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Section I

Irrigated Pasture/Mountain Meadows

Chapter 1

Introduction

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Grassland has influenced human history since prehistoric times. Grazing lands were important to prehistoric people since many of the animals they hunted for food depended on available forage.

With time, humans began to manage grasses for increased productivity for both hay and grazing. In Great Britain, hay making and the scythe date from 750 B.C. Livestock survival through the winter depended upon the success of the hay harvest. Growing hay crops and the importance of proper curing were described in detail by Columella (Roman) in about A.D. 50.

In more recent times, Native Americans relied heavily on grasslands since they supported thousands of buffalo, deer, antelope, and elk which were major food sources. In addition, the hides were used for shelter and clothing.

Native grasslands in the Great Plains of North America were referred to as rangeland shortly after the turn of the 20th century. The English settlers along the Atlantic Coast used the name meadow for native grassland that was suitable for hay. The French in Canada used the term prairie, and the Spanish in Florida used the word savanna. These diverse terms for native grasslands are still in use today.

The eastern U.S. was originally covered in heavy forest growth; however, about 40% of the total land area in the U.S. was grassland.

As the Great Plains and the western U.S. were settled, much of the native grasslands were plowed to grow crops such as small

grains and corn. The development of irrigation systems greatly expanded the types of crops that could be grown. With irrigation, much more productive grass pastures for haying and grazing were developed, especially in the arid West.

In addition to the development of irrigation systems, additional technology was developed to improve pastures for both grazing and hay. The additional technology included species selection, improved varieties of those species, defining fertility requirements, irrigation management, and grazing management.

This improved technology required producers to become educated in several areas of pasture and hay management. Producers have not always been able to keep up with the new management practices. Therefore, we still experience overgrazing, improper time of grazing, incorrect species selection, poor fertility, etc. The purpose of this section of the manual is to provide research-based information that producers can use to improve their management of grass dominated pastures and hayfields.

Mountain Meadows

Mountain meadows are lush, productive grassland areas typically found in valley bottoms along streams and rivers at higher elevations throughout the western United States. Availability of water defines the boundaries of what are considered meadows and sets them apart from the surrounding dryer plant communities. Prior to settlement, native meadows were watered naturally by

snowmelt from the surrounding hills and mountains and subirrigation from the adjoining streams and rivers. Settlers expanded meadows onto poorly watered bottomlands or adjacent uplands by installing extensive systems of ditches for flood irrigation. Many of these same irrigation systems are still used today with little modification, even though they are commonly inefficient at applying water evenly to undulating meadows. Often referred to as "wild flood", this form of irrigation has relatively low operating costs compared to other systems.

Mountain meadows are used primarily for forage production to sustain year-round livestock operations at high elevations. Although this is their primary use, mountain meadows provide many secondary benefits that are now gaining in importance as development threatens to take many meadows out of agricultural production. The open space and aesthetics of the green, lush meadows have a measurable value to tourists. Scientific research has shown that many impurities are reduced or removed from water that flows across meadows, thus improving overall water quality. Many wildlife species use meadows for food and shelter at some point during the year. Irrigation of meadows leads to recharge of groundwater aquifers and extends the length of time until return flows enter streams and rivers which can improve the quality of fisheries.

Keeping high elevation agriculture viable will help preserve the secondary benefits derived from mountain meadows. Forage produced from these meadows provides the *key* to successful, year-round livestock operations at high elevations in the intermountain region. Mountain meadows are predominately privately owned and serve as the base from which livestock producers utilize vast acreages of federally controlled rangeland. This scenario exists throughout the western United States.



Fig. 1. Swathing grass hay at Collbran, Colorado. Photo by Calvin Pearson.

Hay produced from mountain meadows is primarily comprised of native grasses, forbs, sedges, and rushes (Fig. 1). Additionally, some meadows support significant amounts of improved grass and legume species that have been introduced over time. In 2009, approximately 634,500 tons of predominately native and improved grass hay was harvested from 335,400 irrigated acres in 23 intermountain Colorado counties for an average yield of 1.9 tons/ac.¹ Yields by county ranged from a low of 1.20 up to 2.85 tons/ac. In the high mountain basins, the yield averaged 1.72 tons/ac which is close to the long-term average of 1.65 tons/ac. These values indicate that many producers are still struggling to overcome low yields. This is in spite of the wealth of research that has been done and information that is available on management practices to increase yield and quality of forage produced from mountain meadows. The following sections will discuss various management practices and alternatives that producers can use to improve profitability of forage production from mountain meadows.

¹ Colorado Agricultural Statistics. 2010. USDA NASS Colorado Field Office, Denver, CO.