Sagebrush Ecosystem Program
201 Roop Street, Suite 101
Carson City, Nevada 89701
Telephone (775) 687-2000
www.sagebrusheco.nv.gov

JOE LOMBARDO

Governor

Kathleen Steele, Program Manager
Cheyenne Acevedo, Wildlife
Casey Adkins, Forestry/Wildland Fire
Sarah Hale, State Lands
Skyler Monaghan, Agriculture

STATE OF NEVADA
Sagebrush Ecosystem Program

March 26, 2025

Secretary Doug Burgum
Secretary the U.S. Department of the Interior
1849 C Street, N.W.
Washington DC 20240

Regarding: Support for USGS Sage-grouse and Sagebrush Research in Nevada.

Secretary Burgum,

The Nevada Department of Conservation and Natural Resources (DCNR) requests the continual funding and staffing for the US Geological Survey (USGS) research programs that are critical to conservation and sagebrush ecosystem restoration in Nevada. The USGS Western Ecological Research Center (WERC) and the Shrubland Alpine and Grassland Ecology (SAGE) Wildlife Research Group provide essential science that is incorporated into, specifically, the Nevada Division of Natural Heritage (NDNH) database and the Nevada Sagebrush Ecosystem Program, as well as other agencies in the state. This science informs natural resource management, responsible and efficient development and permitting, and conservation efforts statewide and informs land management decisions across our state supporting wildlife conservation, ranching, and sustainable land use.

Nevada is one of the most species-rich states in the country, with the 6th highest number of endemic species (occurring in Nevada and nowhere else), 9th highest number of animal species, 10th highest number of plant species, and 11th highest total number of species overall. It is also home to some of the largest remaining sagebrush ecosystems in the West. However, our state is 3rd highest in the U.S. for total number of species at risk of extinction, threatened by invasive species, critical habitat loss and degradation of the remaining sagebrush ecosystems, increased frequency of extreme weather events, increased drought, and increased frequency, size, and severity of wildfires, among other factors. Scientists from WERC and SAGE recognized global

experts on a number of Nevada's most at-risk species, and have been instrumental in studying the biology of the Mojave desert tortoise (Gopherus agassizii), several State-protected (NAC 527) rare plants from Clark County including Las Vegas bearpoppy (Arctomecon californica), threecorner milkvetch (Astragalus geyeri var. triquetrus), and sticky buckwheat (Eriogonum viscidulum), as well as white-margined beardtongue (Penstemon albomarginatus), which is currently being considered for listing under the Endangered Species Act. Partnering as scientific and technical advisors to the Nevada Division of Forestry, which is tasked with managing all state-protected plants, the NDNH Botany Program relies upon the science produced by USGS to understand management needs of these plant species and provide scientifically sound recommendations. Additionally, extensive USGS monitoring efforts and the insights into desert tortoise biology and ecology produced by their research have likely allowed the species to remain listed as Threatened under the Endangered Species Act rather than Endangered, a significantly more restrictive designation. USGS has also been instrumental in studying the drivers of Greater sage-grouse population trends, assessing habitat restoration effectiveness, and understanding the impacts of increasing Common Raven populations on sage-grouse nests in Nevada. Additionally, SAGE researchers are advancing critical work on pinyon jays, and other sagebrush obligate songbird species closely tied to the health of Nevada's pinyon-juniper woodlands and sagebrush ecosystems. Their research helps guide conservation strategies for these declining species and the ecosystems that they depend on.

USGS research on these species, and on wildlife and ecosystems statewide, also supports conservation, restoration and mitigation measures incorporated into both the Clark County Multi-Species Habitat Conservation Plan (MSHCP), and the Nevada State Wildlife action plan, which were developed and are executed in collaboration with NDNH. These plans provide frameworks for the Nevada Department of Wildlife and Clark County Desert Conservation Program (DCP) to safeguard Nevada's natural heritage by managing healthy wildlife habitat and species-rich ecosystems, while also meeting the recreational, economic and development needs of the growing state population. Research and monitoring conducted by USGS, NDOW, DCP, and others in fulfillment of these plans in turn provides information to the NDNH database that informs streamlined, scientifically sound land use and permitting decisions.

The Nevada SEP is also heavily reliant on USGS science, decision-support tools, and predictive models to inform conservation and management strategies for Adaptive Management and the Conservation Credit System (CCS). Almost $130,000 (55%) of the Program's annual budget goes directly to funding research conducted by these USGS groups, demonstrating how essential their work and on-going updates are to the SEP. The Nevada Greater Sage-grouse Conservation Plan (State Plan) mandates an annual Adaptive Management process that can only be completed using information and models provided by USGS on that annual basis.

Key tools developed, maintained, or in progress to enhance and directly support the SEP and other state agencies by USGS include:

- Maps and models critical within the Conservation Credit System's Mitigation process. These are to be updated by USGS through regular maintenance.
    - <u>Habitat Suitability Indices</u>,
    - <u>Abundance and Space Use Index</u>
    - 2015 and 2024 <u>Greater Sage-grouse Habitat Management Area Maps</u>
    - <u>Pinyon-Juniper Map</u>
    - <u>Annual Invasive Grass Map</u>
- Trigger & Annual Warning System/Tool
    - Identifies early warning signs for ecosystem threats.
    - <u>This tool is required in our State Plan for Greater Sage-grouse and updated by USGS on a yearly basis.</u>
- Topographic Impedance Model
    - Assesses how noise and light pollution are limited by topography, helping refine mitigation obligations for development projects, and guide project placement to areas with less impact on wildlife.
- Anthropogenic Disturbance Tool
    - Models how development projects impact wildlife populations, allowing proponents to proactively adjust footprints to minimize effects without repeatedly rerunning CCS tools.
    - This streamlines permitting and mitigation, freeing up staff time by automating impact estimates and optimizing resource allocation.
- Conservation Planning Tool
    - Supports land-use decision-making and conservation prioritization.
    - Shows the time lag and long-term benefit to various conservation actions in given areas
- Grazing Tool
    - Helps evaluate the effects of livestock grazing in sagebrush habitat.
    - Additionally, the final plan developed in this tool can be uploaded into virtual fencing software to actually implement seamlessly.
- SMART Tool
    - Enhances conservation and restoration planning.
- Prioritizing Restoration of Sagebrush Ecosystems Tool (PReSET)
    - Generates maps that highlight the best areas for restoration and conservation efforts, tailored to specific management goals such as improving habitat connectivity or protecting sagebrush areas that can withstand drought.

- Conifer Removal Tool
  - Directs proponents toward economically feasible restoration projects.
- INHABIT
  - A web-based tool for invasive plant management across the sagebrush biome.
- Predicting Sagebrush Recovery Across the Sage-grouse Range
  - Uses remotely sensed vegetation data and landscape models to assess how sagebrush ecosystems recover after disturbances like wildfire, invasive species spread, and land use changes.
  - This tool helps land managers prioritize restoration efforts by identifying areas with the highest potential for natural recovery and those needing intervention.
- Economic Assessment of Annual Invasive Grass Treatments
  - Evaluates cost-effectiveness of managing cheatgrass and other invasives.
- Assessing Vegetation & Avian Community Response to Juniper Removal –
  - An effective framework to prioritize restoration locations to achieve multi-species benefits across ecosystems.
- Effects of Indaziflam on Invasive Annual Grasses
  - Examines herbicide effectiveness in grassland restoration.
- Evaluating Potential Vectors for Annual Grass Invasion
  - Identifies pathways of invasive species spread.
- Assessing Proliferation & Connectivity of Invasives
  - Improves landscape-level invasive species management.
- Modeling Songbird Density-Habitat Relationships
  - Predicts habitat quality and population trends for 12 sagebrush obligate songbirds.
- Developing Searchable Annotated Bibliographies
  - Helps resource managers access key research.
- Creating Range-Wide Predictive Maps of Greater Sage-Grouse
  - Supports habitat prioritization and conservation efforts.
- Assessing Invasive Annual Grass Treatment Efficacy
  - Evaluates the success of control efforts across the sagebrush biome.
- Mapping Wild Horse Densities
  - Provides data on horse populations across western landscapes.
- Wild Horse & Livestock Impacts on Vegetation & Wildlife
  - Helps refine Appropriate Management Levels (AMLs) for rangeland sustainability.

Without participation by the USGS, the State would lack vital data to help support the NDNH database and critical natural resource management efforts. These USGS-supported tools and research initiatives are also vital to the SEP, which depends on data-driven decision-making for

habitat conservation, land management, and policy development. Many of these tools allow the state to assist industry with reducing their debit obligations or increase their minimization measures by specifying what aspects of the project are causing impact to Greater Sage-grouse and researching or modeling how to reduce those impacts. Other tools assist with modeling the best conservation practices and locations, allowing the state to maximize efforts on the ground instead of throwing money at something that will either recover on its own or is doomed to fail. These same tools benefit ranchers, giving them ways to proactively improve their land for the shared use of their cattle and wildlife. Eliminating these research positions would significantly hinder federal, state, and private stakeholders working to maintain healthy sagebrush ecosystems and avoid further regulatory challenges. Without the scientific expertise and technical capabilities of USGS researchers, the data and decision-support tools relied on by the state agencies will become outdated, severely liming the ability of land managers, conservation groups, and industry partners to make informed decisions about Nevada's public lands and wildlife.

We urge you to advocate for continued funding of USGS sage-grouse and sagebrush research programs for the benefit of Nevada, particularly the work conducted through WERC and SAGE. Continued investment in this science is essential to ensuring the long-term conservation of Nevada's sagebrush ecosystems, threatened or endangered populations, and associated wildlife while also supporting land use planning, restorations projects, and rangeland management. Continual availability of the best science also gives regulatory agencies as well as the States assurance that they are doing the best they can to ensure our economy flourishes for the long term, balancing the interests of all the uses of our state.

Thank you for your time and commitment to Nevada's public lands, wildlife, and sagebrush ecosystems. We appreciate your leadership on these important issues and welcome any opportunity to support efforts in securing funding for these critical research programs.

Sincerely,

CC'd: Sarah Ryker, US Geological Survey; P.O. Box 66783; Albuquerque, NM 87193; sryker@usgs.gov

An inexhaustive list of USGS literature that is relevant to the program can be found below.

Aldridge, C., and M. Boyce. 2007. Linking occurrence and fitness to persistence: Habitat-based approach for endangered Greater Sage-Grouse. Ecological Applications 17:508–26.

Atkinson, J.L., Coates, P.S., Brussee, B.E., Dwight, I.A., Ricca, M.A. and Jackson, P.J., 2021. Common ravens disrupt greater sage-grouse lekking behavior in the Great Basin, USA. Human-Wildlife Interactions, 15(3), pp.374-390.

Beck, J.L., Milligan, M.C., Smith, K.T., Street, P.A., Pratt, A.C., Kirol, C.P., Wanner, C.P., Hennig, J.D., Dinkins, J.B., Derek Scasta, J. and Coates, P.S., 2024. Free-roaming horses exceeding appropriate management levels affect multiple vital rates in greater sage-grouse. The Journal of Wildlife Management, 88(8), p.e22669.

Brussee, B.E., Coates, P.S., O'Neil, S.T., Casazza, M.L., Espinosa, S.P., Boone, J.D., Ammon, E.M., Gardner, S.C. and Delehanty, D.J., 2022. Invasion of annual grasses following wildfire corresponds to maladaptive habitat selection by a sagebrush ecosystem indicator species. Global Ecology and Conservation, 37, p.e02147.

Carpenter, J., Aldridge, C. and Boyce, M.S., 2010. Sage-Grouse habitat selection during winter in Alberta. The Journal of Wildlife Management, 74, pp.1806–1814.

Casazza, M., Coates, P. and Overton, C., 2011. Linking habitat selection and brood success in Greater Sage-Grouse. Pages 151–167 Ecology, Conservation, and Management of Grouse. University of California Press.

Coates, P.S., and Delehanty, D.J., 2010. Nest Predation of Greater Sage-Grouse in Relation to Microhabitat Factors and Predators. The Journal of Wildlife Management, 74, pp. 240–248.

Coates, P.S., Brussee, B.E., Ricca, M.A., Severson, J.P., Casazza, M.L., Gustafson, K.B., Espinosa, S.P., Gardner, S.C. and Delehanty, D.J., 2020. Spatially explicit models of seasonal habitat for greater sage-grouse at broad spatial scales: Informing areas for management in Nevada and northeastern California. Ecology and Evolution, 10, pp. 104–118.

Coates, P.S., Prochazka, B.G., Ricca, M.A., Gustafson, K.B., Ziegler, P.T. and Casazza, M.L., 2017. Pinyon and juniper encroachment into sagebrush ecosystems impacts distribution and survival of greater sage-grouse. Rangeland Ecology and Management, 70, pp. 25–38.

Coates, P.S., Connelly, J.W. and Delehanty, D.J., 2008. Predators of Greater Sage-Grouse nests identified by video monitoring. Journal of Field Ornithology, 79, pp. 421–428.

Coates, P.S., Howe, K.B., Casazza, M.L. and Delehanty, D.J., 2014. Landscape alterations influence differential habitat use of nesting buteos and ravens within sagebrush

ecosystem: implications for transmission line development. Cooper Ornithological Society, 116, pp. 341–356.

Coates, P.S., Lockyer, Z.B., Farinha, M.A., Sweeney, J.M., Johnson, V.M., Meshriy, M.G., Espinosa, S.P., Delehanty, D.J. and Casazza, M.L., 2011. Preliminary Analysis of Greater Sage-Grouse Reproduction in the Virginia Mountains of Northwestern Nevada. Page 32. Nevada Department of Wildlife, Idaho State University, U.S. Fish and Wildlife Service.

Coates, P.S., Casazza, M.L., Ricca, M.A., Brussee, B.E., Blomberg, E.J., Gustafson, K.B., Overton, C.T., Davis, D.M., Niell, L.E., Espinosa, S.P. and Gardner, S.C., 2016. Integrating spatially explicit indices of abundance and habitat quality: an applied example for greater sage-grouse management. Journal of Applied Ecology, 53(1), pp.83-95.

Coates, P.S., Milligan, M.C., Prochazka, B.G., Brussee, B.E., O'Neil, S.T., Lundblad, C.G., Webster, S.C., Weise, C.L., Mathews, S.R., Chenaille, M.P. and Aldridge, C.L., 2024. Status of greater sage-grouse in the Bi-State Distinct Population Segment—An evaluation of population trends, habitat selection, and efficacy of conservation actions (No. 2024-1030). US Geological Survey.

Coates, P.S., O'Neil, S.T., Brussee, B.E., Ricca, M.A., Jackson, P.J., Dinkins, J.B., Howe, K.B., Moser, A.M., Foster, L.J. and Delehanty, D.J., 2020. Broad-scale impacts of an invasive native predator on a sensitive native prey species within the shifting avian community of the North American Great Basin. Biological Conservation, 243, p.108409.

Coates, P.S., O'Neil, S.T., MuÑoz, D.A., Dwight, I.A. and Tull, J.C., 2021. Sage-grouse population dynamics are adversely affected by overabundant feral horses. The Journal of Wildlife Management, 85(6), pp.1132-1149.

Coates, P.S., Prochazka, B.G., Webster, S.C., Weise, C.L., Aldridge, C.L., O'Donnell, M.S., Wiechman, L., Doherty, K.E. and Tull, J.C., 2024. Cooperative conservation actions improve sage-grouse population performance within the bi-state distinct population segment. Rangeland Ecology & Management, 97, pp.135-145.

Condon, L.A., Bradford, J.B. and Coates, P.S., 2024. Biological soil crusts are more prevalent in warmer and drier environments within the Great Basin ecoregion: implications for managing annual grass invasion. Restoration Ecology, 32(6), p.e14150.

Copeland, S.M., Condon, L.A., Rosentreter, R., Miller, J.E. and Kahn-Abrams, M., 2023. Biocrusts indicators of livestock grazing effects on soil stability in sagebrush steppe: a case study from a long-term experiment in the northern Great Basin. Rangeland Ecology & Management, 91, pp.82-86.

Dettenmaier, S.J., Coates, P.S., Roth, C.L., Webster, S.C., O'Neil, S.T., Holcomb, K.L., Tull, J.C. and Jackson, P.J., 2021. SMaRT: a science-based tiered framework for common ravens. Human-Wildlife Interactions, 15(3), pp.575-597.December 31, 2021

Doherty, K.E., Maestas, J., Remington, T., Naugle, D.E., Boyd, C., Wiechman, L., Bedrosian, G., Cahill, M., Coates, P., Crist, M. and Holdrege, M.C., 2024. State of the sagebrush: implementing the sagebrush conservation design to save a biome. Rangeland Ecology & Management, 97, pp.1-11.

Dudley, I.F., Coates, P.S., Prochazka, B.G., Davis, D.M., Gardner, S.C. and Delehanty, D.J., 2022. Maladaptive nest-site selection and reduced nest survival in female sage-grouse following wildfire. Ecosphere, 13(12), p.e4282.

Dudley, I.F., Coates, P.S., Prochazka, B.G., O'Neil, S.T., Gardner, S. and Delehanty, D.J., 2021. Large-scale wildfire reduces population growth in a peripheral population of sage-grouse. Fire Ecology, 17, pp.1-13.

Farzan, S., Young, D.J.N., Dedrick, A.G., Hamilton, M., Porse, E.C., Coates, P.S. and Sampson, G., 2015. Western juniper management: assessing strategies for improving greater Sage-grouse habitat and rangeland productivity. Environmental Management, 56, pp. 675–683.

Heinrichs, J.A., O'Donnell, M.S., Orning, E.K., Pyke, D.A., Ricca, M.A., Coates, P.S. and Aldridge, C.L., 2024. Modeling the Potential Habitat Gained by Planting Sagebrush in Burned Landscapes. Conservation, 4, pp. 2673-7159.

Howe, K., Coates, P. and Delehanty, D., 2014. Selection of anthropogenic features and vegetation characteristics by nesting Common Ravens in the sagebrush ecosystem. Ornithological Applications, 116, pp. 35–49.

Howe, K.B. and Coates, P.S., 2015. Observations of territorial breeding common ravens caching eggs of greater sage-grouse. Journal of Fish and Wildlife Management, 6(1), pp.187-190.

Lockyer, Z.B., Coates, P.S., Casazza, M.L., Espinosa, S. and Delehanty, D.J., 2015. Nest-site selection and reproductive success of greater sage-grouse in a fire-affected habitat of northwestern Nevada. Journal of Wildlife Management, 79, pp. 785–797.

Milligan, M.C., Coates, P.S., O'Neil, S.T., Brussee, B.E., Chenaille, M.P., Friend, D., Steele, K., Small, J.R., Bowden, T.S., Kosic, A.D. and Miller, K., 2024. Greater sage-grouse habitat of Nevada and northeastern California—Integrating space use, habitat selection, and survival indices to guide areas for habitat management (No. 2024-1018). US Geological Survey.

Muñoz, D.A., Coates, P.S. and Ricca, M.A., 2021. Free-roaming horses disrupt greater sage-grouse lekking activity in the Great Basin. Journal of Arid Environments, 184, p.104304.

O'Neil, S.T., Coates, P.S., Brockman, J., Jackson, P.J., Spencer, J.O. and Williams, P.J., 2021. Inter- and intra-annual effects of lethal removal on common raven abundance in Nevada and California, USA. Human-Wildlife Interactions, 15(3), pp.479-494.

O'Donnell, M.S., Edmunds, D.R., Aldridge, C.L., Heinrichs, J.A., Coates, P.S., Prochazka, B.G. and Hanser, S.E., 2019. Designing multi-scale hierarchical monitoring frameworks for wildlife to support management: a sage-grouse case study. Ecosphere, 10(9), p.e02872.

Orning, E.K., Heinrichs, J.A., Pyke, D.A., Coates, P.S. and Aldridge, C.L., 2023. Using state-and-transition simulation models to scope post-fire success in restoring greater sage-grouse habitat. Ecological Modelling, 483, p.110396.

Prochazka, B.G., Coates, P.S., Aldridge, C.L., O'Donnell, M.S., Edmunds, D.R., Monroe, A.P., Hanser, S.E., Wiechman, L.A. and Chenaille, M.P., 2024. Range-wide population trend analysis for greater sage-grouse (Centrocercus urophasianus)—Updated 1960–2023 (No. 1190). US Geological Survey.

Prochazka, B.G., Coates, P.S., O'Neil, S.T., Espinosa, S.P. and Aldridge, C.L., 2024. Geographic principles applied to population dynamics: A spatially interpolated integrated population model. Methods in Ecology and Evolution, 15(8), pp.1394-1407.

Prochazka, B.G., Lundblad, C.G., Doherty, K.E., O'Neil, S.T., Tull, J.C., Abele, S.C., Aldridge, C.L. and Coates, P.S., 2024. Evaluating the sagebrush conservation design strategy through the performance of a sagebrush indicator species. Rangeland Ecology & Management, 97, pp.146-159.

Pyke, D.A., Shriver, R.K., Arkle, R.S., Pilliod, D.S., Aldridge, C.L., Coates, P.S., Germino, M.J., Heinrichs, J.A., Ricca, M.A. and Shaff, S.E., 2020. Postfire growth of seeded and planted big sagebrush—strategic designs for restoring greater sage-grouse nesting habitat. Restoration Ecology, 28(6), pp.1495-1504.

Roche, M.D., Saher, D.J., Buchholtz, E.K., Crist, M.R., Shinneman, D.J., Aldridge, C.L., Brussee, B.E., Coates, P.S., Weise, C.L. and Heinrichs, J.A., 2024. Ecological trade-offs associated with fuel breaks in sagebrush ecosystems. Fire Ecology, 20(1), p.107.

Roth, C.L., Coates, P.S., Gustafson, K.B., Chenaille, M.P., Ricca, M.A., Sanchez-Chopitea, E. and Casazza, M.L., 2021. A customized framework for regional classification of conifers using automated feature extraction. MethodsX, 8, p.101379.

Sanchez, C.A., Brussee, B.E., Coates, P.S., Holcomb, K.L., Harju, S.M., Shields, T.A., Vaughn, M., Prochazka, B.G., Mathews, S.R., Cornell, S. and Olson, C.V., 2021. Efficacy of manipulating reproduction of common ravens to conserve sensitive prey species: three case studies. Human-Wildlife Interactions, 15(3), pp.495-515.

Shinneman, D.J., Germino, M.J., Pilliod, D.S., Aldridge, C.L., Vaillant, N.M. and Coates, P.S., 2019. The ecological uncertainty of wildfire fuel breaks: examples from the sagebrush steppe. Frontiers in Ecology and the Environment, 17(5), pp.279-288.

Tarbox, B.C., Monroe, A.P., Jeffries, M.I., Welty, J.L., O'Donnell, M.S., Arkle, R.S., Pilliod, D.S., Coates, P.S., Heinrichs, J.A., Manier, D.J. and Aldridge, C.L., 2024. Leveraging extensive soil, vegetation, fire, and land treatment data to inform restoration across the sagebrush biome. Landscape Ecology, 39(11), pp.1-23.

Tyrrell, E.A., Coates, P.S., Prochazka, B.G., Brussee, B.E., Espinosa, S.P. and Hull, J.M., 2023. Wildfire immediately reduces nest and adult survival of greater sage-grouse. Scientific reports, 13(1), p.10970.

Webster, S.C., O'Neil, S.T., Brussee, B.E., Coates, P.S., Jackson, P.J., Tull, J.C. and Delehanty, D.J., 2021. Spatial modeling of common raven density and occurrence helps guide landscape management within Great Basin sagebrush ecosystems. Human-Wildlife Interactions, 15(3), pp.331-349.