Working Grasslands Initiative

A non-regulatory, incentive-based strategy to guide Montana Fish, Wildlife and Parks' grassland conservation efforts in partnership with private landowners and other conservation cooperators

March 17, 2017

FWP's *Working Grasslands Initiative* is a 5-year special initiative designed to retain and enhance grasslands by targeting and leveraging voluntary, incentive-based programs for private landowners. Implementation of this guide will help to achieve conservation targets identified in Montana's State Wildlife Action Plan.

Table of Contents

Introduction

Globally, grasslands are the least protected and most altered of all major plant communities. Across the Great Plains, approximately 27.2 million acres of grassland have been converted to other uses, primarily cropland between 1950 and 1990 (Claassen et al. 2011). In eastern Montana, 32% of historical native grasslands have been broken or significantly altered (Pearson and Martin 2012). Conversion of the most productive remaining grasslands in Montana continues at an average of 9,455 acres per year (USDA Farm Service Agency, unpubl. data, 2005-2009). At this rate, eastern Montana could lose an additional 280,000+ acres (7,000 mi^2) of native grasslands in the next 30 years. Concurrently, native grassland birds are suffering the steepest and most consistent decline of bird assemblages on the continent; 75% of grassland bird species are showing significant declines (Sauer et al. 2014). Birds that breed on the grasslands of the Northern Great Plains and winter in central Mexico are showing exceptionally steep declines, up to 70% loss since 1970 (North American Bird Conservation Initiative 2016). Despite ongoing grassland conversion, Montana still boasts some of the last vestiges of native prairie in the United States. Northern breeding grassland birds, such as Sprague's Pipit and Baird's Sparrow, depend on Montana's remaining intact grasslands, especially areas with higher proportions of grass at the landscape scale (Lipsey 2015). Breeding waterfowl, sharp-tailed grouse, pronghorn antelope, black-tailed prairie dog, swift fox, and other prairie wildlife species also depend on intact grass landscapes. Clearly, to conserve Montana's grassland-dependent wildlife species, it is imperative to conserve the grassland habitats on which they depend.

Montana Fish, Wildlife and Parks is poised to provide state-wide focus and coordination to grassland conservation through the implementation of Montana's State Wildlife Action Plan (SWAP; 2015). State-based action plans have been completed by state fish and wildlife agencies, in part, to help prevent future Endangered Species Act listing petitions and decisions. Montana's SWAP characterizes 20.9% (30,724 mi^2) of Montana's landscape as lowland/prairie grassland and 7.4% (10,841 mi^2) as montane grasslands. Cumulatively, over one quarter of Montana's landscape supports habitat for grassland associated wildlife species, yet these community types are identified as Tier 1 communities or Communities in Greatest Need of Conservation. There are 27 Montana Species of Concern directly associated with lowland/prairie and intermountain grasslands (Appendix A). The intent of this strategy is to provide targeted guidance for implementing SWAP objectives and strategies for these particular community types and assessing the success of these actions. Most of the guidance for crafting this strategy is based on research from prairie breeding bird species (e.g., passerines, grouse, waterfowl) because landscape-scale habitat requirements of these species make them likely surrogates for other prairie species (e.g., Great Plains toad, shrews, bats, and snakes). Sage-grouse and the associated shrub-steppe system are addressed through other efforts and are not included here except by reference.

Many of Montana Fish, Wildlife and Parks' partners have developed planning tools and strategies to help advance prairie conservation. Some examples are Partners for Fish and Wildlife program focal areas, Prairie Pothole Joint Venture spatial planning tools, and World Wildlife Fund's plow print map and focal counties. These worthwhile endeavors have fed some of the ideas and concepts contained in this document; however, these strategies focus on a subset of grassland species and/or a different geographic scope than the state. FWP's strategy (this document) is designed to compliment these existing efforts with a specific focus on grasslands and a state-wide perspective.

Without a doubt, the most important partner for grassland conservation is Montana's private landowner. It is a testament to the excellent stewardship by Montana's private landowners that Montana maintains the greatest proportion of native grasslands in the Northern plains, as ~78% of Montana's grasslands are in private ownership. This strategy provides voluntary, non-regulatory, incentive-based options to help willing landowners maintain viable agricultural operations while also maintaining important wildlife habitat. It will take all of these efforts involving private

landowners, agencies, non-governmental organizations, and partnerships, cumulatively, to affect the grassland landscapes of Montana.

The overarching goal of this strategy is **to provide for viable populations of grassland-associated wildlife by providing voluntary, non-regulatory conservation tools to private landowners interested in retaining and enhancing Montana's native grasslands through working lands agriculture**. Our objectives are to:

1. Work with private landowners and other partners to protect existing resources from new habitat loss or degradation,
2. Work with private landowners and other partners to restore and enhance degraded grasslands, especially those in close proximity to existing, intact grasslands,
3. Work with private landowners and other partners to maintain or increase population trends of indicator grassland wildlife species through habitat conservation efforts, and,
4. Create a roadmap for achieving State Wildlife Action Plan objectives in cooperation with private landowners and other conservation partners.

This strategy is drafted in a linear form. However, application is intended to be iterative, with each step informing the other steps. FWP and interested partners can help to advance grassland conservation by facilitating research, monitoring, and program implementation at any step in the strategy.

Section 1. Threats – What is driving habitat loss and change?

Conversion to cropland agriculture

The rich soils and ephemeral wetlands of the prairie grasslands provide high quality habitat for migratory songbirds, waterfowl, pronghorn antelope, swift fox, and an array of other species. It is these rich soils, however, that makes the area attractive for tillage and crop production. Plowing of native prairie began in the late 1800's with Euro-American westward expansion and the rate of conversion has accelerated in recent years. In the 10 years between 1997 and 2007, approximately 1% of the Northern Great Plains was converted to cropland agriculture (Claasen et al. 2011). Conversion rate doubled to 2% from 2009 – 2015 (Gage et al. 2016). Crop insurance, disaster assistance, and other agricultural subsidies are making conversion more attractive to landowners by providing a safety-net to risk (Classen et al. 2011). The socioeconomic demand for biofuels and rising commodity prices are also encouraging conversion (Lark et al. 2015). Montana boasts some of the largest, most intact remaining grassland habitat in the nation, yet conversion, primarily to wheat, is threatening these remaining grasslands (Figure 1). This loss of native prairie is the greatest threat facing Montana's grassland wildlife species.

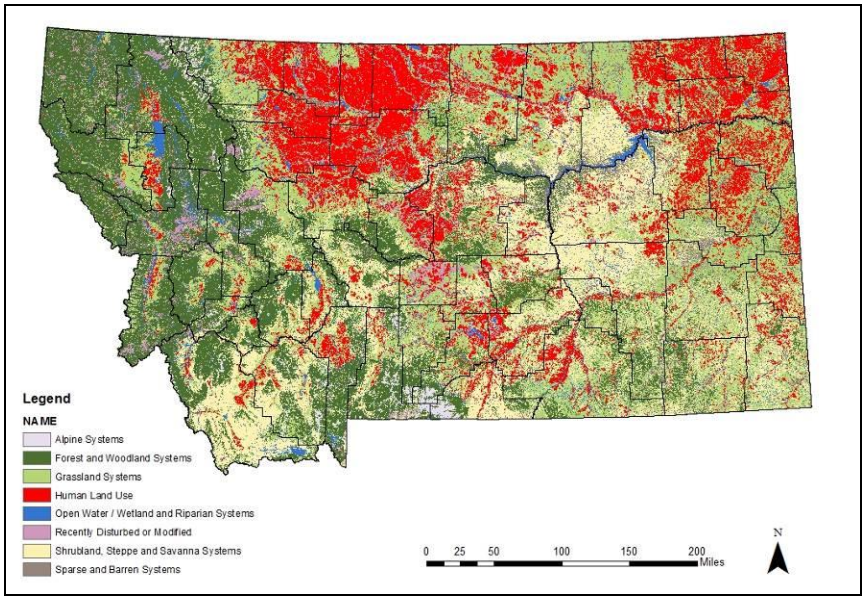

Figure 1. Existing human land use (in red), which is primarily cropland agriculture, is interspersed throughout native grasslands (in light green) in Montana. Expansion of cropland will result in additional grassland losses. (Source: Montana Land Cover Database)

Loss of Conservation Reserve Program (CRP) Acres

The Conservation Reserve Program (CRP) was initiated in 1985 to provide annual rental, cost-share, and in some cases incentive payments to landowners to establish perennial cover on marginal croplands. Contracts are for 10 – 15 years. Enrollment in CRP peaked in Montana in 2006 with almost 3.5 million acres in the program. However, a national limit on CRP acres and increased commodity prices has led to a 57.2% decline in CRP acres in Montana by 2015. Most of the lands expiring from CRP are returned to cropland agriculture. There are currently less than 1.5 million acres of lands remaining in CRP in Montana, 2/3rd of which will expire within the next 5 years (www.fsa.usda.gov).

Benefits of CRP lands to wildlife have been well documented in the Dakotas and include higher duck nesting success (Reynolds et al. 2001), higher densities of grassland songbirds (Johnson 2000), and improved pheasant

reproduction (Matthews et al. 2007) on CRP lands than croplands. In Montana, some grassland birds do not appear to use CRP lands planted in non-native cover such as crested wheatgrass at the site scale, indicating that restoration of these stands is a conservation need (M. Sather, pers. comm.). However, CRP lands that are embedded in or adjacent to larger blocks of intact grassland habitat are important for helping to provide landscape scale wildlife habitat regardless of vegetative cover type at the local scale. The end result of returning CRP lands to cropland agriculture is habitat loss for prairie dependent wildlife species.

Energy Development and Associated Infrastructure

Oil, natural gas, coal bed methane, and other non-renewable energy resources are found under Montana's rich grasslands (Figure 2). New development of these resources is closely tied to global supply and demand economics, meaning energy development pressure will continue to ebb and flow in the future. Renewable energy interests, such as wind and solar, are also targeting Montana's grassland for potential development locations (Figure 3). Roads, well pads, tall structures such as transmission lines and wind turbines, and other infrastructure associated with energy extraction fragment existing grasslands.

The influence of energy development on prairie wildlife species is not well understood. However, many bird species associated with grassland or shrub-steppe habitats are sensitive to patch size or fragmentation (Freemark et al. 1995, Johnson and Igl 2001, Winter et al. 2006). Nest and brood predators are also more likely to be successful where there is more edge habitat, an outcome of fragmentation (Faaborg et al. 1995). Wind turbines can cause direct mortality of birds and bats in addition to fragmentation (USFWS 2012). Tall structures on the landscape, including wind turbines, powerlines, and cell towers, also create perches for raptors and can lead to a functional loss of habitat resulting from avoidance behavior by prey species (Ellis 1985, Bayne and Dale 2011, Hagen et al. 2011).

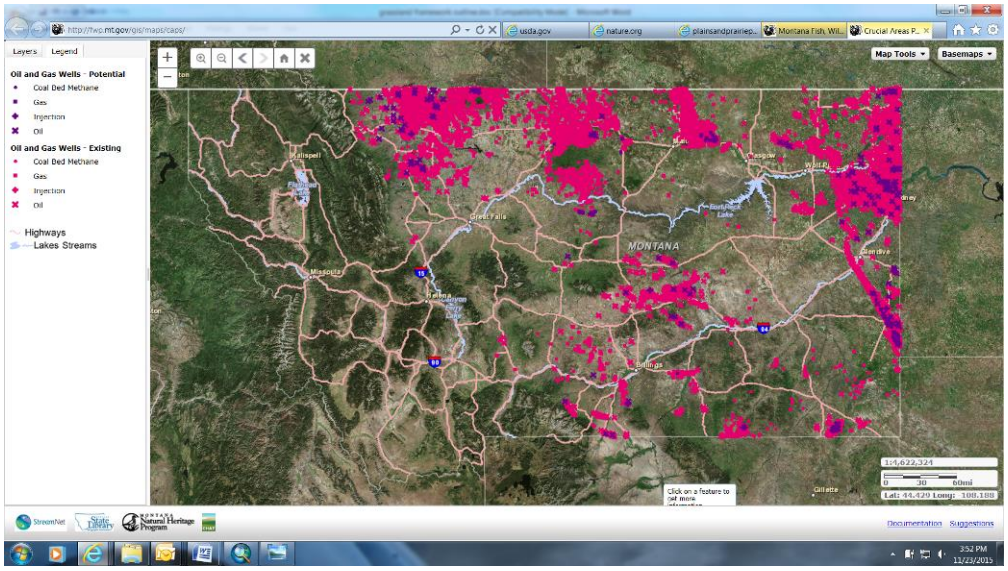

Figure 2. The location of existing and potential nonrenewable energy development in Montana is strongly correlated with converted and existing grasslands. Thus, the impact of energy development will be most strongly felt by Montana's prairie wildlife species. (Source: Department of Natural Resources and Conservation)

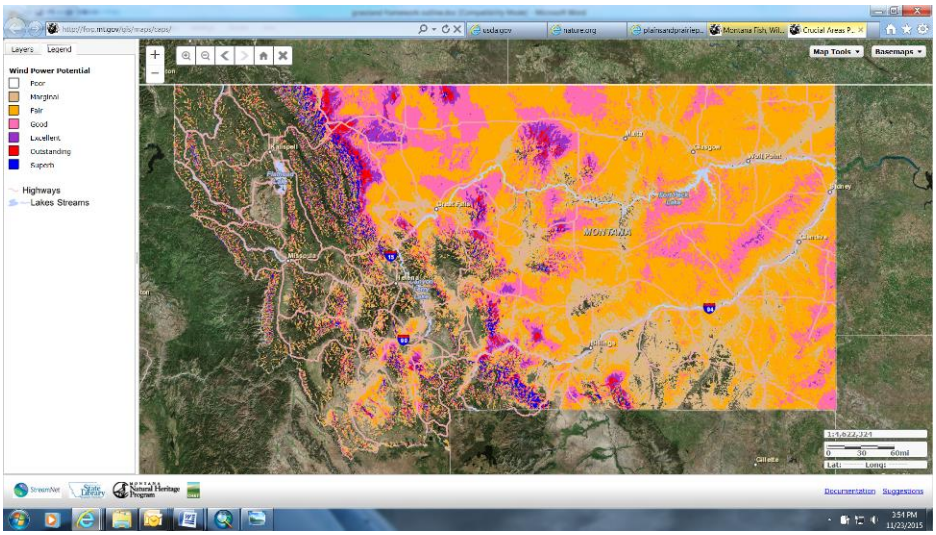

Figure 3. Wind power potential in Montana is relatively high throughout eastern Montana; new wind development will likely impact prairie and shrub-steppe wildlife species. (Source: www.windpower.org)

Subdivision Development

There are almost 1 million people living in Montana as of 2015 (www.census.gov). The human population of Montana has been growing by an average of 0.7%/year for the last 5 years. This means that although Montana is 44th in the nation for number of people, it is roughly 22nd in the nation for recent population growth. Subdivision development in Montana will continue to expand, as economics allow, accommodating the growing number of people in the state. While subdivision development can have positive economic impacts on local communities, it can also fragment large blocks of wildlife habitat, create barriers to animal movement, increase disturbance to native wildlife (e.g., traffic, pets), increase the prevalence of invasive plant species, and degrade water quality and natural stream processes (Montana Fish, Wildlife and Parks 2012).

Invasive Species

Invasions of exotic plant species, such as crested wheatgrass (*Agropyron cristatum*) have degraded rangelands across the northern Great Plains (Vaness and Wilson 2007). Some grassland birds avoid exotic vegetation (Lipsey 2015) or have lower reproductive and survival rates in exotic vegetation (Fisher and Davis 2011). Woody trees can invade prairie systems or be planted as wind breaks and pheasant winter cover. Trees on the prairie can facilitate avian nest predators and result in decreased nesting densities (Ellison et al 2013). Japanese brome (*Bromus japonicus*) and Kentucky bluegrass (*Poa pratensis*) are invasive grass species found in the montane grasslands of the Rocky Mountains (Stohlgren et al. 1999).

Changing Climate

Over the next century temperature increases of 4-8°F are possible for the northern Great Plains (U.S. EPA 2015; Figure 4). Increased precipitation in winter and spring months is predicted for the northern U.S. but precipitation is not expected to increase during the hot summer months (Figure 5). Snow pack is expected to decrease by 15% nation-wide which can lead to water shortages for irrigation (U.S. EPA 2015). Changes in the timing and amount of precipitation along with warming temperatures can have significant implications for the resilience of prairie vegetation and associated wildlife species. Moisture levels during the breeding season are an important factor influencing the distribution and abundance of birds on the Northern Great Plains (Niemuth et al. 2008). Over 21% of North American birds are

considered climate endangered, which means they are projected to lose more than half of their current range without the potential to expand in to new areas by 2050 (Langham et al. 2015). Climate endangered species native to the northern prairie include species with currently declining populations such as Baird's sparrow, chestnut-collared longspur, McCown's longspur, and Sprague's pipit, and grassland species with more stable numbers such as long-billed curlew, golden eagle, short-eared owl, and prairie falcon. In general, bird species distributions are expected to expand northward during the breeding season with more species lost than gained from the northern prairie. The prairies, however, may become more important for birds during the non-breeding season (Langham et al. 2015).

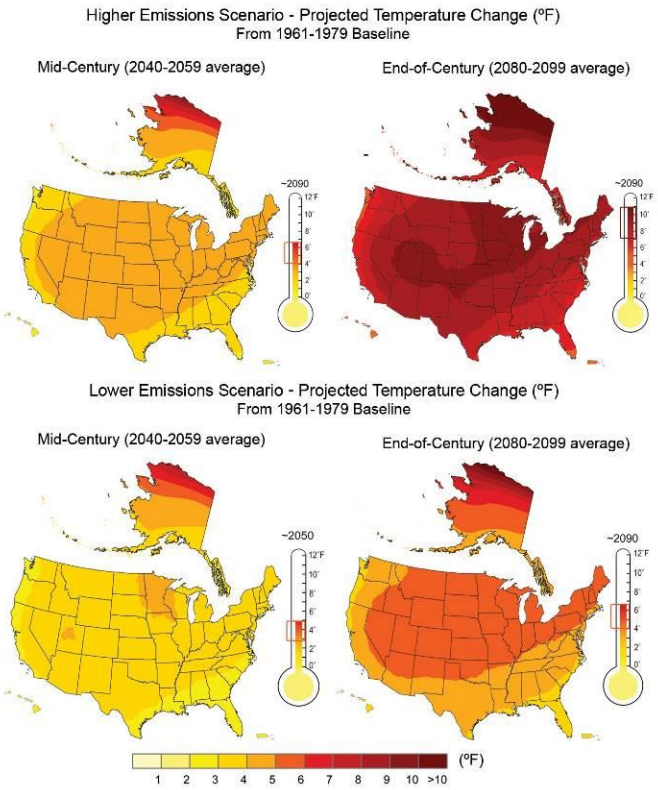

Figure 4. Temperature is expected to increase over the next century throughout the U.S. under all emission scenarios. (Source: U.S. EPA 2015).

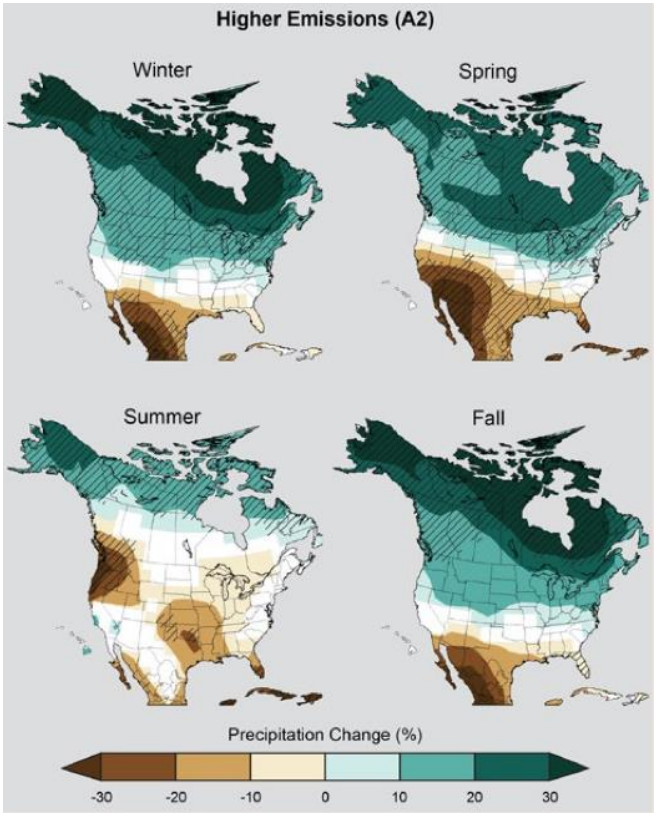

Figure 5. Predicted precipitation change over the next 100 years. Areas with hatching indicate higher confidence in model predictions, meaning there is high confidence of increased precipitation in winter and spring in Montana. (Source: U.S. EPA 2015).

Section 2. Conservation Approach – Where do we need to work? What do we need to do?

Grassland Priority Counties

Native grasslands, especially those in larger, intact landscapes, provide the most benefits to grassland birds (Freemark et al. 1995, Askins et al. 2007, Lipsey 2015) and other wildlife. We identified priority counties with relatively more grassland landscapes that are likely important to the long-term persistence of grassland wildlife.

We used the Montana Land Cover Database to map the location of prairie and montane grasslands in Montana (30-m resolution; Figure 1). It was important to scale up the 30-m grassland pixels to identify larger landscapes with abundant grass and to protect landowner privacy. Waterfowl and grassland birds have higher nest success and occupancy rates with higher proportions of grass on the landscape, respectively (Thompson et al. 2012, Lipsey 2015). In the case of grassland birds, the strongest association was at larger scales (Lipsey 2015). Based on Lipsey's research, we calculated the percent of grass on the landscape within 7.5" geographic quadrangles (~70 mi^2). Quadrangles (quads) with 50% or greater of grassland were identified as priority landscapes (Figure 6).

We then scaled the priority landscapes up to focal counties that were more meaningful from an implementation perspective. Federal (NRCS), state (DNRC), and local (Conservation districts) entities work at county scales. Statistics are also often available on human population, economic, and agricultural trends at this scale. Therefore, we identified counties with higher number of priority grassland quads as our focal counties (Figure 6). Counties were excluded if the priority grass areas were exclusively on tribal lands, as the sovereignty of tribal governments makes it difficult to focus state agency actions in these areas. The Mission Valley in northwestern Montana has many federal and private in-holdings within Confederated Salish and Kootenai lands so it was not excluded.

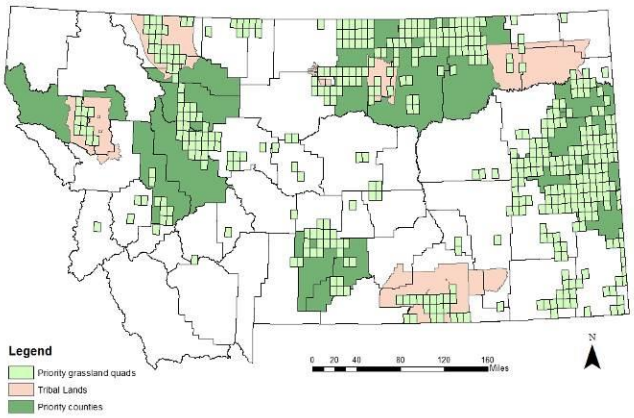

Figure 6. Priority county distribution is shown with grassland quadrangles (7.5") and tribal lands.

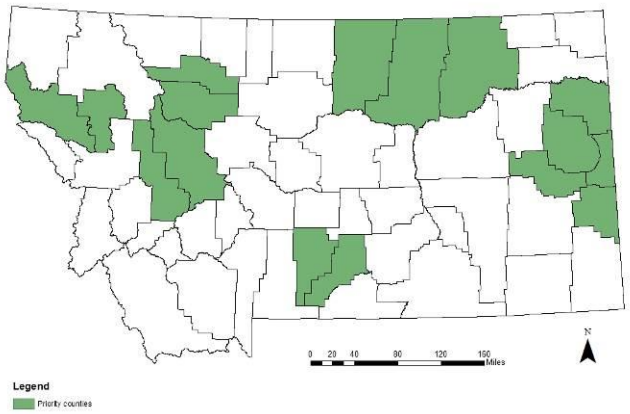

Figure 7. Priority grassland counties for targeting grassland conservation in Montana.

Our final 14 priority counties are distributed across the state (Figure 7). Cumulatively these counties cover 26 million acres, 9.7 million acres of which are grasslands (37%; Appendix B). Approximately 85% of grasslands in these priority areas are in private landownership, emphasizing the critical role of private landowners in grassland conservation.

Priority counties overlap with other currently available conservation planning tools relatively well. The Prairie Pothole Joint Venture optimal habitat map for priority bird species overlays many of our priority counties (Figure 8). The Montana Natural Heritage Program's maps of habitat suitability for Sprague's pipit, which are a grassland Species of Concern, show the majority of moderate and high suitability habitat for Sprague's pipit are in our priority counties (Figure 9).

Grasslands are also found in association with sagebrush steppe systems in Montana. These sagebrush-grassland habitats are not the focus of this strategy, in part, because resources are already targeted in these areas through on-going sage-grouse conservation efforts. When sage-grouse Core Areas and priority grassland counties are combined, the majority of Tier 1 focus areas in Montana's SWAP are captured (Figure 10). The resulting maps demonstrate how this grassland strategy compliments existing conservation efforts and when applied in coordination with other efforts should help deliver Fish, Wildlife and Parks' conservation goals.

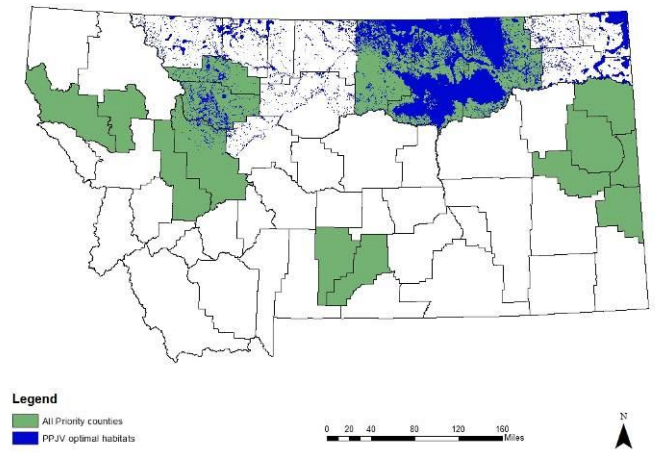

Figure 8. Prairie Pothole Joint Venture optimal habitats overlay relatively consistently with our priority grassland habitats. (PPJV models were only produced for the Prairie Pothole region of Montana).

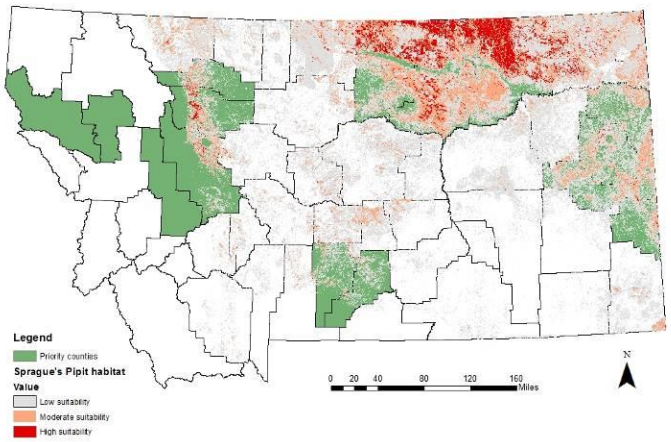

Figure 9. Sprague's pipit habitat models show a high degree of overlap with priority grassland counties.

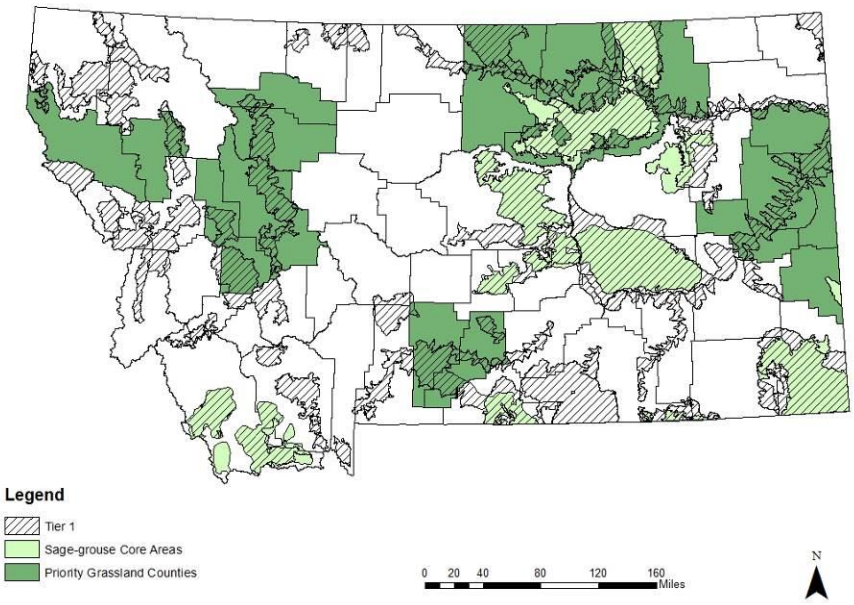

Figure 10. Priority Grassland Counties combined with Sage-grouse Core Areas cover much of the landscape identified as Tier 1 focal areas in Montana's SWAP.

Conservation Tools and Implementation Strategies

Approximately 85% of Montana's grasslands in our priority counties are in private ownership; thus, working with private landowners to maintain profitable agricultural operations while simultaneously conserving grasslands is our most important strategy. Participation in conservation programs by landowners is voluntary. FWP programs and a subset of partner programs that can be leveraged to assist landowners with conservation actions are listed in Appendix C. All agreements with FWP include negotiated free public access for hunting and/or recreational activities (e.g., birdwatching); specific details negotiated based on habitat values and landowner interest.

Grassland protection: Conservation easements and long-term leases are voluntary conservation tools effective for slowing the rate of habitat loss from conversion to cropland agriculture and subdivision development.

- Conservation leases
    - 30-year agreement to maintain existing native habitat
    - Could include species-specific stipulations and/or additional cost-share activities when relevant to grassland wildlife conservation objectives (e.g., prohibition on prairie dog poisoning, fence modifications to facilitate pronghorn connectivity, etc.)
    - One-time payment, flat rate/acre
- Conservation easements
    - Perpetual agreement, includes range management plans
    - Payment based on Fair Market Value

Grassland enhancement: FWP is exploring opportunities to work with private landowners who are interested to convert marginal croplands, including those expiring from the CRP, to grass-based agriculture. These opportunities might include assisting with range infrastructure (e.g., fencing and water structures) and seed cost-share assistance. Limited funding may also be available to assist with fence modifications to meet species-specific habitat needs.

- Range infrastructure cost-share
    - Transition marginal cropland or expiring CRP to grass-based agriculture
    - Modify fences to facilitate pronghorn antelope connectivity (typically will be in combination with a conservation lease or easement)
    - Up to 75% cost-share on fencing (including external fences), water supply, etc.
    - Can be in cooperation with other conservation efforts (e.g., protection or restoration activities)
    - Term agreement to maintain infrastructure will be required

Grassland restoration: FWP is also interested to work with willing landowners and conservation partners to help transition non-native vegetation (e.g., crested wheatgrass) to native grass stands (e.g., western wheatgrass).

- Native grassland restoration cost-share
    - Projects will be identified on a case-by-case basis
    - Up to 75% cost-share on seeding, fencing for early spring grazing, etc.
    - Usually in cooperation with other conservation efforts (e.g., protection activities)
    - Term agreement appropriate to restoration activities will be required

Non-regulatory recommendations for subdivisions and energy development: Grasslands near urban areas may be under current or future pressure for subdivision development. Locations for energy development will vary depending, in part, on the type of energy and economics. When new subdivision or energy development projects are proposed, FWP can help guide responsible development.

- Staff will use FWP's *Fish and Wildlife Recommendations for Subdivision Development in Montana* (2012) or most current agency recommendations when commenting on proposed subdivision.
- FWP staff will continue to use FWP's *Fish and Wildlife Recommendations for Oil and Gas Development in Montana* (2013a) and *Fish and Wildlife Recommendations for Wind Energy Development in Montana* (2013b) when commenting on oil and gas or wind energy projects.
- FWP staff will also recommend that energy project proponents follow the U.S. Fish and Wildlife Service mitigation sequencing whenever a new project is proposed in any of the priority landscapes. The mitigation sequencing is:

    1) Avoid priority grasslands,
    2) Minimize impacts,
    3) Reclaim and Restore degradation that occurs from development, and,
    4) Compensate for remaining project impacts elsewhere on the landscape.

Other considerations: Invasive species and climate change are threats addressed indirectly by the conservation tools listed above. Invasive species occur at local scales and cannot accurately be mapped at statewide scales. Impacts to Montana's grasslands from climate change are difficult to predict. Keeping high priority grassland in good range condition that increases resiliency to new and increasing threats is likely our best strategy for preparing for a changing climate and minimizing the spread of invasive species.

Project Ranking Criteria

Conservation easements will be evaluated and selected through FWP's existing Wildlife Lands process and scoring criteria. Additional criteria may be added to that process, if deemed necessary, to reflect grassland habitat values.

The Wildlife Habitat Bureau will issue a call for *conservation lease* projects at least twice annually. Competing projects will be evaluating using the following criteria to ensure that limited technical and financial resources are prioritized for projects that provide the greatest wildlife habitat benefits. Scoring guidelines will be prepared for the following criteria:

- Project is within a priority county,
- Ranching is the predominant land use,
- Project will expand existing protected areas,
- Project will encompass a relatively large landscape (projects ≥ 3,000 acres will receive highest priority),
- Existing or restored vegetation is dominated by native species,
- Existing property provides habitat for a diversity of wildlife species, especially Montana Species of Concern,
- Project has adequate habitat for specific wildlife recovery needs, if relevant to project objectives (e.g., 1,500+ acres of prairie dog habitat suitable for potential black-footed ferret reintroduction), and,
- Property is considered at high risk of conversion or subdivision development.

Range infrastructure cost-share projects will be evaluated when received. Ranchers Stewardship Alliance is working with the USFWS Partners for Fish and Wildlife Program to offer a similar cost-share opportunity to landowners in Blaine, Phillips, and Valley counties. FWP's cost-share opportunity is intended to compliment but not compete with this or other partner programs. Range infrastructure cost-share projects will typically have the following characteristics:

- Landowner is interested to transition marginal cropland or expiring CRP acres to grass-based agriculture,
- Existing vegetation is dominated by native species or the landowner is willing to manage non-native stands to favor native establishment,
- Landowner grazes cattle or leases pastures for grazing on other parts of their operation,
- Project expands contiguous acres of pastureland, and,
- Project activities will maintain or enhance habitat values for a diversity of wildlife species.

Native grassland restoration cost-share projects will be evaluated on a case-by-case basis. These will typically be in cooperation with other FWP and/or partner conservation efforts. For example, a landowner might be interested to restore a quarter-section of cropland to native grass and then enroll his/her entire operation in a conservation lease.

Section 3. Habitat Outcomes – Did we accomplish our habitat targets?

Implementation monitoring can be used to answer the question did we do what we set out to do. For this grassland conservation strategy, implementation monitoring will help us assess whether our actions and those of our partners are meeting our objectives to maintain and enhance the distribution, abundance, and in places the condition of existing grasslands. Remotely-sensed data can be used for landscape scale assessments; however local scale data is also needed to understand range composition. The process and elements for implementation monitoring include:

a. Manage a central database, updated annually (in cooperation with FWP Application and Development)
b. Complete a landscape scale assessment in a GIS framework every 5 years. Landscape tracking metrics would include:
    i. Total acres and trends in acres (+/-) of native grassland,
    ii. Location and number of quads that meet the priority grassland criteria,
    iii. Acres & locations of grassland protected,

iv. Acres & locations of restored/enhanced grasslands,
v. Changes in landownership patterns,
vi. Acres & locations of new conversion to cropland,
vii. Expiring CRP – new land use patterns

c. Cooperate with NRCS, Montana Association of Conservation Districts, and other range monitoring staff to assess local scale habitat metrics, as feasible. Tracking metrics at local scale might include:
   i. Range assessments
   ii. Invasive plant species control, establishment &/or encroachment
   iii. New anthropogenic disturbance
d. Conservation easements and other land protection options will be monitoring by FWP biologists in cooperation with FWP Conservation Easement Stewardship Manager.
e. Provide range assessment data to landowners as available to assist with ranch management decisions.
f. Prepare a report every 5 years that identifies habitat goals outlined in Part 2 above and progress made toward achieving those goals.

Section 4. Biological Outcomes – Are our actions influencing wildlife populations?

Effectiveness monitoring tells us if the implemented actions are having the intended biological response. This grassland strategy is intended to provide the quality and quantity of habitat required by grassland species of interest so that those species' populations are maintained or increased as a result of this targeted action. Management objectives for a group of indicator grassland species are listed in Appendix D. Species monitoring data will be included in the 5-year assessment. Regional trends in populations will be compared with range-wide trends to help differentiate the influence of habitat programs versus abiotic factors (e.g., climate factors), as available data allows. For example, the Integrated Monitoring by Bird Conservation Region (IMBCR) program provides species specific estimates for grassland birds across a broad expanse of the Great Plains. Regional data can be compared to state and range-wide estimates through this program. FWP staff will support quantitative assessments to determine which existing monitoring programs can evaluate the effectiveness of this strategy, and if needed, expand or develop new programs to achieve monitoring objectives (see Research Needs).

Section 5. Research Needs – How can we improve?

New information is needed to continue to effectively deliver grassland conservation. Information on habitat use and the relationship between demographic rates and habitat quality for many of our prairie wildlife species will help us better target conservation to the habitats most important for population persistence. This strategy will be revised as new information becomes available. Some of the priority research needs are listed in Appendix E. Projects that address these research needs will be considered through FWP's Research Review Process for FWP endorsement and, when appropriate, possible funding support.

Section 6. Implementation Capacity – How can we implement this strategy?

Potential Funding Sources and Partnerships

FWP will pursue new, targeted funds to help implement this grassland strategy. One potential source is Pittman-Robertson funding with match coming from the Montana Outdoor Legacy Foundation and/or non-federal granting entities. State Wildlife Grants (SWG), as available, and funding from Recovering America's Wildlife Act, if authorized by Congress, could also help deliver components of this strategy. Program funds will be used for on-the-ground projects, new personnel (as needed), and implementation and effectiveness monitoring. Support for research projects related to this strategy will likely come from other sources (e.g., LCCs, SWG non-habitat projects, etc.).

There are other conservation options complimentary to this initiative that are available through state and federal agencies, and non-governmental organizations. FWP will work cooperatively with our partners to cumulatively conserve larger landscapes of grassland wildlife habitat. Some of the complimentary programs and opportunities currently available include:

- NRCS provides range infrastructure (EQIP) and conservation easement (ACEP) funding assistance. NRCS is currently contemplating a special state initiative to target EQIP range infrastructure funding to marginal cropland or expiring CRP acres in the Prairie Pothole region.
- Ducks Unlimited recently received a Regional Conservation Partnership Program award to help target NRCS funding for grassland and wetland conservation in the Prairie Pothole region, including parts of Montana.
- The USFWS Partners for Fish and Wildlife Program leads several active North American Wetlands Conservation Act partnership projects to conserve wetlands and grasslands in many of our priority counties through conservation easement and some enhancement work (e.g., Rocky Mountain Front, Hi-Line).
- The USFWS Partners for Fish and Wildlife Program also uses program and grant funding to work with private landowners on conserving native grasslands and transitioning non-native to native grass stands.
- FWP manages three programs that are also complimentary to this grassland initiative and may provide funding support as appropriate to these programs: Upland Game Bird Enhancement Program, Migratory Bird Wetland Program, and State Wildlife Grants program.

Capacity Needs

Existing FWP staff will likely be involved in all aspects of this strategy from identifying and implementing projects to monitoring and research, as time, interest, and opportunity allow. However, FWP biologists are typically time-limited so additional requests on their time will be minimal. If a new funding source is identified, FWP may hire two seasonal wildlife technicians to support FWP Wildlife Biologists with the additional work load. Technicians will conduct program outreach, work with interested landowners, implement projects, conduct habitat and species monitoring, and other tasks associated with the implementation of this strategy. FWP Wildlife Biologists and Technicians may also work closely with our conservation partners to take advantage of opportunities to leverage programs and dollars and cooperate on monitoring, especially Pheasants Forever Farm Bill Biologists, Bird Conservancy of the Rockies Private Lands Wildlife Biologist, and Ducks Unlimited Conservation Specialists.

FWP Data Services staff can develop a web-based project evaluation tool that will include data layers of existing conservation efforts and spatially mapped threats such as cropland risk or expiring CRP lands. This tool would be

available internally to FWP staff to facilitate easy project review and proposals for potential projects. Data Services can also provide outreach assistance tools based on region-specific criteria.

Timeline

FWP will commit to targeted delivery of this strategy for a minimum of 5 years. At that time, a program review will be conducted and priorities, personnel needs, and conservation strategies will be reassessed. Initial efforts will focus on raising matching funds, hiring grassland specialists, and range infrastructure and grazing management projects (Figure 11). Existing staff, such as upland game bird specialists and wildlife biologists, can begin range infrastructure and grazing management work associated with this strategy as soon as funds are available and ideally in time to help interested landowners keep some expiring CRP acres in grass. Seasonal technicians, partner biologists, and potentially agricultural-based groups (via contract with FWP) may do much of the networking to find landowners interested in longer-term restoration or lease projects.

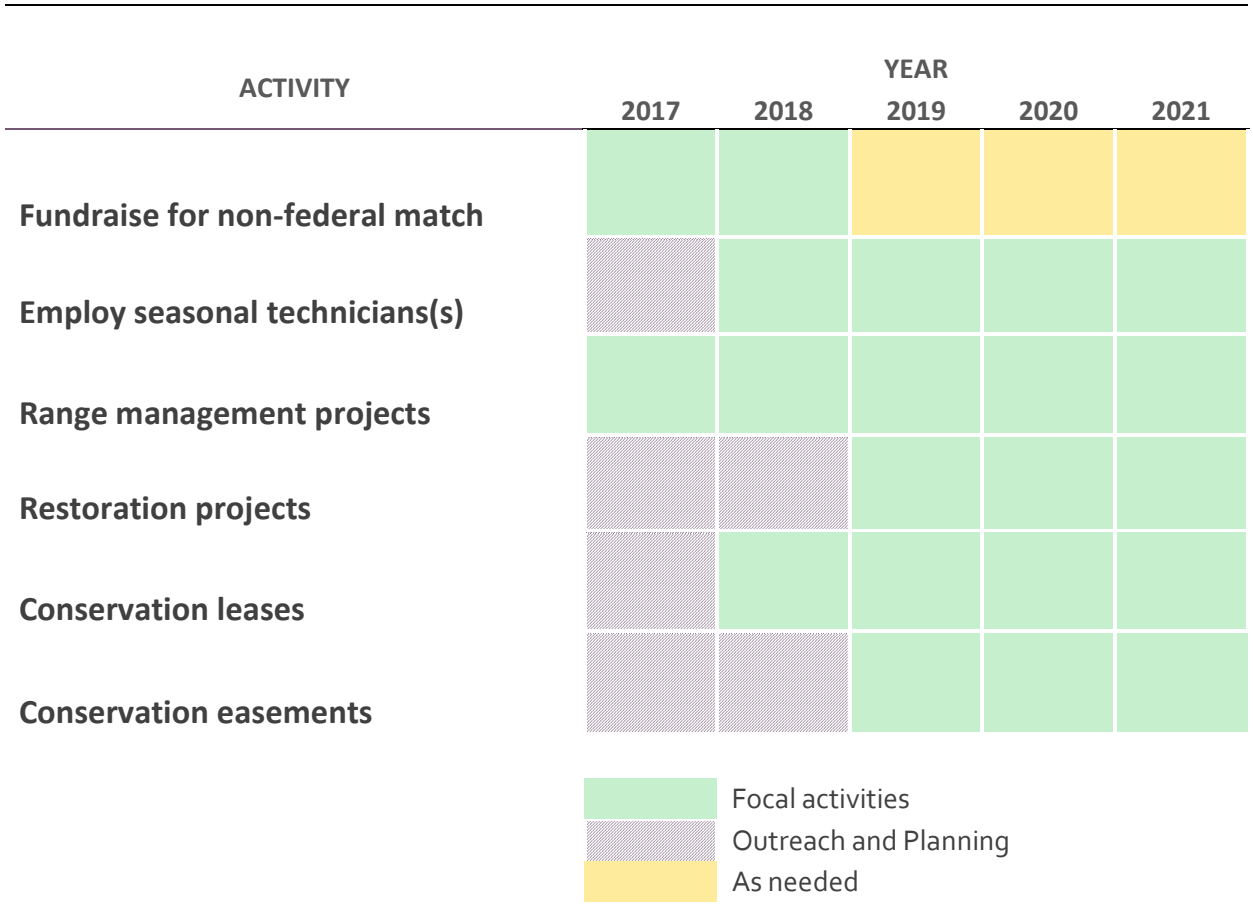

Figure 11. Proposed implementation timeline for FWP's *Working Grasslands Initiative*.

References

Askins, R.A., F. Chavez-Ramirez, B.C. Dale, C.A. Haas, J.R. Herkert, F.L. Knopf, and P.D. Vickery. 2007. Conservation of grassland birds in North America: Understanding ecological processes in different regions. The Auk 64:1-46.

Bayne, E.M. and B.C. Dale. 2011. Effects of energy development on songbirds. Pp. 95-114 in D.E. Naugle (ed.). Energy Development and Wildlife Conservation in Western North America. Island Press, Washington, DC.

Claassen, R., F. Carriazo, J.C. Cooper, D. Hellerstein, and K. Ueda. 2011. Grassland to Cropland Conversion in the Northern Plains: The role of crop insurance, commodity, and disaster programs. U.S. Department of Agriculture. Economic Research Report, Number 120.

Derner, J.D., W.K. Lauenroth, P. Stapp, and D.J. Augustine. 2009. Livestock as Ecosystem Engineers for grassland Bird Habitat in the Western Great Plains of North America. Rangeland Ecology and Management 62:111-118.

Ellis, K.L. 1985. Distribution and habitat selection of breeding male sage grouse in northeastern Utah. M.S. Thesis, Brigham Young University, Provo, UT.

Ellison, K.S., C.A. Ribic, D.W. Sample, M.J. Fawcett, and J.D. Dadisman. 2013. Impacts of tree rows on grassland birds and potential nest predators: a removal experiment. PLoS ONE 8(4): e59151. Doi:10.1371/journal. Pone.0059151.

Faaborg, J., M. Brittingham, T. Donovan, and J. Blake. 1995. Habitat Fragmentation in the Temperate Zone. Pages 357-380 *in* Martin, T.E. and D.M. Finch, eds. Ecology and Management of Neotropical Migratory Birds: A synthesis and review of critical issues. Oxford University Press, New York.

Fisher, R.J. and S.K. Davis. 2011. Post-fledging dispersal, habitat use, and survival of Sprague's pipits: Are planted grasslands a good substitute for native? Biological Conservation 144:263-271.

Freemark, K.E., J.B. Dunning, S.J. Hejl, and J.R. Probost. 1995. A Landscape Ecology Perspective for Research, Conservation, and Management. Pages 381-427 *in* Martin, T.E. and D.M. Finch, eds. Ecology and Management of Neotropical Migratory Birds: A synthesis and review of critical issues. Oxford University Press, New York.

Fuhlendorf, S.D., W.C. Harrell, D.M. Engle, R.G. Hamilton, C.A. Davis, and D.M. Leslie, Jr. 2006. Should Heterogeneity be the Basis for Conservation? Grassland Bird Response to Fire and Grazing. Ecological Applications 16:1706-1716.

Gage, A.M., S.K. Olimb, and J. Nelson. 2016. Plowprint: Tracking cumulative cropland expansion to target grassland conservation. Great Plains Research 26:107-116.

Hagen, C.A., J.C. Pitman, T.M. Loughin, B.K. Sandercock, R.J. Robel, and R.D. Applegate. 2011. Impacts of anthropogenic features on habitat use by lesser prairie-chickens. Pp 63-75 in B.K. Sandercock, K. Martin, and G. Segelbacher (eds.). Ecology, conservation, and management of grouse. Studies in Avian Biology (vol. 39), University of California Press, Berkeley, CA.

Igl, L.D. and D.H. Johnson. 2016. Effects of haying on breeding birds in CRP grasslands. The Journal of Wildlife Management, doi:10.1002/jwmg.21119.

Johnson, D.H. 2000. Grassland Bird Use of Conservation Reserve Program Fields in the Great Plains. Pages 19-33 in L.P. Heard, A.W. Allen, L.B. Best, S.J. Brady, W. Burger, A.J. Esser, E. Hackett, D.H. Johnson, R.L. Pederson, R.E. Reynolds, C.Rewa, M.R. Ryan, R.T. Molleur, and P. Buck. A comprehensive review of farm bill contributions to

wildlife conservation, 1985-2000. W.L. Hohman and D.J. Halloum, U.S. Dept. of Agriculture, Natural Resources Conservation Service, Wildlife Habitat Management Institute, Technical Report, USDA/NRCS/WHMI-2000. Jamestown ND. http://www.npwrc.usgs.gov/resource/birds/glbuseindux.htm.

Johnson, D.H. and L.D. Igl. 2001. Area requirements of grassland birds: a regional perspective. Auk 118:24-34.

Langham, G.M., J.G. Schuetz, T. Distier, C.U. Soykan, and C. Wilsey. 2015. Conservation Status of North American Birds in the Face of Future Climate Change. PLoS One 10(9): e0135350. doi: 10.1371/journal.pone.0135350.

Lark, T.J., J.M. Salmon, and H.K. Gibbs. 2015. Cropland expansion outpaces agricultural and biofuel policies in the United States. Environmental Research Letters 10:044003. doi:10.1088/1738-9326/10/4/044003.

Lipsey, M.K. 2015. Cows and Plows: Science-based conservation for grassland songbirds in agricultural landscapes. PhD Dissertation. University of Montana, Missoula.

Matthews, T.W., J. S. Taylor, and L.A. Powell. 2012. Mid-contract management of Conservation Reserve Program grasslands provides benefits for ring-necked pheasant nest and brood survival. The Journal of Wildlife Management 76:1643-1652.

Montana Fish, Wildlife and Parks. 2012. Fish and Wildlife Recommendations for Subdivision Development in Montana: A Working Document. Montana Fish, Wildlife and Parks, Helena, Montana.

Montana Fish, Wildlife and Parks. 2013a. Fish and Wildlife Recommendations for Oil and Gas Development in Montana: A Working Document. Montana Fish, Wildlife and Parks, Helena, Montana.

Montana Fish, Wildlife and Parks. 2013b. Fish and Wildlife Recommendations for Wind Energy Development in Montana: A Working Document. Montana Fish, Wildlife and Parks, Helena, Montana.

Montana Fish, Wildlife and Parks. 2015. Montana's State Wildlife Action Plan. Montana Fish, Wildlife and Parks, 1420 East 6th Ave., Helena, MT. 441 pp.

Niemuth, N.D., J.W. Solberg, and T.L. Shaffer. 2008. Influence of Moisture on Density and Distribution of Grassland Birds in North Dakota. Condor 110:211-222.

North American Bird Conservation Initiative. 2016. The State of North America's Birds 2016. Environment and Climate Change Canada: Ottawa, Ontario. 8 pages. www.stateofthebirds.org.

Pearson, A.J. and B.H. Martin. 2012. Status of grassland and shrub steppe in the northern Great Plains of Montana. The Nature Conservancy, Unpublished Report.

Reynolds, R.E., T.L. Shaffer, R.W. Renner, W.E. Newton, and B.D.J. Batt. 2001. Impact of the Conservation Reserve Program on Duck Recruitment in the U.S. Prairie Pothole Region. The Journal of Wildlife Management 65:765-780.

Sauer, J.R., J.E. Hines, J.E. Fallon, K.L. Pardieck, D.J. Ziolkowski, Jr., and W.A. Link. 2014. The North American Breeding Bird Survey, Results and Analysis 1966 – 2013. Version 01.30.2015 USGS Patuxent Wildlife Research Center, Laurel, MD.

Smith, J.T., J.S. Evans, B.H. Martin, S. Baruch-Mordo, J.M. Kiesecker, and D.E. Naugle. 2016. Reducing cultivation risk for at-risk species: Predicting outcomes of conservation easements for sage-grouse. Biological Conservation 201:10-19.

Stohlgren, T.J., L.D. Schell, and B.Vanden Heuvel. 1999. How grazing and soil quality affect native and exotic plant diversity in Rocky Mountain grasslands. Ecological Applications 9:45-64.

Thompson, S.J., T.W. Arnold, and S. Vacek. 2012. Impact of encroaching woody vegetation on nest success of upland nesting waterfowl. The Journal of Wildlife Management 76:1635-1642.

U.S. Environmental Protection Agency (EPA). 2015. Climate Change: Future Climate Change. http://www3.epa.gov/climatechange/science/future.html [Accessed February 2, 2016].

U.S. Fish and Wildlife Service (USFWS). 2012. U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines. U.S. Fish and Wildlife Service. OMB Control No. 1018-0148.

Vaness, B.M. and S.D. Wilson. 2007. Impact and management of crested wheatgrass (*Agropyron cristatum*) in the northern Great Plains. Canadian Journal of Plant Science 87:1023-1028.

Winter, M., D.H. Johnson, J.A. Shaffer, T.M. Donovan, and W.D. Svedarsky. 2008. Patch size and landscape effects on density and nesting success of grassland birds. Journal of Wildlife Management 70:158-172.

Appendix A. A selected list of Montana Species of Concern associated with Montana's grasslands. (Source: FWP 2015)

Class	Species	Habitat Association
Amphibians	Great Plains Toad	prairie grassland
	Plains Spadefoot	prairie & montane grassland
Birds	Baird's Sparrow	prairie & montane grassland
	Bobolink	prairie & montane grassland
	Burrowing Owl	prairie grassland
	Chestnut-collared Longspur	prairie grassland
	Ferruginous Hawk	prairie & montane grassland
	Golden Eagle	prairie & montane grassland
	Loggerhead Shrike	prairie & montane grassland
	Long-billed Curlew	prairie & montane grassland
	McCown's Longspur	prairie grassland
	Mountain Plover	prairie grassland
	Sharp-tailed Grouse	prairie grassland
	Sprague's Pipit	prairie grassland
Mammals	Black-tailed Prairie Dog	prairie grassland
	Dwarf Shrew	prairie & montane grassland
	Fringed Myotis	prairie & montane grassland
	Hoary Bat	prairie & montane grassland
	Little Brown Myotis	prairie & montane grassland
	Merriam's Shrew	prairie & montane grassland
	Pallid Bat	prairie grassland
	Preble's Shrew	prairie & montane grassland
	Spotted Bat	prairie grassland
	Swift Fox	prairie grassland
	Townsend's Big-eared Bat	prairie & montane grassland
Reptiles	Greater Short-horned Lizard	prairie & montane grassland
	Western Hog-nosed Snake	prairie grassland

Appendix B. Grassland and human use statistics for Priority Grassland Counties.

NAME	Total County Areas	Acres of Grassland	%	Unprotected Grasslands*	%	Acres of Grass on Public Lands	%	Acres of Grass in Conservation Easement	%	% of County Farmed or Ranched	% of County in Cropland	Acres of CRP expiring in 2017	% of County enrolled in CRP, WRP, WREP or Farmable Wetland	Human Population (2010 Census)	Human population change 2000-2010 (%)
Blaine	2,711,177	1,208,453	44	977,900	80	216,272	17	14,278	1	81.5	23.17	7,731	4.34	6,491	-
Dawson	1,523,580	789,114	51	751,132	95	37,980	4	0	0	82.9	23.31	1,053	4.71	8,966	-
Fallon	1,037,004	547,795	52	465,533	84	77,587	14	0	0	94.4	16.59	395	1.29	2,890	+
Lake	1,057,362	232,507	21	209,307	90	15,459	6	7,742	3	58.3	8.46	0	0.54	28,746	+
Lewis & Clark	2,235,819	609,060	27	467,142	76	94,384	15	47,531	7	38.1	4.17	227	0.60	63,395	++
Phillips	3,333,174	1,345,212	40	738,298	54	556,956	41	50,180	3	62.8	21.34	14,539	5.10	4,253	-
Pondera	1,049,803	235,833	22	205,834	87	16,452	6	13,544	5	92.1	37.74	20,495	6.49	6,153	-
Powell	1,490,925	353,227	23	215,311	60	77,622	21	62,710	17	39.6	3.59	60	n/a	7,027	-
Prairie	1,113,703	682,480	61	377,715	55	295,130	43	9,632	1	69.2	10.74	3,650	1.85	1,179	-
Richland	1,342,068	661,856	49	622,806	94	32,955	4	6,093	0	96.9	41.72	16,193	7.40	9,746	+
Sanders	1,778,204	308,661	17	255,503	82	41,811	13	11,343	3	19.2	1.95	0	0.10	11,413	++
Stillwater	1,154,886	370,954	32	346,119	93	8,341	2	16,488	4	70.4	16.3	16,283	4.37	9,117	++
Sweet Grass	1,191,004	447,536	37	402,124	89	12,993	2	32,414	7	72.1	6.63	0	0.08	3,651	+
Teton	1,465,404	459,799	31	331,655	72	55,738	12	72,399	15	67.1	54.70	39,127	8.01	6,073	-
Valley	3,237,198	1,121,152	34	716,613	63	387,389	34	17,148	1	51.9	25.01	29,343	8.82	7,369	-
Wibaux	567,163	335,323	59	319,537	95	15,784	4	0	0	95.8	23.85	622	3.06	1,017	-
Source	Montana Land Cover Database	Montana Land Cover Database		Montana Cadastral		Montana Cadastral		Fish, Wildlife and Parks database		USDA NASS Census of Ag.	USDA NASS Census of Ag.	USDA Farm Services Agency	USDA NASS Census of Ag.	U.S. Census 2010	U.S. Census 2010

*Grasslands considered protected from cropland conversion include public lands (except School Trust Lands outside of sage-grouse Core Areas) and private lands in conservation easement or long-term lease.

++ = 10 - 25% increase, + = 0 - 10% increase, - = 0 to 10% decrease

Appendix C. Conservation tools and potential funding sources for voluntary landowner conservation actions.

Voluntary Landowner Action	Conservation Tool	Potential Funding Sources*
Protection from cropland conversion and/or subdivision development	FWP Conservation Easements	• NRCS Agricultural Land Easement Program (requires non-federal match) • Habitat Montana (matching funds) • Pittman-Robertson funding
	FWP 30-year Conservation Leases	• Grant funding • Upland Game Bird Enhancement Program and/or Migratory Bird Wetland Program (matching funds)
Transition expiring CRP and/or marginal cropland to grass-based agriculture	FWP contract for range infrastructure cost-share on expiring CRP lands (e.g., fencing and water sources)	• Grant funding • Pittman-Robertson funding
	Special NRCS EQIP initiative for infrastructure cost-share (includes short-term rental rates)	• NRCS EQIP
	Partner programs for range infrastructure cost-share and restoration on expiring CRP lands	• Grant funding (e.g., NFWF) • Partners for Fish and Wildlife
	Restoration of non-native CRP stands or other marginal cropland areas to native grass	• Grant funding (e.g., NFWF) • Pittman-Robertson funding • State Wildlife Grants
Range management & enhancements	FWP grazing management plans and range infrastructure cost-share	• Grant funding • Pittman-Robertson funding • Upland Game Bird Enhancement Program
	NRCS EQIP grazing management practices (CP528)	• NRCS EQIP
Range maintenance (e.g., to maintain existing prairie dog &/or upland game bird habitat)	FWP Conservation Leases for maintaining priority wildlife habitats	• Pittman-Robertson funding • Upland Game Bird Enhancement Program • State Wildlife Grants
	NRCS CSP upland wildlife habitat management	• NRCS CSP
Invasive weed control	Targeted grazing, biological and chemical control, restoration techniques	• Montana Weed Control Association; DNRC; conservation districts

*Recovering America's Wildlife Act, if authorized by Congress, could be used to help fund most of the FWP sponsored activities in this table including conservation easements, leases, and range infrastructure.

Appendix D. Grassland indicator species and associated management objectives and tools.

Species	% of Global Breeding Range in Montana^	Metrics	Management Objective	Monitoring Tools#	Reference
Baird's sparrow	27%	Population trends # birds/mi^2 Probability of occurrence	Reverse decline*: By 2026 - slow rate of decline by 60-75% By 2046 - increase 2016 population by 5-15%	BBS IMBCR	Partners in Flight 2016
chestnut-collared longspur	32%	Population trends # birds/mi^2 Probability of occurrence	Reverse decline*: By 2026 - slow rate of decline by 60-75% By 2046 - increase 2016 population by 5-15%	BBS IMBCR	Partners in Flight 2016
McCown's longspur	41%	Population trends # birds/mi^2 Probability of occurrence	Reverse decline*: By 2026 - slow rate of decline by 60-75% By 2046 - increase 2016 population by 5-15%	BBS IMBCR	Partners in Flight 2016
Sprague's pipit	18%	Population trends # birds/mi^2 Probability of occurrence	Reverse decline*: By 2026 - slow rate of decline by 60-75% By 2046 - increase 2016 population by 5-15%	BBS IMBCR	Partners in Flight 2016
waterfowl (mallard, northern pintail, blue-winged teal, northern shoveler, gadwall)	3-7%	# pairs/4-mi^2	Maintain duck production capacity (581,000 breeding pairs in Prairie Pothole region of Montana in 2016)	USFWS 4-mile^2 surveys	Prairie Pothole Joint Venture Implementation Plan 2017
sharp-tailed grouse	6%	# birds/lek # of leks	Adaptive Harvest Management targets	Lek monitoring	FWP Management Bureau/Regions
black-tailed prairie dog	15%	Acres of colonies	Maintain habitat for associated species	Mapping (remotely or on-the ground)	Montana Prairie Dog working group
pronghorn antelope	7%	# of individuals	Adaptive Harvest Management targets	Annual trend surveys	FWP Management Bureau/Regions
swift fox	1%	Presence/absence	Maintain/increase	Targeted surveys	Swift Fox Conservation Team

^Montana Natural Heritage Program estimates.

#BBS=USGS Breeding Bird Survey, IMBCR=Integrated Monitoring by Bird Conservation Region

*Range-wide objectives. Montana objectives are to meet or exceed range-wide objectives.

Appendix E. Priority research needs for grassland indicator species.

Research Topic	Species
The influence of habitat characteristics, landscape heterogeneity, *and conservation actions* on breeding season vital rates to identify high quality breeding habitat characteristics, population modeling, and the impact of conservation actions on populations.	Grassland birds*, sharp-tailed grouse, black-tailed prairie dog
Impacts of energy development (infrastructure and fragmentation) on populations.	All grassland indicator species
Vital rates and limiting factors during all seasons (breeding, migration, or winter) for migratory species to identify what point of the life cycle is driving population declines. This will help to inform if our strategy should focus on maintaining breeding habitat or if additional restoration of breeding habitat is needed.	Grassland birds*
Identification of habitat needed for maintenance of connectivity, and the impact of anthropogenic features and conservation actions on maintenance of connectivity.	Swift fox (ongoing Region 6), pronghorn antelope
Value of existing CRP and other conservation lands as habitat in Montana.	Grassland birds*, swift fox, pronghorn antelope, sharp-tailed grouse
Relative value of transitioning non-native grass to native grass stands.	All grassland indicator species
Evaluation of existing monitoring programs for their effectiveness in evaluating the impacts of this grassland conservation strategy on grassland indicator species and targets, and development of new/ refined protocols as necessary.	All grassland indicator species

*Grassland birds = Baird's sparrow, chestnut-collared longspur, McCown's longspur, Sprague's pipit