59,887.

[16]Press Release, U.S. Fish & Wildlife Serv., Historic Conservation Campaign Protects Greater Sage-Grouse (Sept. 22, 2015), https://www.fws.gov/news/ShowNews.cfm?ref=historic-conservation-campaign-protects-greater-sage-grouse-&_ID=35237.

[17]*Cahill Ranches Inc. v. BLM*, No. 1:17-cv-960-CL (D. Or. filed June 19, 2017); *Bd. Of Cnty. Commr's of the Cnty. Of Garfield, Colo. V. Zinke*, No. 1:17-cv-01199-WYD (D. Colo, filed May 15, 2017); *Harney Soil & Water Conservation Dist. v. U.S. Dep't of the Interior*, No. 1:16-cv-2400-EGS (D.D.C. filed Dec. 7, 2016); *W. Energy Alliance v. U.S. Dep't of Interior*, No. 16-cv-112 (D.N.D. filed May 12, 2016); *Am. Exploration & Mining Ass'n v. U.S. Dep't of the Interior*, No. 16-cv-737 (D.D.C. filed Apr. 19, 2016); *Wyo. Coalition of Local Gov'ts v. U.S. Dep't of Interior*, No. 2:16-cv-41 (D. Wyo. filed Mar. 1, 2016); *Herbert v. Jewell*, No. 2:16-cv-101 (D. Utah filed Feb. 4, 2016); *Wyo. Stock Growers Ass'n v. U.S. Dep't of Interior*, No. 2:15-cv-181 (D. Wyo. filed Oct. 14, 2015); *Otter v. Jewell*, No. 1:15-cv-1566 (D.D.C. filed Sept. 25, 2015); *W. Exploration, LLC v. U.S. Dep't of the Interior*, No. 3:15-cv-491 (D. Nev. filed Sept. 23, 2015).

[18]*See, e.g.*, *Cahill Ranches*, No. 1:17-cv-960-CL, Dkt # 1, ¶ 1 (June 19, 2017) ("This is a classic case in which a federal agency, driven by pressure to make a decision at a national level, ignores a decision by the same agency at the local level on the same matter…. The headquarters' decision was made without any apparent consideration of the local allotment-level decision, the localized facts supporting the local decision, and without any explanation that supports the reversal of position.").

[19]*W. Watersheds Proj. v. Schneider*, No. 1:16-cv-00083-BLW (D. Idaho filed Feb. 25, 2016).

[20]*See Sage-Grouse Conservation Partnership (SageCon)*, Oregon Solutions, http://orsolutions.org/osproject/sagecon (last visited Mar. 31, 2018).

[21]Clait Braun et al., *Seasonal Habitat Requirements for Sage-Grouse: Spring, Summer, Fall, and Winter*, USDA Forest Serv. Proceedings RMRS-P-38 38-40 (2005); John W. Connelly et al., *Characteristics of Greater Sage-Grouse Habitats: A Landscape Species at Micro- and Macroscales*, *in* Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats 69, 69 (Steven T. Knick & John W. Connelly eds., 2011); *see also W. Watersheds Proj. v. Salazar*, 843 F. Supp. 2d 1105, 1111-12 (D. Idaho 2012) (describing sage-grouse life history and habitat characteristics).

[22]75 Fed. Reg. at 13,957.

[23]75 Fed. Reg. at 13,916.

[24]*See Body-Popping sage Grouse—Nature's Greatest Dancers: Episode 1 Preview—BBC One,* YouTube (June 26, 2015), https://youtu.be/cLnbiTkj1TQ (video of the renowned sage-grouse courtship dance).

[25]John W. Connelly, C.A. Hagen & M.A. Schroeder, *Characteristics and Dynamics of Greater Sage-Grouse Populations*, *in* Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats 53, 60 (Steven T. Knick & John W. Connelly eds., 2011).

[26]Braun et al., *supra* note 21, at 38-40; Connelly et al., *supra* note 25, at 71-80; 75 Fed. Reg. at 13,915-16.

[27]Braun et al., *supra* note 21, at 40; Connelly et al., *supra* note 25, at 79-80.

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[28]Christian A. Hagen, Greater Sage-grouse Conservation Assessment and Strategy for Oregon: A plan to maintain and enhance populations and habitat 10, 47, 52-53, 184 (2011), *available at* http://www.dfw.state.or.us/wildlife/sagegrouse; Connelly et al., *supra* note 25, at 79-80.

[29]75 Fed. Reg. at 13,916.

[30]Hagen, *supra* note 28, at 10; 75 Fed. Reg. at 13,923-24.

[31]Steven T. Knick & Steven E. Hanser, *Connecting Pattern and Process in Greater Sage-Grouse Populations and Sagebrush Landscapes*, *in* Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats 383, 383-405 (Steven T. Knick & John W. Connelly eds., 2011); Sara J. Oyler-McCance & Thomas W. Quinn, *Molecular Insights Into The Biology of Greater Sage-Grouse*, *in* Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats 85, 91-92 (Steven T. Knick & John W. Connelly eds., 2011) (genetic research confirming "unique genetic clusters" in neighboring "populations geographically adjacent to one another").

[32]75 Fed. Reg. at 13,918-19, 13,957-58.

[33]75 Fed. Reg. at 13,923, 13,945.

[34]*See Steens Mountain*, Bureau of Land Mgmt., https://www.blm.gov/or/districts/burns/recreation/steens-mtn.php (last visited Mar. 31, 2018).

[35]*See* Edward O. Garton et al., *Greater Sage-Grouse Population Dynamics and Probability of Persistence*, *in* Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats 293, 354-56 (Steven T. Knick & John W. Connelly eds., 2011) (describing this population); *see also* 75 Fed. Reg. at 13,919 (USFWS describing that the "Northern Great Basin Management Zone," where Steens Mountain is located, is significant because it holds "core populations" that "have the highest reported densities" of birds).

[36]*Id*.

[37]Garton et al., *supra* note 3 at 19.

[38]*Id*.

[39]*Id*.

[40]Or. Dep't of Fish & Wildlife, Oregon Greater Sage-Grouse Population Monitoring: 2017 Annual Report (Sept. 2017), http://www.dfw.state.or.us/wildlife/sagegrouse/docs/ODFW_2017_Sage-Grouse_Population_Report.pdf.

[41]*Id*. at 4-5.

[42]*See, e.g.*, *Sage Grouse Counts Likely to Decline in Coming Year*, Wyo. Game & Fish Dep't, https://wgfd.wyo.gov/News/Sage-grouse-chick-production-likely-to-decline-in (last visited Mar. 31, 2018) (Wyoming Game & Fish Department expecting decline again in 2018 based on an analysis of sage grouse wings provided by hunters); Nevada Department of Wildlife, Nevada Sage-grouse Lek Counts: Effort and Trends (Aug. 3, 2017), http://sagebrusheco.nv.gov/uploadedFiles/sagebrusheconvgov/content/Meetings/2017/2017_GSG_Lek_Counts.pdf (reporting 10 percent decline in male lek attendance between 2016 and 2017).

[43]75 Fed. Reg. at 13,916, 13,923, 13,957.

[44]80 Fed. Reg. at 59,871, 59,887.

[45]*See id*. at 59,887-928 (USFWS comprehensive review of threats to sage-grouse).

[46]*See* 75 Fed. Reg. at 13,927 (defining fragmentation as "the separation or splitting apart of previously contiguous, functional habitat components of a species").

[47]75 Fed. Reg. at 13,939-42.

[48]75 Fed. Reg. at 13,939-40, 13,942.

[49]75 Fed. Reg. at 13,940.

[50]75 Fed. Reg. at 13,941; Brett L. Walker & David E. Naugle, *West Nile Virus in Sagebrush Habitat and Impacts on Greater Sage-Grouse Populations*, *in* Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats 127, 129, 132 (Steven T. Knick & John W. Connelly eds., 2011).

[51]*See* 75 Fed. Reg. at 13,941, 13,967-68; Walker & Naugle, *supra* note 50, at 127-41.

[52]75 Fed. Reg. at 13,928.

[53]*Id*.

[54]Hagen, *supra* note 28, at 113; 75 Fed. Reg. at 13,928.

[55]75 Fed. Reg. at 13,928.

[56]*Id*. at 13,928, 13,951.

[57]*Id*. at 13,928.

[58]*Id*. at 13,931-35; William L. Baker, *Pre-Euro-American and Recent Fire in Sagebrush Ecosystems*, *in* Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and its Habitats 185, 185-201 (Steven T. Knick & John W. Connelly eds., 2011).

[59]75 Fed. Reg. at 13,931; Knick & Hanser, *supra* note 31, at 395, 403.

[60]Knick & Hanser, *supra* note 31, at 403.

[61]*See* 75 Fed. Reg. at 13,931-35;

[62]*See* Knick & Connelly, *supra* note 1, at 1-3.

[63]75 Fed. Reg. at 13,923.

[64]Knick & Hanser, *supra* note 31, at 383; *see also* 75 Fed. Reg. at 13,914 (USFWS explaining that sage-grouse "populations follow an isolation-by-distance model of restricted gene flow"—meaning "gene flow resulting from movement between neighboring populations rather than being the result of long distance movements of individuals").

[65]*See* 75 Fed. Reg. at 13,923.

[66]*Id*.

[67]*Id*.

[68]Hagen, *supra* note 28, at *x-xi*, 79-88.

[69]*Id.* at *x-xi*.

[70]*Id.* at 80.

[71]*Id.* at 81.

[72]*Id.* at 80-81.

[73]*Id.* at 95 (map at Fig. 27).

[74]75 Fed. Reg. at 13,950.

[75]National Technical Team, A Report on National Greater Sage-grouse Conservation Measures 7 (2011). Interior established and charged this team leading expert sage-grouse scientists with identifying "science-based … conservation measures" that are "necessary to promote sustainable sage-grouse populations, and which focus on the threats in each of the management zones." BLM, National Greater Sage-Grouse Planning Strategy, Charter (2011).

[76]*See* Michele R. Crist, S.T. Knick, & S.E. Hanser, Range-Wide Network of Priority Areas for Greater Sage-Grouse—A Design for Conserving Connected Distributions or Isolating Individual Zoos?, U.S. Geological Survey Open-File Report 2015-1158 (2015); Michele R. Crist, S.T. Knick, and S.E. Hanser, *Range-Wide Connectivity of Priority Areas for Greater Sage-Grouse: Implications for Long-Term Conservation from Graph Theory*, 119 The Condor 44-57 (2017)