Native Grassland and Shrub Habitat Recommendations for Subdivision Development in Montana—Additional Guidance for Minimizing Fragmentation and Maintaining Connectivity: Justification and Rationale

A Professional Paper
January 9, 2012

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Foreword
The open range is an iconic symbol of the American West—captured in art, film, and stories. Native Montanans are willing to brave cold, windy winters and new citizens are attracted to Montana each year, in part because of the species diversity and abundance inherent in our vast landscapes. Yet many grassland and shrub-associated species are declining in numbers or distribution, making them rarer on the landscape. Actions and decisions that conserve these species now will help to maintain our natural legacy in the future.

Montana's citizens also deserve new homes and a strong economy. This paper, assembled by a team of professional biologists, outlines a strategy for focusing new development in areas less likely to impact species conservation needs. This strategy recognizes that subdivision development will continue as the population of Montana grows and changes; it simultaneously encourages protection of the largest and most important pieces of native wildlife habitat. These recommendations stem from published literature and expert opinion on birds, because birds are one species group where there is some scientific information available to guide recommendations. However, adherence to this guidance will likely provide conservation values to a wide suite of wildlife species.

Montana's citizens have the opportunity now to build our future—a future that includes homes for our citizens, a strong economy, and the persistence of the wildlife we value. These guidelines are one step toward that common vision.

Kenneth P. McDonald
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January 4, 2012

This professional paper outlines the justification and rationale behind one element of the native grassland and shrub habitat recommendations for subdivision development: the Additional Guidance for Minimizing Fragmentation and Maintaining Connectivity. This guidance applies to native grassland or native shrub habitat patches greater than 25 acres in size. The following table identifies how much of a native grassland or native shrub habitat patch could be developed and still minimize habitat fragmentation for wildlife, based upon its existing size and regardless of land ownership:

Total Native Grassland or Native Shrub Habitat Patch Size	**Recommended Limits to Habitat Patch Development within a Proposed Subdivision**	**Subdivider Is Advised to Consult FWP for Recommendations on Extent and Location of Proposed Development.**
> 25 to 100 acres	A maximum of 5% of the portion of the habitat patch located within the proposed subdivision site could be developed, and at least 25 acres of the habitat patch should remain undeveloped.	No
> 100 to 1,000 acres	A maximum of 10% of the portion of the habitat patch located within the proposed subdivision site could be developed.	Yes
> 1,000 acres	A maximum of 20% of the portion of the habitat patch located within the proposed subdivision site could be developed.	Yes

Justification and Rationale:

Native grassland and shrub lands are listed as two ecotypes in greatest need of conservation in *Montana's Comprehensive Fish and Wildlife Conservation Strategy* (MCFWCS 2005). They are relatively rare on the landscape in the 21st century because of their current and historic high rate of conversion to agriculture or other anthropogenic uses. The loss continues at an alarming pace. Over 46,000 acres of native prairie and intermountain basin grasslands were lost in Montana between 2005 and 2009 (Ducks Unlimited, pers. comm.). Not coincidentally, grassland bird populations are showing some of the steepest declines of all landbirds in North America, and shrub-nesting landbirds comprise the largest number of Species of Continental Importance in the Intermountain West areas of the United States and Canada (Rich et al. 2004).

Birds are excellent barometers of ecosystem health because they inhabit nearly all habitats and respond rapidly to landscape change. Thus, maintaining landscapes for birds will likely have measurable benefits for an array of wildlife species. In addition, there is credible research documenting the influence of patch size and landscape requirements from which to draw inferences on how birds may be affected by subdivision development. These factors—(1) the conservation status of grass and shrub-associated birds and their habitats, (2) the strong link between bird populations and landscape conditions, and (3)

available research results—make birds a good tool for providing recommendations on how to both accommodate subdivision development and maintain healthy wildlife populations in native grassland and shrub habitats.

Research on landscape requirements for grassland and shrub-associated birds is abundant and fairly unanimous (see summaries in Faaborg et al. 1995; Freemark et al. 1995; Johnson 2001). Larger, intact native habitats typically result in higher bird densities and reproductive success. At least 22 bird species associated with grassland or shrub habitats are sensitive to patch size or fragmentation (Freemark et al. 1995). In addition, nest predators tend to be more successful in smaller patches because those patches have proportionately more habitat edge than larger patches.

Askins et al. (2007) found the rate of incidence for six grassland birds increased exponentially with patch size until at least 100 acres for some species and over 1,000 acres for other species. Some grassland birds occupy larger areas of habitat than their territory size would imply (Johnson 2001). Patches smaller than 25 acres tend to provide little grassland habitat for most grassland species. Research has also documented that grassland bird abundance decreases significantly when the sum of all urban activity is 5 percent of 100 acres (Haire et al. 2000), and urbanization shifts the bird community toward more nonnative species and fewer native species (Marzluff 2001).

Shrub-associated birds tend to have larger home ranges than grassland birds, suggesting a similar pattern of increased densities at larger patch sizes. Landscape configuration and juxtaposition of patches contribute to the relative quality of a patch, but these relationships are difficult to quantify without a site evaluation by a professionally trained biologist.

The studies referenced above, together with our knowledge of avian ecology, leads us to the following conclusions:

- Native grassland and shrub habitats are relatively rare on the landscape in Montana, as much of the land has already been converted to agriculture or development. Thus, the conservation of remaining habitats is critical to the persistence of the bird species that depend on them. Some habitat patches are more important than others; hence, our goal is to provide guidelines for conserving critical habitat patches and encouraging development elsewhere. In general, we encourage development in areas that are already dominated by nonnative vegetation.

- Conversion of native patches of 25 acres or less to subdivision development likely will have minimal impact on bird populations. Thus, we have less concern about decisions to locate new development in those areas that are already fragmented into small native vegetation patches.

- Limiting subdivision development to 5 percent or less of 25- to 100-acre patches in grassland and shrub habitat is important for maintaining bird populations. Patches of this size are critical for many species and cannot withstand much fragmentation or urbanization. The value of a patch for birds in this range increases exponentially as it gets larger, but the converse is also true. The value will decrease dramatically even with minimal reductions in size. We recognize

that this provision is relatively restrictive and discourages development of patches between 25 to 100 acres.

- Although we are not aware of conclusive research that looks at patch sizes greater than 100 acres, it is reasonable to assume that birds can withstand development of somewhat greater percentages as patch size increases, as long as fragmentation is minimized by clustering development to one side of the patch. Limiting subdivision development to 10 percent of 100- to 1,000-acre patches would allow for some development while maintaining larger landscapes for avian species with larger patch size requirements (e.g., Sprague's Pipits, Long-billed Curlews). Under a 1,000-acre patch size scenario, up to 100 acres of native grassland or shrub habitat could be developed with minimal impacts to birds.

- Some birds have relatively large patch requirements (750–200,000 acres; e.g., raptors, grouse). It is imperative that some large patches are maintained across the landscape for these species. Allowing development on 20 percent of patches greater than 1,000 acres in size would allow for some development while retaining relatively large patches for wildlife. Under a 2,000-acre patch size scenario, 400+ acres of native grassland or shrubland could be developed.

- It is important to recognize that the patch size guidance for native grassland and shrub habitats applies to the existing patch, regardless of how much of the patch is present on a given property. This is designed to address cumulative impacts of multiple proposed projects in a given area and does not favor the first subdivision applicant. Without this sliding, percentage-based scale, grassland and shrub habitats could incrementally be reduced by subsequent developments until patches become too small to support an array of wildlife species.

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Citation: Wightman, C. 2012. *Native Grassland and Shrub Habitat Recommendations for Subdivision Development in Montana—Additional Guidance for Minimizing Fragmentation and Maintaining Connectivity: Justification and Rationale.* Montana Fish, Wildlife & Parks Professional Paper, January 9, 2012.