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The Role and Economic Importance of Private Lands in Providing Habitat for Wyoming's Big Game

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Wyoming's wildlife is an important asset to residents and visitors, providing pleasure for viewing and hunting and generating dollars in the state's economy. Wildlife generally does not respond to the boundaries of human society as animals move among private, state, tribal, and federal lands. These movements occur in yearly, seasonal, and daily patterns. Animals that are on public lands during the summer and autumn, especially in areas of high elevation, are very often found on lower elevation private lands during the winter.

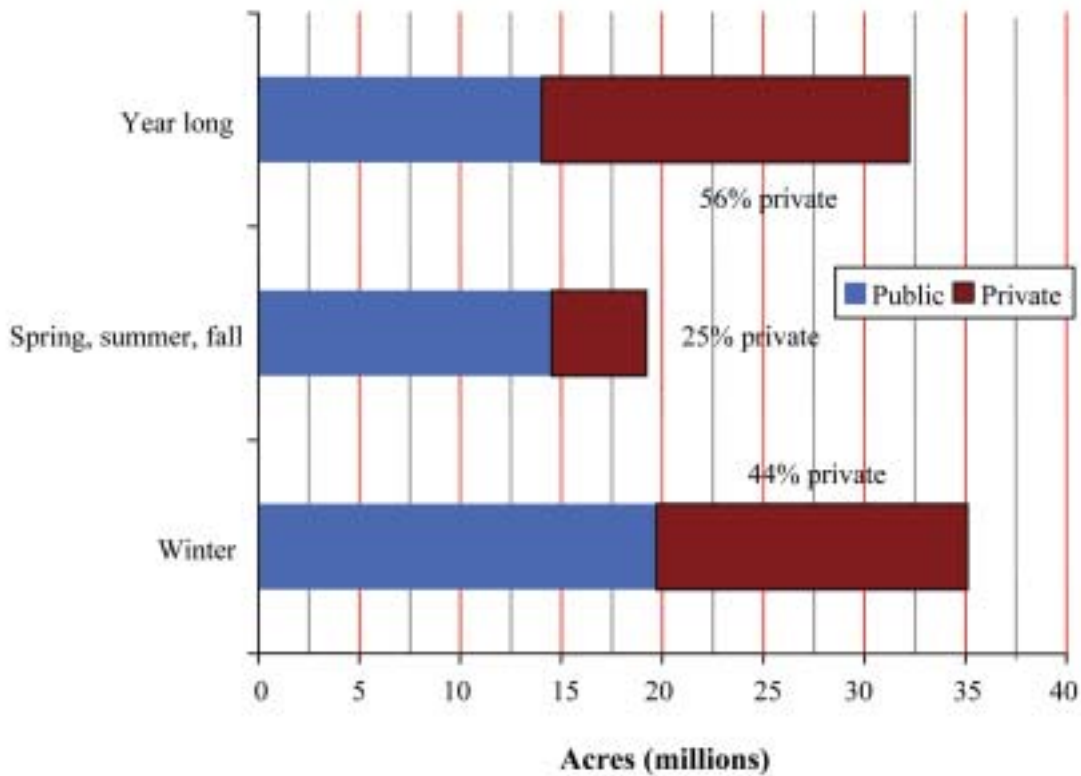
The mix, availability, and quality of seasonal range, both private and public, are critically important to big game herd size and viability, and herd size and viability can ultimately affect the enjoyment of residents and visitors. For this reason, the Wyoming Game and Fish Department (WGFD) works closely with private landowners and public land management agencies to manage the state's wildlife populations, both to enhance people's enjoyment and to decrease wildlife damage to private property. This publication describes the relationships among private lands, public lands, and seasonal range as well as the economic importance of private lands in providing seasonal habitat for six major big game species in Wyoming: pronghorn, elk, moose, bighorn sheep, mule deer, and white-tailed deer. This analysis was conducted to assess some of the potential consequences of habitat loss on private lands due to rural land development.

Seasonal Range

To estimate the role of private lands in providing seasonal range, a geographic information system (GIS) analysis was conducted using 2001 seasonal range data from WGFD and a land ownership map (University of Wyoming 1996). Seasonal range was categorized into winter, spring-summer-fall, and year-long range. Year-long range includes places where animals are able to reside in the same area throughout the year. Winter range identifies areas where animals migrate from spring-summer-fall range to get away from harsh winter conditions such as deep snow.

The three types of seasonal range are not mutually exclusive, and overlapping ranges among the six species were accounted for in this analysis as described in the following examples: If an area of 100 acres was classified as winter range for two or more species, it was counted as 100 (not 200 or more) acres in the total for winter range. If an area of 100 acres was classified as spring-summer-fall range for one species and winter range for another species, it was counted as 100 acres in the spring-summer-fall range category and again as 100 acres in the winter range category.

Figure 1. Seasonal range categories and acreages on private and public lands in Wyoming for six big game species combined.



This analysis does not distinguish among different levels of habitat quality within a specific range classification. Characteristics such as slope, elevation, vegetation, human use patterns, and water availability can make some areas more attractive than others within a seasonal range category. Because information on these “micro-level” characteristics is not available, however, the analysis took a statewide perspective and assumed that they were similar within seasonal range categories.

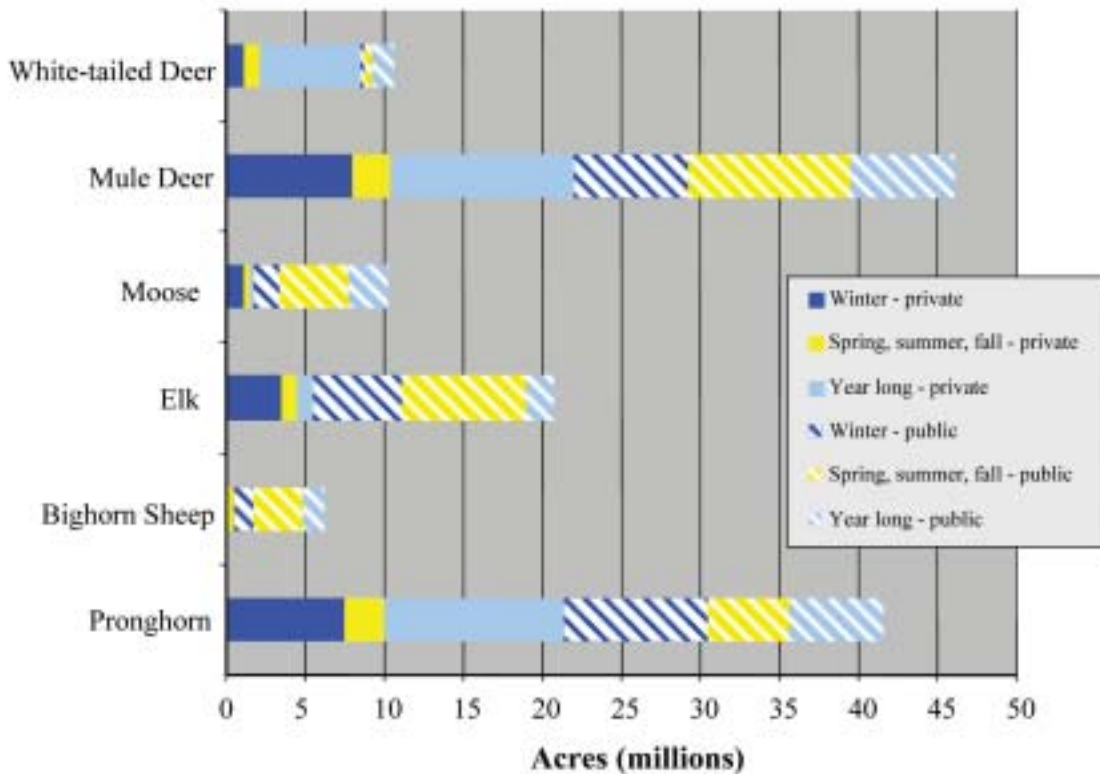
Winter range on private and public land accounts for more than 35.1 million acres, spring-summer-fall range is approximately 19.2 million acres, and year-long range totals 32.2 million acres (Figure 1). Year-long range is 56 percent private land and is located in areas of the state that are predominantly privately owned. Forty-four percent of winter range is in private ownership; much of this is critical to animals that summer in higher elevations. Spring-summer-fall range is predominantly on public land with only 25 percent on private lands.

Map 1 displays aggregate seasonal ranges on private land and public land for all six species combined. No seasonal range is shown for Yellowstone National

Park because it was not included in this study. Maps 2 to 7 show the types of seasonal range on private land for each individual species. Areas not identified as private land winter, spring-summer-fall, or year-long range on Maps 2 to 7 are either public land seasonal range or are not considered seasonal range for any of the species studied.

The overall importance of private land is greater for some big game species than for others (Figure 2). White-tailed deer in some places generally occur in bottomland along rivers, and these areas are mostly privately owned. Eighty percent of white-tailed deer seasonal range is private. Mule deer (58 percent) and pronghorn (51 percent) also substantially depend on private land seasonal range. In contrast, bighorn sheep have the least amount of seasonal range on private land, totaling only 7 percent. Twenty-seven percent of elk seasonal range is private as is 17 percent of moose seasonal range. Typically, for many of these species, a high percentage of spring-summer-fall range on public land correlates with a high percentage of winter range on private land.

Figure 2. Seasonal range categories and acreages on private and public lands for six big game species in Wyoming.



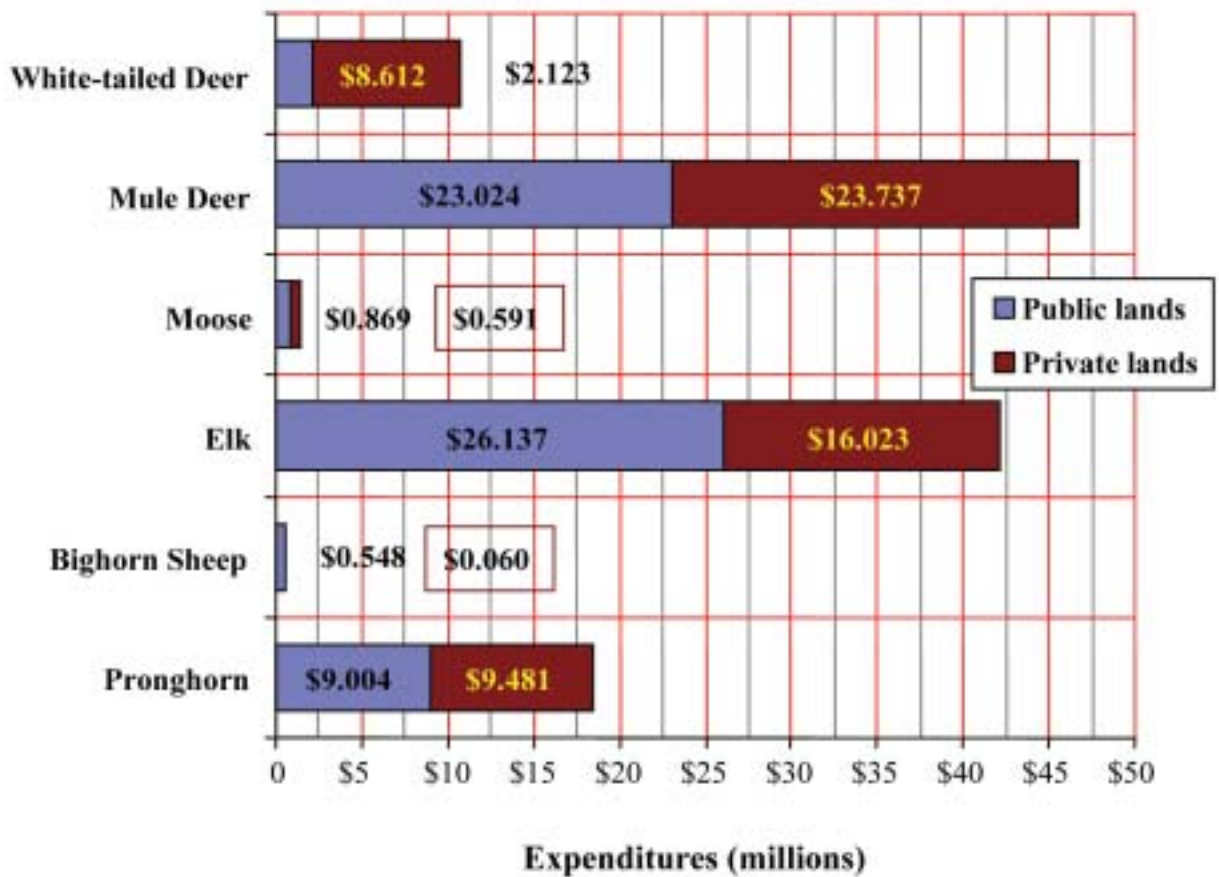
Hunter Expenditures

While it is not known exactly how much hunting and wildlife watching occurs each year on public or private land in the state, WGFD data and other studies can be used to estimate the activity and economic benefits related to hunting. Private lands support a proportion of hunter days directly through access arrangements, but more importantly they support hunter days indirectly by providing habitat for animals during other times of the year. Annual hunter-day data collected by WGFD were used to allocate hunter-day information to each seasonal range category. (“Hunter days” are determined by WGFD questionnaires that ask hunters how many days of effort they expended). WGFD groups hunter data by geographic areas called herd units with boundaries that are unique for each species. Hunters are assigned to specific herd units, and the agency collects resident and non-resident hunter-day data for each herd unit. For this study, hunter-day data were allocated to seasonal range areas within each herd unit and then summarized by seasonal range type.

Total expenditures were estimated using hunter-day estimates and expenditure studies for Wyoming (Lee and others 1989; Responsive Management 1998). Hunter-day expenditure categories were taken from these two sources and inflated to 2002 dollars. Hunter expenditures were summarized across herd units and allocated to seasonal range types, both public and private, based on the acreage for each type within each herd unit. Estimates of hunter days and hunter expenditures from individual herd units were then added for a state total.

Resident and non-resident hunters pursuing these six species totaled almost 918,000 hunter days in Wyoming in the year 2000. Residents accounted for 71 percent of total hunter days. The six species reviewed here generated more than \$120.3 million in hunter expenditures in 2000, with resident hunters accounting for 49 percent and non-resident hunters accounting for 51 percent of this total. Based on the acreages of private seasonal range for each species and species-specific hunter information, it is estimated that private lands supported more than \$58 million in

Figure 3. Annual hunter expenditures in 2000 for six big game species supported by habitat on private and public lands in Wyoming.



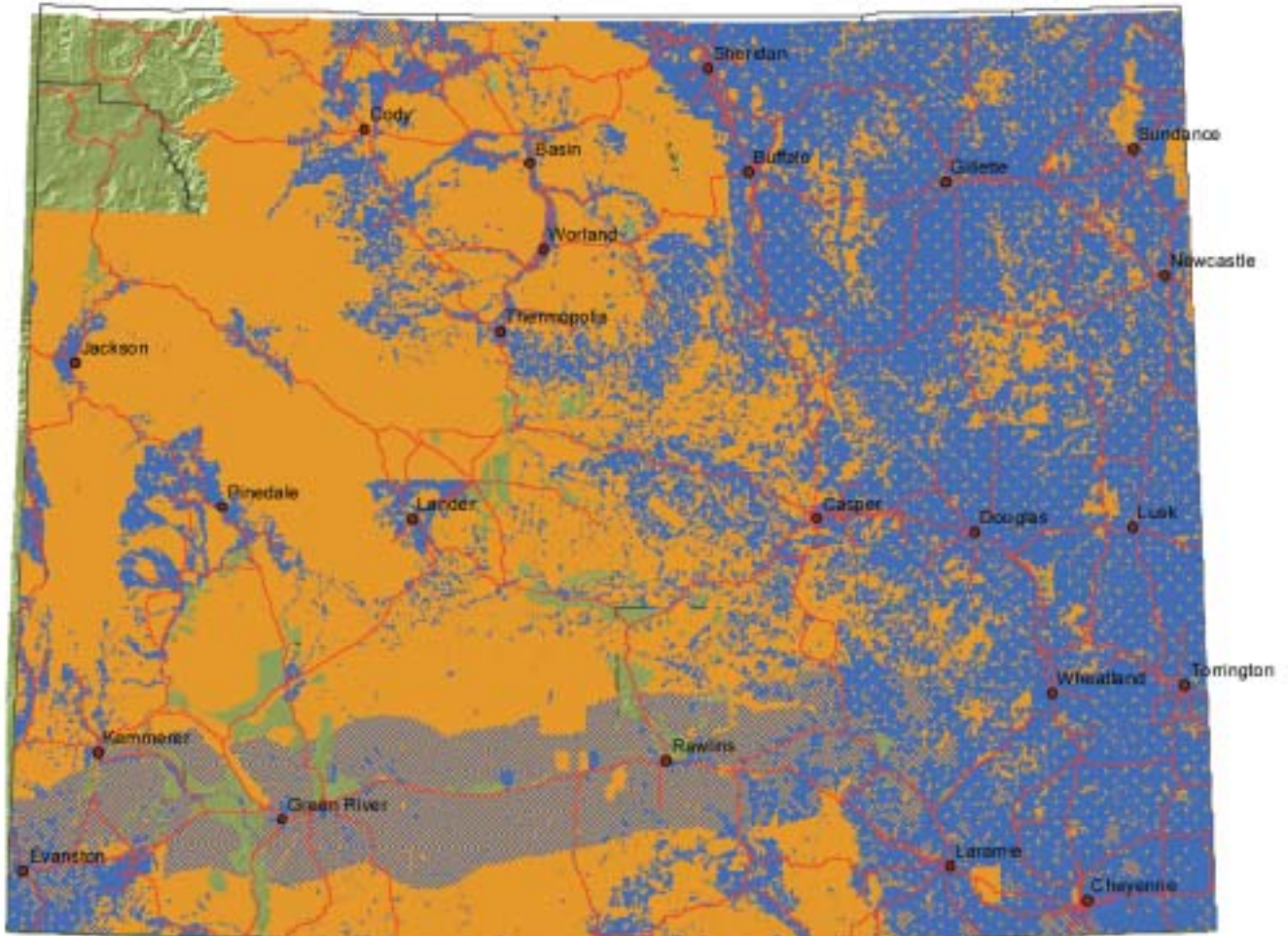
hunter expenditures in 2000 or just under 50 percent of the total. Values ranged from \$60,067 for bighorn sheep to \$23.7 million for mule deer (Figure 3).

Private landowners do receive some compensation in the form of payments for wildlife damage and hunter access fees, but most economic activity related to wildlife accrues to the state's businesses such as motels, gasoline stations, restaurants, retail outlets, and food stores. Thus, private land seasonal range provides a positive economic spillover from agriculture and other private landowners to the broader economy. The loss of private ranchlands in some areas of the state to rural development (as discussed in American Farmland Trust 2002 and Taylor 2003) could adversely affect the sizes of big game herds, causing potential important consequences to Wyoming's economy.

Literature Cited

- American Farmland Trust. 2002. *Strategic Ranchland in the Rocky Mountain West: Mapping the Threats to Prime Ranchland in Seven Western States*. www.farmland.org.
- Lee, Be-Ling, Walter M. Hudson, and Thomas Buchanan. 1989. *Hunting and Fishing Expenditure Estimates for Wyoming*. Report Submitted to the Wyoming Game and Fish Department, Cheyenne, Wyoming.
- Responsive Management. December, 1998. *Wyoming 1997 Hunting Expenditures*. Report Submitted to the Wyoming Game and Fish Department, Cheyenne, Wyoming.

Map 1. Aggregate seasonal range on private lands (blue) and public lands (orange) for six major big game species in Wyoming. Yellowstone National Park was not included in this analysis. Other green areas are not considered seasonal range for any of the species studied.



Taylor, David T. 2003. *The Role of Agriculture in Maintaining Open Spaces in Wyoming*. University of Wyoming Cooperative Extension Service Bulletin B-1141, Laramie, Wyoming.

University of Wyoming Spatial Data and Visualization Center. 1996. *Land Ownership and Management for Wyoming*. Wyoming GAP Analysis. Laramie, Wyoming.

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Map 2. Seasonal range on private lands for bighorn sheep in Wyoming. Dark blue areas are private winter range, light blue areas are private year-long range, and yellow areas are private spring-summer-fall range. Green areas are either public land seasonal range or are not considered seasonal range for this species.



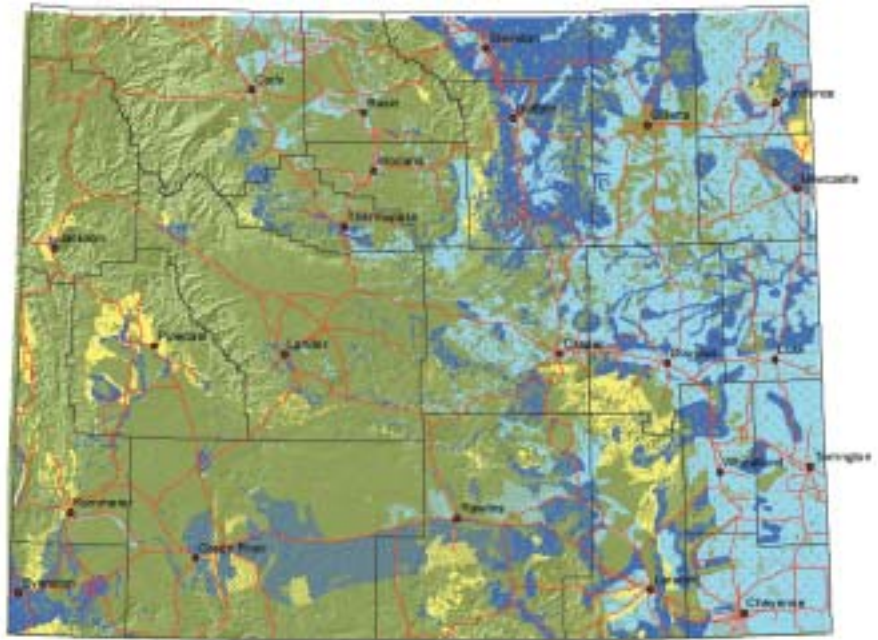
Map 3. Seasonal range on private lands for elk in Wyoming. See Map 2 for explanation of colors.



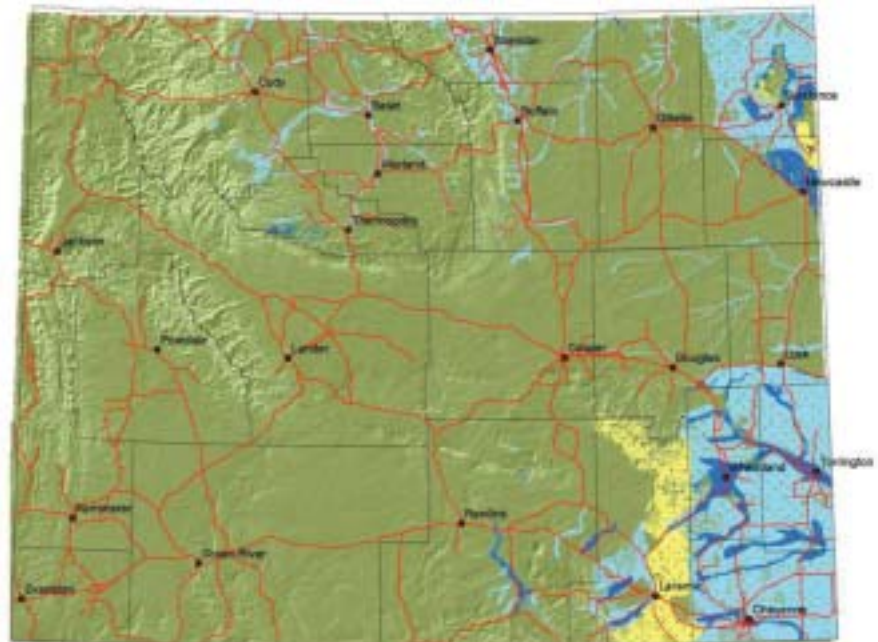
Map 4. Seasonal range on private lands for moose in Wyoming. See Map 2 for explanation of colors.



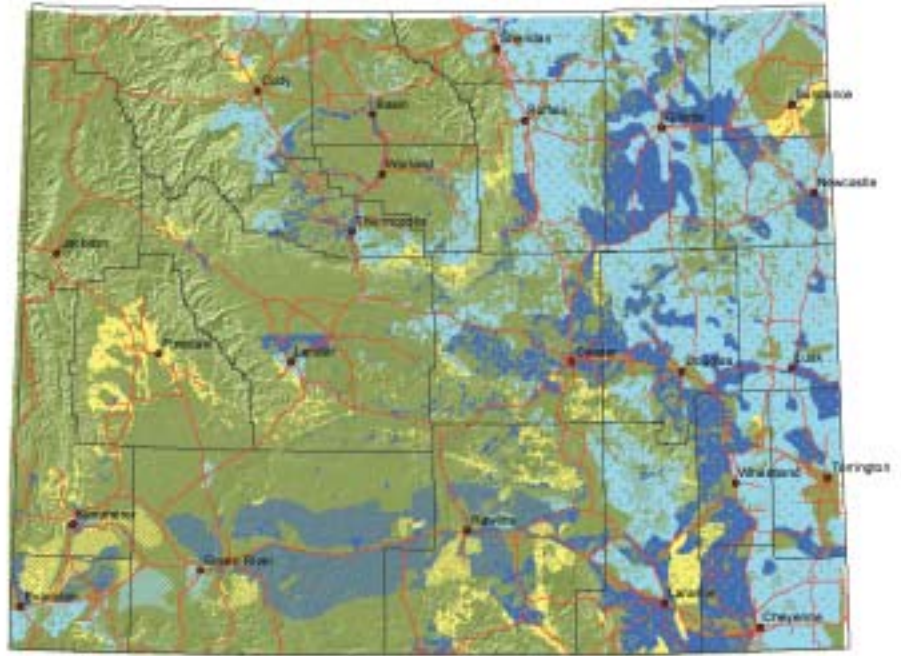
Map 5. Seasonal range on private lands for mule deer in Wyoming. See Map 2 for explanation of colors.



Map 6. Seasonal range on private lands for white-tailed deer in Wyoming. See Map 2 for explanation of colors.



Map 7. Seasonal range on private lands for pronghorn in Wyoming. See Map 2 for explanation of colors.



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