

Fire Effects on Rangeland FACTSHEET

Post Fire Livestock Management

Fire can have a dramatic impact on rangeland forage. The magnitude of this impact is dependant on numerous factors including plant species, season of the fire, fire intensity, vigour of the plants prior to the fire, associated species and climatic conditions during and following the fire. Once rangeland has been burned, the range manager is faced with numerous difficult choices including determining how long to rest a particular pasture. This decision is often controversial but very important since grazing management following burning has the potential to significantly affect range health including productivity and plant species composition.

WHY REST?

Following a fire, rangeland is often rested for the following reasons:

1. To allow surviving plants to recover,
2. To allow desirable plant species to regenerate, and
3. To allow litter to accumulate.

Allowing Plant Recovery

Some plants are inherently more susceptible to fire than others. Bunchgrasses such as Idaho fescue and needle-and-thread for example, are often more vulnerable and are slower to recover than other grasses. Other less dense bunchgrasses, such as bluebunch wheatgrass and various rhizomatous grasses, such as pinegrass however, tend to be more tolerant and generally only top-killed by fire. For the most part, the impact of fire on British Columbia's ranges is dependant on fire severity which is often correlated with season of burn. In general, June and July fires are the most detrimental to bunchgrasses, while July and August fires are the most detrimental season to burn most forbs, shrubs and rhizomatous grasses (there are notable exceptions including Kentucky bluegrass). The health of your range prior to a fire also determines how long it will take range plants to recover with unhealthy ranges generally taking longer to recover than those healthy ranges. Finally, climate will also play an integral role in range plant recovery. For example, below normal precipitation in the years following a fire will typically prolong the amount of time needed in order for your range to recover whereas above average years may facilitate recovery.



Depending on Burn Intensity Examples of Plant Recovery Time Are:

Pinegrass- will generally recover in 1 year.

Bluejoint- will generally recover in 1 to 2 years.

Kentucky Bluegrass- will generally recover in 1 to 2 years.

Bluebunch Wheatgrass- will generally recover in 1 to 3 years.

Idaho fescue- will generally recover in 2 or more years.

Rough Fescue- will generally recover in 2 or more years.

Tufted Hairgrass- will generally recover in 2 or more years.

Needlegrasses- will generally recover in 3 or more years.

Beaked Sedge- will generally recover in 1 year.

Showy Aster- will generally recover in 1 year.

Willows- highly variable depending on species, varying from 1 to 5 years.

Red-osier Dogwood- will generally recover in 1 year.

Big Sage, Antelope-bitterbrush –highly variable, varying from 8 to 20 years.

Aspen Poplar- will generally recover in one year.



Note: These recovery periods are all dependant on soil moisture, season and fire severity.

Allowing Desirable Plants to Regenerate

The initial concern for range managers following a fire is to ensure that both plant vigour and seed production is restored. Generally, range plants will establish by either sprouting and/or from seed. Plants that establish by re-sprouting usually deplete their energy (carbohydrate) reserves and become especially vulnerable to further damage. Even though these plants often appear to be highly productive and nutritious, most will be in low vigour and thus extremely vulnerable to grazing. If these plants are subjected to grazing, some will be further weakened while others may be destroyed and removed from the range plant community. Overall, it is important for the range manager to ensure that the range is rested so that carbohydrate reserves are replenished in the longer stem bases.

Fire often facilitates seed production for a number of British Columbia species, including bluebunch wheatgrass, pinegrass, and Junegrass. Depending on fire severity, other species however, such as Idaho fescue, often show an initial reduction in seed production (e.g., first two years). In order for plant establishment from seed to occur, there must be a source of viable seed, adequate seed coverage, suitable germination temperatures, minimal competition from other plants and most importantly, adequate soil moisture for the seedling to develop sufficiently. In British Columbia's southern interior, the last requirement, adequate moisture, is often the most difficult one to achieve. Once plants have been allowed to go to seed, livestock grazing can be used to enhance the establishment of new plants through promoting seed coverage and soil to seed contact.



Allowing Litter to Accumulate

Most fires will consume a majority of plant residue and litter. This is important since litter is often required for both soil and watershed protection. For example, a litter layer often performs the following ecological functions:

- Protects soil against erosion (e.g., raindrop impact),
- Detains overland flow, and facilitates soil infiltration and permeability
- Enhances forage production, and
- Buffers against dry conditions by aiding moisture retention and reducing moisture loss.

Therefore, in order to promote these important ecological functions, post-fire livestock management must promote the establishment of a litter layer.

DETERMINING REST PERIOD

While most managers agree with the principle of rangeland rest following a fire, the length of rest is often a difficult and controversial decision, particularly on Crown land. While this factsheet will not provide you with a cookbook answer, it will discuss what to consider before restocking the range. Most importantly, restocking decisions should vary from one pasture to another and be made on a case-by-case basis since plant recovery is often dependant on numerous site-specific variables including those that affect plant survival, growth, and reproduction. Once a restocking schedule has been established, it must be flexible enough to account for situations that may impede plant recovery, including below normal precipitation. In addition, an inspection should be conducted prior to turning out on burned pastures to ensure that the range is ready for grazing regardless of whether the prescribed period of rest has been adhered to. In general, when determining rest period, the following rules of thumb should be considered:

- One growing season of rest is often be adequate following a low severity fire on range sites that were highly productive and healthy prior to the fire.
- On unhealthy range sites (e.g., perennial plants were low in vigour; lots of invasive species) however, one growing season is often inadequate for plant recovery.
- Bunchgrasses often require longer rest periods and lighter utilization rates than do other plants.
- Riparian communities with shrubs and trees often require longer rest periods.
- Rest can also be adjusted depending on site objectives. For example, some shrubs, such as antelope-bush, often require longer rest periods whereas others, such as big sage, often benefit from shorter rest periods. Also, depending on the site, grazing may also be used to promote seed coverage and planting following seed ripening, and reduce plant competition and thus facilitate forest regeneration in cutblock situations.



POST FIRE LIVESTOCK MANAGEMENT

Fire changes animal behaviour by influencing grazing patterns, preferences, utilization rates, and forage consumption. These changes are generally attributed to changes in forage productivity, availability and quality (see **Factsheet 5**) and often cause wildlife and livestock to congregate on burned areas. While this may be beneficial from an immediate animal production standpoint, it may result in over-utilization of some plants and thus become detrimental from a range health point of view. Improved forage on burned sites can also cause animals to avoid not burned areas. This combined with the removal of natural barriers can result in a distribution problem and cause some areas of a pasture to be over-utilized and others to be under-utilized. Overall, in order to maximize use of the entire pasture and to limit the overuse of individual plants, the range manager must overcome these challenges by developing a range use plan that considers pre and post range health, livestock type, stocking rate, distribution tools, season of use, and intensity.

MONITORING

Since fire effects are often highly variable, it is important for the range manager to monitor their range. Monitoring in both the short and long-term allows evaluation of post-fire management and helps us to understand the impacts of fire and grazing on range productivity and sustainability. Monitoring and responding to observations early on will assist us in maintaining productivity and sustainability over the long term.



REFERENCES

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For further information contact:

Darren Bruhjell

Phone: 250.371.6058

Email: Darren.Bruhjell@gems6.gov.bc.ca

Greg Tegart

Phone: 250.260.3035

Email: Greg.Tegart@gems3.gov.bc.ca

INDUSTRY COMPETITIVENESS BRANCH

Ministry of Agriculture, Food and Fisheries

162 Oriole Road

Kamloops, BC V2C 4N7

INTERIOR REGION

Ministry of Agriculture, Food and Fisheries

4607 23rd Street

Vernon, BC V1T 4K7