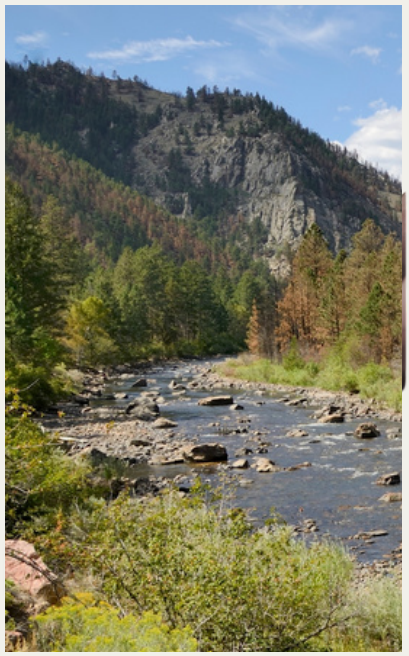
RURAL LAND STEWARDSHIP through COMMUNITY-BASED CONSERVATION

Introduction & Background



THE JUNIPER INITIATIVE

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Introduction

Exurban migration to private rural lands is the fastest growing form of land use in the U.S. Between 1990 and 2000, approximately thirty million acres were developed for private exurban lands nationwide. According to the 2017 US Census Bureau, roughly ninety-seven percent of U.S. land is identified as private rural lands, however only fourteen percent of the population resides here. As a result, private land owners disproportionately manage huge portions of America's lands and watersheds.

Nationwide, private lands support over two-thirds of the species listed under the Endangered Species Act, with ten percent of listed species occurring solely on private lands. In Colorado, private lands make up about sixty percent of the state, with approximately thirty percent or 7.1 million acres of the state's forested landscapes under management by less than two-hundred thousand private land owners (Colorado State Forest Service, 2018). As a result, efforts to protect biodiversity may require less reliance on protected lands & more on private lands.

Furthermore, the conservation of ecosystems, water, wildlife, the production of energy, and many other critical natural processes depend on the actions taken by rural private land owners. These areas offer opportunities for conservation that are different from protected areas, reserves, urban areas, and even ranch or agriculture lands, but have remained less of a focus in national conservation efforts.

PROTECTED AREAS ALONE WON'T BE ENOUGH TO ADDRESS CLIMATE CHANGE; CONSERVATION WITHIN RURAL RESIDENTIAL PRIVATE LANDS WILL BE CRUCIAL IN ORDER TO MANAGE ECOSYSTEM SERVICES AND PROTECT BIODIVERSITY.

While efforts to protect and restore wild areas continues to be a critical component to protecting ecosystem health and wildlife populations, as these areas continue to shrink and face pressure, it's important to have conjoined efforts that focus on other frameworks of conservation. This report examines how land stewardship behavior on rural private lands can provide additional habitat for certain species, protect natural processes, and have other positive impacts such as rural community resilience and increase human wellbeing. However, support is needed if we are to see meaningful impacts; this is where community-based organizations play a key role.

Socio-Ecological Perspectives

Exurban development causes the conversion of native habitat to roads, yards, and structures. The continued expansion of exurban development poses a threat to ecosystem health and wildlife, resulting in habitat loss and fragmentation, biodiversity declines, issues in soil nutrient cycling and a reduction in Ecosystem Services[1](ES). Impacts will negatively affect food supply chains, causing significant risks to human wellbeing in ways we have yet to fully understand.

THE ROLE OF RURAL COMMUNITIES

According to Colorado Rural Health, seventy-three percent of Colorado's counties are rural, with seventy-seven percent of the state's land mass being rural. For this reason, many decisions about the state's land management are made by private landowners. These decisions can have significant impacts radiating from each home extending hundreds of yards to miles, potentially altering biodiversity within protected areas. This is a significant area for conservation that is being predominantly overlooked, as small-acreage rural residents have not been a focus for conservation efforts.

Yet, rural communities are shown to be underrepresented in conservation decision-making within Colorado (Kretser et al, 2019). Colorado's population depends on the provision of ES in these regions, despite only one in five Americans living on rural lands, resulting in inequities surrounding environmental responsibility, economic hardships, and resource sharing. Additionally, research suggests that rural Americans have a closer connection to nature, and could therefore be a major component for protecting it.

However, rural residents can't do it alone. Support, funding and resources are needed in order to reduce further pressures on rural communities in order to share accountability in the management of ES, natural resources and biodiversity.

1. The Millennium Ecosystem Assessment from the United Nations identifies Ecosystem Services as benefits to humans provided by natural processes and are categorized as; Provisioning Services or the provision of food, fresh water, fuel, fiber, and other goods, Regulating Services such as climate, water, and disease regulation as well as pollination, Supporting Services such as soil formation and nutrient cycling; and Cultural Services such as educational, aesthetic, and cultural heritage values as well as recreation and tourism.

ADDITIONAL FRAMEWORKS OF RURAL COMMUNITIES: WUI

With private lands covering twenty-five percent of the conterminous U.S., and more than nine percent identified as wildland-urban interface[2] (WUI), continued rapid development leads to more ecological damage and habitat destruction. Colorado's WUI is often seen as a focal point for human–environment conflicts, such as the destruction of homes by wildfires, habitat fragmentation, biodiversity decline, and issues with nonnative species.

WUI regions are rapidly growing emergent systems, arising from interactions between human development and ecological processes that come with unique risks, services, and conservation opportunities. As a result, the dynamics of managing WUI regions now and into the future presents multiple challenges, especially with the added pressure of a changing climate. As a result, decision-making often takes place despite limited knowledge about critical environmental interactions and trade-offs.

A more robust conceptualization of conservation needs to include efforts and initiatives within WUI regions that prioritize ecological restoration and conservation while engaging with rural communities in order to find solutions that work for residents and the environment. A better understanding of these regions, specifically in relation to WUI interactions and their role in the bridging between cities and surrounding wildlands, is crucial in order to reduce the risk of environmental destruction, ensure the continued provisioning of ES, and conserve biodiversity.

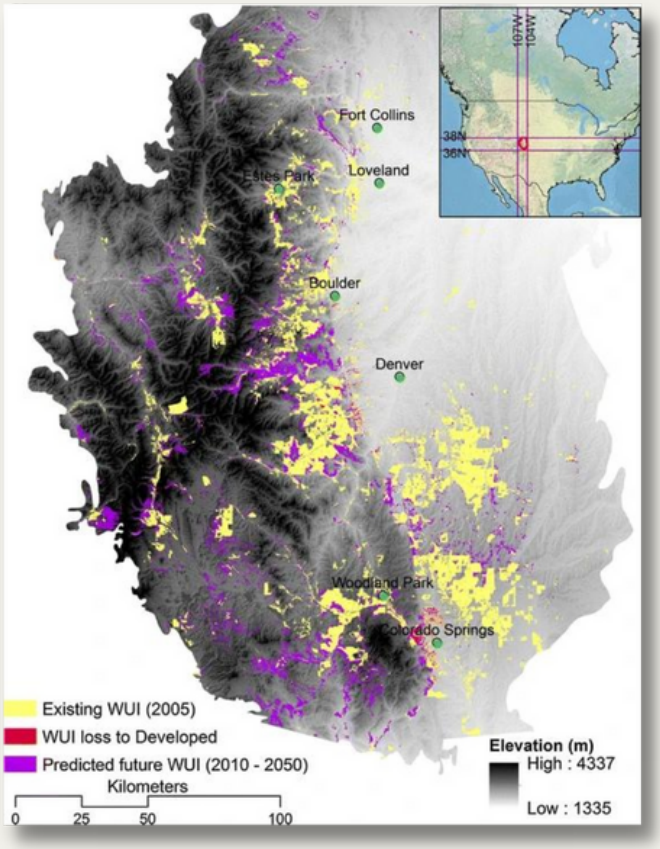

Figure 1. Some of the highest growth rates are anticipated to be in Northern Colorado and the Western Slope, with the majority of this occurring in rural areas. Across Colorado, some of these regions have seen an increase of over 50% in population since 2016, with the largest areas located in the eastern Rocky Mountains, including Larimer County. (Climate change and wildfire risk in an expanding wildland-urban interface: a case study from the Colorado Front Range Corridor, 2015).

2. The definition of WUI as stated by the U.S. Fire Administration is the zone of transition between unoccupied land and human development. It is the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels and is at risk of wildfire.

WUIs are of particular importance in conservation, serving to couple human and natural systems with multiple interacting processes. Further adding to this complexity, rural stakeholders differ widely in their values surrounding development, needed services, hazards, and conservation, where actions are influenced by diverse goals, jurisdictions, and capacities, and operate across multiple spatial scales. This contributes to an increased challenge in the management of WUI regions.

WILDLAND-URBAN INTERFACE DYNAMICS

Figure 2. WUIs are systems arising from the interactions between development and ecological processes. Changing ecological systems within the WUI makes it challenging to comprehend the dynamics of each interaction. (An expanded framework for wildland–urban interfaces and their management, 2022).

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ACRES OF PRIVATE LANDS HAVE BEEN DEVELOPED

50%

EXPANSION OF WUI PROJECTED ON THE FRONT RANGE BY 2050

Human–environment issues in the WUI are likely to increase in the future as growth trends continue in rural areas that are rich in natural amenities. Given these implications, the WUI should be a focus of statewide discussions on natural resource issues and policies, in which local leadership and voices have a say in decision-making. This will require new partnerships with rural stakeholders, rethinking of environmental impacts and practices, as well as new communication strategies.

As a result of WUIs emerging from societal and environmental systems, people can work to improve future dynamics and conditions. Management of WUIs should place an emphasis on trade-offs among development practices, known ecosystem processes, and local stakeholders.

While wildfire is of particular concern, it is just one of many risks involved in WUI communities. Given that WUIs are often priority areas for development, they are also hotspots for ecological change.

1 WILDLIFE

The WUI is a focal point for human–environment conflicts, such as fragmentation and biodiversity decline, invasive species, and habitat loss.

2 WATERSHED

Many WUI communities in Colorado are located in or near watersheds, in which other populations within the Southwest, as well as local wildlife, depend on.

3 POLLUTION

WUI communities serve as crucial regions for ES, making these places more susceptible to impacts from various pollutants.

61% OF COLORADO'S LANDS ARE PRIVATE LANDS & CONTAIN MORE SPECIES OF CONSERVATION VALUE

Challenges & Threats

Evaluating complex ecological systems and the inherent issues that arise from interacting human activity from a local perspective is fundamental when considering ecological and socioeconomic dimensions, as each region will have its own set of problems and setbacks to reconcile. As a result, conservation efforts should focus not only on environmental aspects such as habitat connectivity and biodiversity, but also on localized social and anthropogenic factors.

ENVIRONMENTAL

Climate change & other factors are having impacts on many ecological processes; drought and rising temperatures are anticipated to cause significant water supply shortfalls within the next few decades.

Recurring wildfire catastrophes impact critical ES and habitats for many threatened species, and bring significant risks to human life.

Numerous case studies show that housing in or near the WUI have profound effects on biodiversity and ecosystems, and that these effects are largely negative.

ANTHROPOGENIC

Rural areas affected by human encroachment have experienced habitat degraded by roads, development, invasive species, livestock & other domestic animals, waste runoff from farms, & heavy use of chemicals such as pesticides & fertilizers.

70-80% of Colorado's water falls west of the Continental Divide, while 80-90% of the population resides in the Front Range, causing impacts to watershed and riparian ecosystems.

Increases in population across the state will also increase recreational use in WUI regions, further impacting wildlife and wild spaces.

SOCIAL FACTORS

Socio-economic & cultural drivers shape the dynamics that drive development & interactions among private & public stakeholders, including land developers, landowners, residents, businesses, NGOs, & government agencies.

A 2014 study conducted by the Soil and Water Conservation Society indicated that perceived cost was the greatest barrier to adopting conservation practices.

Human health & wellbeing are inextricably linked with our surrounding ecosystems. As a result, health & wellbeing are being eroded, as is the existence of other species and the habitats they rely on.

Next Steps

Research has shown that engagement with rural stakeholders creates pathways for critical science to reach these communities, it also increases trust in environmental policies that impact the community directly.

Resources for how to protect natural resources and ES on private lands, as well as careful design of development and structures, implementation of native habitat for wildlife, and other various stewardship practices, can be decided upon by community members with the guidance and support of local conservation organizations and groups. This level of engagement within the community promotes conservation goals that address small rural residential landowners' needs in order to become more efficient and effective.

1 DEVELOPMENT

Promote green building design and practices, education on the importance of restricted water use and limited alteration of the land and native plant species.

2 SPECIES HABITAT

Provide education and outreach pertaining to harmful pesticide use, invasive plant management, water needs for wildlife, and wildscaping and/or wildlife garden practices.

3 WILDFIRE MITIGATION

Share information and resources on practices that help to reduce risk of wildfire, reducing threats to human life, habitat and ES loss, as well as financial costs.

Stewardship Through Community-Based Conservation

According to a recent study at Duke University, rural residents value environmental protection and policy at nearly the same level as urban residents, though they vary on which issues are most important. Additionally, rural residents emphasized a strong connection felt with the natural world, and while individuals in these regions may be willing to engage in stewardship behavior as a result of personal investment surrounding a particular issue or due to feeling a connection to an environmental problem, perceived cost remains the greatest barrier to rural landowners' adoption of conservation practices (Bonnie et al, 2020).

Private lands that provide habitat for wildlife support twice the wildlife and a greater diversity of species compared to a conventional landscaping (Talbert et al, 2007). Moreover, most biologically productive lands are private lands, bridging a divide in conservation that could afford significant opportunities for conservation goals and impact.

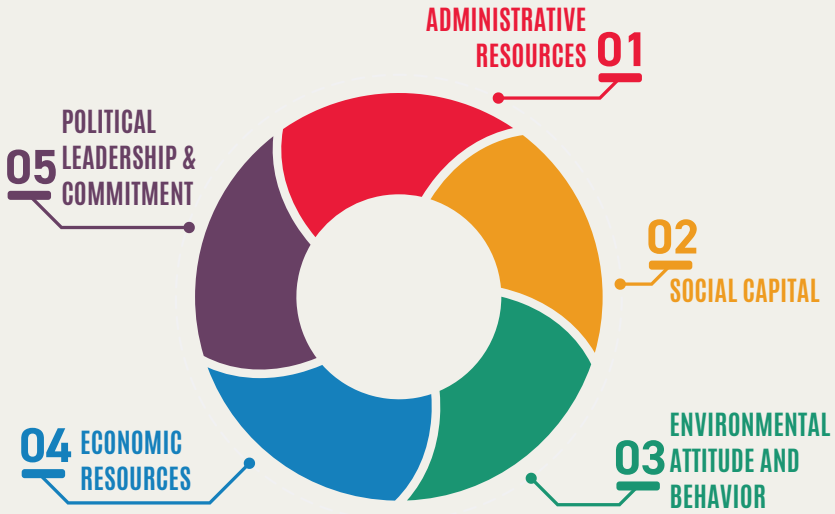
MANY SPECIES CAN THRIVE IN WUI COMMUNTIES, BUT ONLY IF WE MAKE EFFORT TO PROVIDE SAFE HABITAT

Community-based organizations provide needed collaborative support in rural and WUI communities due to their familiarity of regional ecological interactions, conservation issues of focus, local climate change impacts, and social dynamics. These organizations contribute to building trust, developing relationships within the community, and providing valuable resources and information for effective conservation practices.

A great example of conservation stewardship through community-based actions within Colorado has been the implementation of backyard nesting boxes across the state, which have helped bluebird populations recover from loss of natural nesting habitat. While these practices won't directly aid imperiled species such as Grizzly bears or Grey wolves that require vast wilderness areas, they can make a sizable difference for many species of wildlife, and may carry positive ripple effects to surrounding ecosystems.

KEY COMPONENTS OF CONSERVATION STEWARDSHIP

According to Bicudo da Silva et al (2017), there are five components required for rural conservation efforts to be successful; administrative resources, social capital, environmental attitude and behavior, economic resources, and political leadership and commitment. These elements are fundamental if we are to see collaborative conservation efforts in these regions.



5 KEY COMPONENTS RURAL CONSERVATION NEEDS TO SUCCEED

Despite rural residents consistently identifying as possessing a strong sense of legacy and stewardship of their environment, many of these communities lack the resources, organization and administration for up-to-date science, technologies, and collaborations (Bonnie et al 2020). Community-based organizations bridge gaps in national and statewide conservation efforts by improving the adoption of conservation practices and policy among rural residents via an increase in resources, information, and support. Community-based organizations can expand on rural conservation stewardship methods and practices, working to fill a gap in conservation among private lands, which contain roughly eighty percent of habitat for threatened and endangered species in the US.

While conservation on rural private lands is in need of more localized organization and resources, individual stewardship practices are crucial and should be developed and adapted to fit regional ecological and social needs. There are three primary guidelines that every rural landowner can follow to support local wildlife and ecosystems:

PESTICIDES

- Pesticides are some of our worst environmental pollutants, poisoning the air, water and soil and killing wildlife.
- Little is known about the combinations of chemicals being used, their effectiveness, their interactions with the environment & the true financial costs.

WATER

- Water is a precious resource for all life on Earth, not only humans.
- Billions of gallons are wasted annually on lawn care alone.

NATIVE PLANTS

- Plants are the foundation of wildlife habitat. Wildlife can't survive without healthy plant communities to provide habitat and food.
- Sustainable and environmentally-friendly management of invasive plant species.

In addition to ecological benefits, these practices also improve human health and wellbeing, as well as preserve ES. Land stewardship also serves as a connection to nature that's lacking from many people's lives. Ecosystem health should be considered an integral component in development sustainability and human wellbeing. We should be striving for ecosystem health in conservation stewardship practices at all levels to maintain and improve ES and in turn, our own wellbeing.

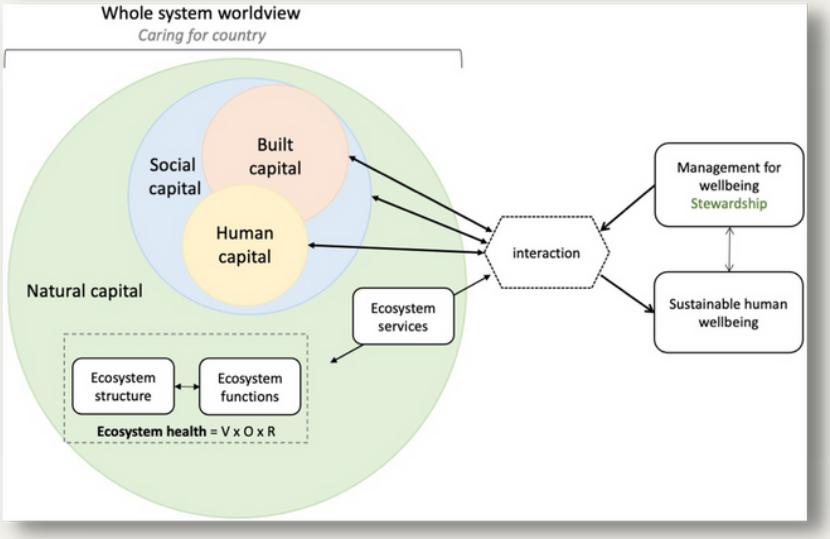


Figure 3. Healthy ecosystems provide human health and wellbeing through various ES, which are produced by interactions within individual, social, and natural resource benefits through capital and provisions. These services are affected by different conservation stewardship practices at individual and societal scales. (Ecosystem health, ecosystem services, and the well-being of humans and the rest of nature, 2022).

Conclusion

Conservation does not have a one-size-fits-all solution; not only does this pertain to ecological systems but to social ones as well. To encourage sustainable land management practices for the conservation of wildlife and ES on rural private lands, other considerations needs to be taken into account, such as financial sustainability for rural land owners and localized threats, like fire or invasive species. This will require an integrative approach based on ecological and socioeconomic factors specific to local ecological systems and community needs.

Environmental policy and suggested practices implemented from state or other large agencies do not always match the social and ecological realities of an area, particularly when pertaining to rural America. Community-based organizations support local engagement, permitting communities to make conservation decisions that apply to their region and in turn, produce greater adoption of conservation practices and a better outcome of goals.

Conventional approaches to conservation have often disconnected ecosystems and society in their aim for protection and preservation of species, ecosystems, and ES. Rather than recognizing that human societies are part of nature and as a result, are highly interconnected with ecological systems, we are beginning to see the repercussions of these outdated beliefs ecologically and within our societies.

We need a whole-system worldview of ecological and biological interactions and functions if we hope to change the current trajectory of environmental destruction. This will require both individual and conjoined efforts at national and local levels that bring new perspectives and will require greater critical thinking, resources, and collaboration.

Conservation stewardship not only works to address local and global environmental issues, but also protects ES, wildlife habitat, and human health and well-being. This is paramount for the survival of not only our environment, but ourselves as well. Community-based organizations connect rural communities with resources in order to improve state and nationwide conservation efforts in ways that strengthen residents' connection to nature and in turn, help to improve society and the environmental for everyone.

Works Cited

Berkes, F. (2004). Rethinking Community-Based Conservation. Conservation Biology. Vol. 18, Iss. 3. 621-630. https://doi.org/10.1111/j.1523-1739.2004.00077.x

Bicudo da Silva R.F., Delgado Alves Rodrigues M., Aparecida Vieira S., Batistella M., Farinaci, J. (2017). Perspectives for environmental conservation and ecosystem services on coupled rural–urban systems. Perspectives in Ecology and Conservation, Volume 15, Issue 2, Pages 74-81. https://doi.org/10.1016/j.pecon.2017.05.005.

Bonnie, R., E. Pechar Diamond, E. Rowe. (2020). Understanding Rural Attitudes Toward the Environment and Conservation in America. NI R 20-03. Durham, NC: Duke University. https://www.landcan.org/pdfs/understanding-rural-attitudes-toward-environment-conservation-america.pdf

Charles C., Keenleyside K., Chapple R., Kilburn B., Salah van der Leest P., Allen D., Richardson M., Giusti M., Franklin L., Harbrow M., Wilson R., Moss A., Metcalf L., Camargo L. (2018). Home to us all: how connecting with nature helps us care for ourselves and the Earth. Minneapolis: Children & Nature Network. http://hdl.handle.net/10545/623158

Hernández-Blanco M., Costanza R., Chen H., deGroot D., Jarvis D., Kubiszewski I., Montoya J., Sangha K., Stoeckl N., Turner K., van 't Hoff V. (2022). Ecosystem health, ecosystem services, and the well-being of humans and the rest of nature. Global Change Biology. https://doi.org/10.1111/gcb.16281

Jenerette G.D., Anderson K.E., Cadenasso M.L., Fenn M., Franklin J., Goulden M.L., Larios L., Pincetl S., Regan H.M., Rey S.J., Santiago L.S., Syphard A.D., (2022). An expanded framework for wildland-urban interfaces and their management. Frontiers in Ecology and the Environment. https://doi.org/10.1002/fee.2533

Kittredge, D.B., Short Gianotti, A.G., Hutyra, LR., Foster, D.R., Getson, J.M. (2015). Landowner conservation awareness across rural-to-urban gradients in Massachusetts. Biological conservation, Vol.184, p.79-89. https://colostate.primo.exlibrisgroup.com/permalink/01COLSU_INST/51l05n/cdi_proquest_miscellaneous_1770338357

Kretser H.E., Dale E., Karasin L., Pejchar L. Reed S.E (2019). Factors Influencing Adoption and Implementation of Conservation Development Ordinances in Rural United States, Society & Natural Resources, 32:9, 1021-1039, DOI: 10.1080/08941920.2019.1605435

Liu Z., Wimberly M.C., Lamsal A., Sohl T.L., Hawbaker T., (2015). Climate change and wildfire risk in an expanding wildland-urban interface: a case study from the Colorado Front Range Corridor. Landscape Ecology. 30, 1943-1957. https://link.springer.com/article/10.1007/s10980-015-0222-4?ftag=MSF0951a18

Works Cited

Mizejewskil D. Attracting Birds, Butterflies, and Other Backyard Wildlife. Singapore, National Wildlife Federation, 2019.

Perry-Hill R., Prokopy L. (2014). Comparing different types of rural landowners; Implications for conservation practice adoption. Journal of Soil & Water Conservation Society, 2014-05-01, Vol.69 (3), p.266-278. DOI: https://doi.org/10.2489/jswc.69.3.266

Radeloff V.C., Hammer R.B., Stewart S.I., Fried J.S., Holcomb S.S., McKeefry J.F., (2005). The Wildland-Urban Interface in the United States. Ecological Applications. C. 15, Iss. 3, 799-805. https://doi.org/10.1890/04-1413

Talbert, C.B., R.L. Knight &J.E. Mitchell. 2007. Private ranchlands and public land grazing in the southern Rocky Mountains. Rangelands 29:5-8. https://doi.org/10.2111/1551-501X(2007)29[5:PRAPLG]2.0.CO;2

Theobald D., Romme W., (2007). Colorado's Wildland-Urban Interface, Current and Projected. From the 2007 Report on the Health of Colorado's Forests. Colorado State University. https://static.colostate.edu/client-files/csfs/pdfs/Current_projected_WUI.pdf

Colorado's Changing Population (2017). Colorado Parks & Wildlife. https://cpw.state.co.us/Documents/Commission/2018/Sept/CO-Demographic-Changes.pdf

Colorado's Water Plan (2015). Colorado Water Conservation Board. https://dnrweblink.state.co.us/CWCB/0/edoc/199531/FinalCombinedCWPJune2016.pdf

U.S. Department of Agriculture (n.d.) What is the Wildland Urban Interface (WUI)? https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_053107.pdf

U.S. Fire Administration (June 8, 2022). What is the WUI? https://www.usfa.fema.gov/wui/what-is-the-wui.html