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April 2, 2021

Re: Center for Large Landscape Conservation Comments on the Draft Gallatin County Growth Policy

Dear Gallatin County Commission, Planning Board, and Steering Committee:

We appreciate the opportunity to provide comments regarding the *Envision Gallatin County Draft Growth Policy* (“Growth Policy”). The Center for Large Landscape Conservation, based in Bozeman, Montana, seeks to conserve biodiversity and improve community resilience by reconnecting fragmented habitats and restoring functional ecological networks. We partner with a variety of government agencies, universities, and non-governmental organizations on ecological connectivity science, policy, and projects, including in Gallatin County. For instance, we recently worked with U.S. Forest Service staff on the Custer-Gallatin National Forest to develop ecological connectivity assessments for their forest plan revision.¹

We are encouraged that the Draft Growth Policy recognizes the importance of maintaining and restoring connections between key areas of fish and wildlife habitat in the county. In particular, we appreciated the recognition of important winter range habitat in the foothills of the Bridger Mountains and Gallatin Range, as well as the recognition of important wildlife movement and migration across Bozeman Pass and in the Hebgen Lake area, which the draft Growth Policy acknowledges are important Focal Areas in Montana’s State Wildlife Action Plan (page 5-36). Relatedly, the county was wise to establish goals to “[a]void creating impediments to wildlife movement and migration” and “[m]inimize the fragmentation and loss of habitat” (page 5-36). The Draft Growth Policy also includes a sound recommendation to “[l]imit fencing or encourage wildlife friendly fencing” (page 5-38). Additionally, it was prudent of the county to establish the policy to “[m]aintain and develop key partnerships to identify important wildlife habitat, including areas important for wildlife movement and migration” (Habitat Policy HAB-1-4 on page 6-7), to monitor the total acreage preserved of wildlife corridors, and to establish a target to increase the amount of protected acreage (page 8-10).

In revising this draft of the Growth Policy, the county has the opportunity to better integrate the concept of ecological connectivity throughout the document so that planners and developers have

¹ Williamson, M.A., Creech, T.G., Carnwath, G., Dixon, B. and Kelly, V., 2020. Incorporating wildlife connectivity into forest plan revision under the United States Forest Service's 2012 planning rule. *Conservation Science and Practice*, 2(2), p.e 155.

sufficient guidance to adequately advance the stated commitment to facilitating important natural wildlife movements and reducing habitat fragmentation. Maintaining intact natural systems is important not only because doing so protects habitat, but also because doing so provides critical ecosystem services, such as pollination, carbon sequestration, flood control, drought mitigation, water purification, pest and disease regulation² – all of which greatly contribute to the human and community well-being.

We offer the following recommendations regarding potential revisions to ensure that the best available scientific information, tools, and policies regarding ecological connectivity are fully integrated into the final version of the Growth Policy:

1. Elevate the importance of terrestrial habitat connectivity as a criterion in subdivision review
2. Incorporate Montana Fish, Wildlife & Park’s subdivision design standards to minimize habitat fragmentation
3. Monitor the impacts of growth and development on ecological connectivity
4. Include additional policies to promote safe wildlife passage across roads
5. Protect native vegetation to maintain ecological corridors and other ecosystem services
6. **Develop a map of ecological connectivity in Gallatin County to inform land use and transportation planning**

These recommendations could be implemented through straightforward revisions to the text of the draft Growth Policy, as proposed below. Adopting the proposed recommendations would ensure adequate protection of our fish and wildlife heritage, and the environmental, economic, and recreational benefits they provide for current and future generations of Gallatin County residents and visitors.

Comments on “Chapter 5: Primary Criteria and Subdivision Review”

1. Elevate the importance of terrestrial habitat connectivity as a criterion in subdivision review

Among the greatest threats to the survival of many native species is the loss, degradation, and fragmentation of natural habitat. Species need corridors to migrate, disperse to new territory, maintain genetic diversity, and move in response to events like fire, drought or flooding.³ These natural movements and migrations between patches of habitat can be impeded by physical barriers like roads and fences and land use changes that fragment or degrade habitat.⁴

²Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-Being*. Washington, D.C: Island Press. <https://islandpress.org/books/millennium-ecosystem-assessment-series>

³Gregory, A., Spence, E., Beier, P., and E. Garding. 2021. Toward Best Management Practices for Ecological Corridors. *Land* 140 (10): 1-25. <https://www.mdpi.com/2073-445X/10/2/140>.

⁴Ament, R., R. Callahan, M. McClure, M. Reuling, M., and G. Tabor. 2014. *Wildlife Connectivity: Fundamentals for Conservation Action*. Center for Large Landscape Conservation: Bozeman, Montana. <https://largelandscapes.org/resources/>.

We recommend that the criteria for reviewing subdivision proposals include additional considerations of the impacts of proposed development (particularly transportation infrastructure) on both terrestrial and aquatic habitat connectivity. Specifically, within the “Wildlife Habitat” section, we recommend revising the second bullet in the “Definition” sub-section to include the following italicized text:

- “The following items may be considered when evaluating a proposed subdivision’s potentially significant adverse impacts on wildlife habitat...Potential for creating barriers to *terrestrial* wildlife movement and migration on the landscape (e.g., non-wildlife friendly fencing, *construction or widening of roads, and increased traffic volume*) ...” (page 5-33).

Additionally, within the “Water Bodies” column of the table labeled “Core Wildlife Habitat,” we recommend inserting the following italicized text:

- “Water bodies provide important habitat for fish and wildlife. Water bodies are listed as Aquatic and Terrestrial Community Types of Greatest Conservation Need in Montana's State Wildlife Action Plan. *Rivers, streams, and their associated riparian areas are used as movement corridors by a wide variety of aquatic and terrestrial species...*” (page 5-36, “Justification” row).
- “Design road crossings to minimize delivery of sediments and other pollutants to nearby waterbodies while providing aquatic organism passage, which allows permanent, bidirectional movements of fish and other aquatic organisms through or beneath human infrastructure such as culverts, bridges, diversion dams, etc. Refer to Montana's Stream Permitting Guide⁴ for design and maintenance recommendations. *Where feasible, design crossings to accommodate terrestrial species as well. See also: US Department of Transportation Wildlife Crossing Structure Handbook⁵ and New Jersey Flood Hazard Area Control Act Rules⁶* (“Recommendations” row).

Comments on “Chapter 6: Goals and Policies”

2. Incorporate Montana Fish, Wildlife & Park’s subdivision design standards to minimize habitat fragmentation

Subdivisions often degrade wildlife habitat by fragmenting blocks of open space occupied by wildlife; creating physical barriers between patches of habitat that prevent natural animal movements; creating immediate and/or ongoing disturbances that hamper the ability of wildlife to survive and reproduce; and/or removing riparian vegetation and introducing sediments and pollution into nearby streams. Habitat Policy HAB-1-7 addresses these adverse effects by making a commitment to incorporating Montana Fish, Wildlife & Parks (FWP) “recommendations for mitigating development impacts” on wildlife and their habitat (page 6-6).

⁵ Clevenger, A.P. and M.P. Huijser, M. P. 2011. [Wildlife crossing structure handbook: design and evaluation in North America](#). USDOT/Federal Highway Administration: Publication No. FHWA-CFL/TD-11-003.

⁶ N.J.A.C. 2019. §7:13. New Jersey Flood Area Control Act Rules: https://www.nj.gov/dep/rules/rules/njac7_13.pdf

The Growth Policy would be even better positioned to achieve its goal of preserving habitat connectivity if it included an additional policy specific to habitat fragmentation caused by subdivision development. We recommend adding the following Habitat Policy under Habitat Goal 1 (page 6-6) to

- *“Incorporate the following subdivision design standards recommended by FWP: ⁷*
 - *Cluster the subdivision design features on as small a footprint as possible, as far from winter range as possible, and as close to existing development as possible.*
 - *Locate areas of proposed open space immediately adjacent to existing open space or seasonal habitat in order to maintain ecological connectivity.*
 - *Provide or maintain linkages within and between patches of seasonal habitat. WL, WH, NE”*

3. Monitor the impacts of growth and development on ecological connectivity

More than 20 years of research suggests that maintaining ecological connectivity is the most effective strategy to safeguard healthy wildlife populations⁸ and the aforementioned ecosystem services upon which life depends, particularly in light of changing land use patterns and climate.⁹ Ecological connectivity is most simply defined as: “the unimpeded movement of species and processes that support life on earth.”¹⁰ Ecological connectivity can be monitored through spatial analysis of land use patterns and by monitoring of wildlife movements. Such analyses are critical for assessing the potential cumulative effects of new development on wildlife and intact natural systems that currently contribute to the county’s “high quality of life” (page 5-24). Several Bozeman-based groups, including the Center for Large Landscape Conservation, Wildlife Conservation Society, and Craighead Institute, and university researchers have conducted ecological connectivity analyses of local landscapes, and are considered experts in this field.

We recommend integrating the concept of ecological connectivity into policy under Environment Goal 1. Specifically, the Draft Growth Policy could include the italicized text under Environment Policy ENV-1-4:

- *“Develop and/or maintain strategic partnerships to monitor key environmental indicators that support air and water quality, fishery productiveness, species health, *ecological connectivity, etc.*”* (page 6-10).

4. Include additional policies to promote safe wildlife passage across roads

⁷ See the design standards on pages 11-12 of Fish and Wildlife Recommendations for Subdivision Development in Montana. April 2012. <https://myfwp.mt.gov/getRepositoryFile?objectID=55357>.

⁸ Heller, N. and E. Zavaleta. 2009. Biodiversity Management in the face of climate change: A review of 22 years of recommendations. *Biological Conservation* 1 (142): 14–32. <https://www.sciencedirect.com/science/article/abs/pii/S000632070800387X>

⁹ Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-Being. Washington, D.C: Island Press. <https://islandpress.org/books/millennium-ecosystem-assessment-series>

¹⁰ Convention on the Conservation of Migratory Species of Wild Animals. <https://www.cms.int/en/topics/ecological-connectivity>.

Montana ranks second-in-the-nation for collisions with wildlife,¹¹ and the recent Montana Department of Transportation (MDT) US-191 Corridor Study¹² found that nearly a quarter of reported crashes were due to wildlife. Collisions between wildlife and vehicles have increased by 50% in the most recently reported 15-year period, even as total collisions have held constant.¹³ Using a conservative methodology, the 1,247 carcasses MDT documented between Four Corners and Beaver Creek from 2009-2018 cost over \$10 million in property damage, lost hunting revenue, and human injury.¹⁴

In addition to direct wildlife mortality, roads can create a barrier to wildlife seeking water, food, mates, and shelter. These impediments to movement undermine long-term population viability for many vulnerable fish and wildlife species.¹⁵ Maintaining connections between habitat across the landscape is critical to conserving biodiversity.^{16,17} For this reason, neighboring Park County's 2017 Growth Plan encouraged MDT "to include mitigation of wildlife corridors in planning and implementing highway projects" on state and federal roads in the county.¹⁸ Federal highway projects in Montana are paid for by a mix of federal and state funds, and several federal surface transportation programs can be used to support wildlife crossing infrastructure.

Fortunately, Gallatin County is home to world-class experts in the field of road ecology and the level of resolution needed to determine potential areas for mitigation measures is achievable at the county-level. The Western Transportation Institute at MSU (WTI-MSU) put together a Wildlife Crossings Master Plan for Teton County and an Animal-Vehicle Collision Reduction Plan for the Blackfeet Nation. The Center for Large Landscape Conservation partnered with WTI-MSU on the Blackfeet project and is gathering additional information about US-191 through citizen science, in response to the need for partnership to achieve implementation described in the aforementioned MDT corridor study. The Center for Large Landscape Conservation, Wildlife Conservation Society, and Craighead Institute have carried out additional connectivity research that may apply in specific reaches of the county.

¹¹ State Farm Auto Insurance. <https://www.statefarm.com/simple-insights/auto-and-vehicles/how-likely-are-you-to-have-an-animal-collision>.

¹² Montana Department of Transportation. 2020. US-191 Corridor Study (Four Corners to Beaver Creek). <https://www.mdt.mt.gov/pubinvolve/us191/documents.shtml>.

¹³Huijser, M. P., P. T. McGowen, J. Fuller, A. Hardy, A. Kociolek, A. P. Clevenger, D. Smith, and R. Ament. 2007. Wildlife-Vehicle Collision Reduction Study. Report to U.S. Congress. U.S. Department of Transportation, Federal Highway Administration, Washington DC.

¹⁴ Huijser, M. P., J. W. Duffield, A. P. Clevenger, R. J. Ament, and P. T. McGowen. 2009. Cost-benefit analyses of mitigation measures aimed at reducing collisions with large ungulates in the United States and Canada: A decision support tool. *Ecology and Society* 14(2): 15.

¹⁵ Ament, R., R. Callahan, M. McClure, M. Reuling, M., and G. Tabor. 2014. Wildlife Connectivity: Fundamentals for Conservation Action. Center for Large Landscape Conservation: Bozeman, Montana. <https://largelandscapes.org/resources/>

¹⁶ Hilty, J. et al. 2019. Corridor Ecology: Linking Landscapes for Biodiversity Conservation and Climate Adaptation. Washington, DC: Island Press. <https://islandpress.org/books/corridor-ecology-second-edition>

¹⁷ Heller, N. and E. Zavaleta. 2009. Biodiversity management in the face of climate change: A review of 22 years of recommendations. *Biological Conservation* 1(142): 14-32. <https://www.sciencedirect.com/science/article/abs/pii/S000632070800387X>

¹⁸ Park County Growth Policy. 2017. <http://www.parkcounty.org/uploads/files/pages/36/Growth-Policy-with-Appendices-attached.pdf>

We therefore recommend including an additional policy under Habitat Goal 1 to promote wildlife safe passage and reduce fragmentation of terrestrial habitat. The new policy could follow Habitat Policy HAB-1-8 (regarding aquatic organism passage for road crossings) and read:

- *“Encourage options for safe terrestrial wildlife passage at road crossings, especially in areas that may serve to connect core wildlife habitat zones, higher-value wildlife habitat, wildlife corridors, river and stream corridors, and open space networks”* (page 6-6).

Similarly, we recommend incorporating corridor conservation policy under Habitat Goal 2. Specifically, we suggest incorporating the italicized language into the list of issues to address through covenants and other tools in Habitat Policy HAB-2-3:

- *“Facilitation of wildlife access to streams, wetlands, and other nearby wildlife habitat and corridors”* (page 6-7).

Wildlife-vehicle conflict could also be addressed by adding the following policy under Transportation Goal 1:

- *“TRN-1-19: Encourage partnerships with agencies, universities, non-governmental organizations, and other experts to incorporate information on wildlife movement and migration into transportation planning and documents such as the County-wide Transportation Master Plan. PH, NE, WL, WH”* (page 6-19).

5. Protect native vegetation to maintain ecological corridors and other ecosystem services

Native plants have tremendous value: they improve climate resilience, reduce soil erosion, build soil structure, and absorb rainfall.¹⁹ Yet each day in the U.S., over 6,000 acres—the equivalent of 4,500 football fields—of open space converted per day to other uses, resulting in a dramatic degradation and reduction of native vegetation and the habitat it provides.²⁰ Maintaining native plants in landscapes supports pollinators and other insects that are key parts of the food chain for birds and other wildlife. FWP offers the following subdivision design standards in order to “[m]inimize the fragmentation and loss of native grassland” and “maintain habitat patches important to wildlife and wildlife connectivity”:

Locate areas of proposed open space immediately adjacent to existing native vegetation or open space on adjacent lands, in order to maintain the functional connection with other open space and native grassland and native shrub habitat patches on public and private lands.²¹

We therefore recommend the Growth Policy include native plant conservation in habitat policies and landscaping standards. More specifically, native plant conservation could be incorporated into the list of issues to address through covenants and other tools in Habitat Policy HAB-2-3 by adding the following italicized language:

¹⁹USDA-NRCS-Montana. https://www.nrcs.usda.gov/wps/portal/nrcs/mt/water/resources/nrcs144p2_057454/. Accessed 3/25/2021.

²⁰ U.S. Forest Service. <https://www.fs.fed.us/science-technology/loss-of-open-space>. Accessed 3/25/2021.

²¹ Fish and Wildlife Recommendations for Subdivision Development in Montana. April 2012. <https://myfwp.mt.gov/getRepositoryFile?objectID=55357>.

- “Limit pond and water features, and encourage xeriscaping *and maintenance of native vegetation (in accordance with FWP’s recommendations on subdivision development)* to conserve water for fish and wildlife” (page 6-7).

We also recommend incorporating native plant conservation into Sustainability Goal 1 by adding the italicized text to Sustainability Policy ST-1-3:

- “Encourage the inclusion of landscaping standards (water-wise and drought-tolerant planting, *including maintenance of native vegetation where applicable*, green roofs, greenspace, parks, watercourse mitigation, edible landscapes, and community gardens) into developments” (page 6-21).

Comments on “Chapter 8: Implementation and Action Plan”

6. Develop a map of ecological connectivity in Gallatin County to inform land use and transportation planning

Given the aforementioned spatial, road, and corridor ecology expertise of local university, agency, and conservation organization staff, Gallatin County is uniquely positioned to successfully identify key areas of ecological connectivity. Understanding where ecological corridors exist and where they intersect with various land uses and transportation systems would allow the county to better balance and achieve the conservation and development goals articulated in the Growth Policy. Spatially identifying ecological corridors would be essential to achieving the county’s stated policy to “[m]aintain and develop partnerships to identify important wildlife habitat, including areas important for wildlife movement and migration” (Habitat Policy HAB-1-4 on page 6-6). Moreover, such a mapping effort would align²² Gallatin County’s Growth Policy with that of neighboring Park County, which directs the planning department to “[i]dentify critical wildlife corridors for development, infrastructure, and conservation planning.”

We recommend the county work with partners at natural resource agencies, MSU, and conservation organizations, such as the Center for Large Landscape Conservation, to map areas of important ecological connectivity throughout Gallatin County. This map would complement the wildlife habitat maps, and serve as a layer to be incorporated in county land use and transportation maps to inform future planning efforts. This proposal could be included in the Growth Policy by adding the following italicized text to the “Additional Plans, Studies, and Programs Section”:

- “Examples of these potential efforts include: a County-wide Transportation Master Plan, a Capital Improvements Plan, a Climate Action Plan, a community asset mapping initiative that identifies viewsheds, open spaces, *ecological connectivity*, and sites within the County to be preserved for future generations, a Preservation of Farm Lands Master Plan, a Water Resources Master Plan and many others” (page 8-6).

²² Park County Growth Policy. 2017. <http://www.parkcounty.org/uploads/files/pages/36/Growth-Policy-with-Appendices-attached.pdf>.

Thank you for considering our recommendations. We would look forward to the opportunity to provide additional information and resources regarding any of the suggestions proposed in this document.

Sincerely,

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