

## Strategies for Rejuvenating Forage and Pasture Lands

### Impacted by Drought

There may be multiple strategies to successfully rejuvenate overgrazed or drought-affected pastures or forage fields. Full rejuvenation to peak potential may take several years.

To maximize the potential for successful rejuvenation of forage and pasture following drought conditions, it is important to: assess your current situation, determine your specific goals, select an appropriate strategy, implement it, monitor the outcome, and adjust as needed. Each of these steps are outlined in this document and related information resources and tools are listed for each step.

This information was developed in conjunction with agrologists from B.C. Ministry of Agriculture and Food and industry. Keep in mind this document provides general recommendations and may not include all strategies and options to rejuvenate pasture or forage fields.

### 1. Assess Your Resources

The most important variable when rejuvenating a forage stand is soil moisture, and it is a prime consideration in the timing and strategy chosen (BCRC, 2023). To preserve moisture, integrating no-till/minimum till (light harrowing)/direct seeding can be a valuable approach. Using tillage can have detrimental effects to soil carbon, soil structure, and water cycling (Black, 2023). Detrimental soil effects may include loss of soil moisture and potentially slower water infiltration.

First and foremost, determine what resources are available within your operation (other factors beyond this list may need to be considered):

- a. Animal Inventory and Classes of Livestock
- b. Pasture and/or Hay Availability
- c. Soil Type(s)
- d. Moisture (soil moisture and local weather patterns)
- e. Time to Commit to Rejuvenation of Pasture/Forage
- f. Equipment and Infrastructure on Farm (right seeder or tillage equipment)
- g. Plant Stand (condition and plant coverage)
- h. Plant Types (i.e., shrubs, grasses, forbs, legumes, invasive, undesired species etc.)
- i. Soil Factors (e.g., condition, compaction, nutrients available)
- j. Anticipated First Frost Date/End of Local Growing Season
- k. Available Budget

## 2. Determining Your Needs/Options

Each operation will need to determine their goals before selecting their best strategy or strategies. In some cases, the primary goal may be to provide early season feed for grazing animals. In other situations, a spring-seeded annual may be the best fit for either silage or greenfeed for winter feeding. If grazing is the primary goal via re-establishing a perennial stand, grazing management will be vital to ensure that the re-seeded areas are not overgrazed before plants are fully established.

To help identify goals and select strategies, first determine the current needs and options for your operation. Considerations and questions regarding the operation may include:

- a. What are the animals' nutritional needs – is this forage feeding pregnant females, weanlings, or yearlings? Can animals be grouped and fed according to individual livestock nutritional demands?
- b. Can stocking rates be adjusted according to animal grouping? For example, can young animals be weaned and pastured while breeding animals are fed available hay to maintain condition?
- c. When is grazing or feed required? For example, is feed needed for fall or early season grazing, or for winter feeding the following year?
- d. Can agreements be made with neighbours or others with properties where pasture or forage can be utilized?
- e. Can forage fields be grazed (instead of taking last cut)?
- f. Is there adequate hay available or is this a source that will be making up for winter feed shortages?
- g. Can grain or other crops be utilized for grazing or taken as a source of hay? Note – ensure feed testing is done as there could be potential toxicities – see BCRC resource *Alternative Feeds* below.
- h. Is one pasture or field most compromised and can potentially be used for winter feeding? Focusing bale feeding in a specific area will allow for ongoing recovery/rejuvenation in other areas while also contributing organic residue to the most impacted area laying the groundwork for future plant growth.
- i. Can pastures or fields be divided to optimize feed sources and provide adequate rest?
  - i. Is there access to infrastructure, for example mobile water and mobile fencing (electric or otherwise) to manage grazing?
- j. Can supplements or other alternative nutrient sources be provided alongside feed to ensure animal's nutritional needs are met?

### Recommended Resources:

- [Pasture Management Considerations During Drought](#) - Government of Saskatchewan
- [Rejuvenation of hay and pasture](#) - Beef Cattle Research Council
- [Matching Forage Supplies to Livestock Needs Calculator](#) - Government of Alberta

- [Carrying Capacity Calculator](#) - Beef Cattle Research Council
- [Sampling Forage Quality](#) - B.C. Forage Council
- [Alternate Forage Crops When Irrigation Water is Limited](#) - B.C. Ministry of Agriculture and Food
- [Range and Pasture Management When Dealing with Drought](#) - Government of Alberta
- [Managing Grazing Lands During Drought](#) - B.C. Ministry of Agriculture and Food
- [Value of Crops of Livestock Feeds Calculator](#) - Beef Cattle Research Council
- [Alternative Feeds](#) - Beef Cattle Research Council

### 3. Strategies

In order to meet the goals that have been identified, you may need to implement one, or a combination, of the strategies below.

#### A. Reseeding

For reseeding an existing stand, species and variety choices need to match the nutritional needs of the livestock, the climatic/environmental conditions of the area, availability of seed, available equipment, the planned management (grazed or mechanically harvested) and producer goals. Individual circumstances and the inventories garnered in *section one* above may also influence what is planted.

There are many resources available to help decide on an appropriate reseeding option and several are listed at the end of this section. Keep in mind that seed availability may also vary by region and time of year required.

Some general rules of thumb for reseeding and establishment:

- Optimal germination requires good seed to soil contact and available moisture.
- In order to have success when seeding into perennial forages visible soil (e.g., less than 2 plants/sq ft and no rhizomatous species) is needed. Refer to the *Managing Ground Cover* resource in section four to determine ground coverage.
- For the next several years, management including the potential integration of rotations (grazing or crop type) will be fundamental for success of any of these strategies.

With any of the reseeding options, ensuring that appropriate species selection based on biogeoclimatic conditions (including climatic and soil conditions) and crop nutritional needs, nutrients available based on soil test results, and crop use is recommended.

There are several options for reseeding and providing forage for livestock detailed below; the strategies are categorized based on intended use and/or time of year for seeding.

### ***i. Immediate Need for Grazing***

Seeding in the summer and early fall can be done to produce forage that would be available for animals prior to use of winter feeding options. Annuals may be the best option for this because perennials seeded in summer may require up to a year without any grazing pressure to fully establish/ensure survival. Spring annuals can establish quickly and provide more forage volume in a shorter time; annual options do not need to survive the winter. Success of this option will depend on adequate growing conditions at time of planting and germination.

For fall grazing (immediate pasture use prior to feeding winter stocks), adequate rain will be needed to infiltrate the soil and have moisture available for the plants to germinate. Without optimal plant growth there may not be enough quantity and good quality forage for livestock to graze. It may also be important to manage grazing to retain enough plant material to prevent erosion and capture snow or other winter moisture to aid in spring management.

If the correct planting conditions are present or expected, options could include:

- Annuals such as oats, triticale, barley, annual ryegrass, or others; diverse grass species mixes which may include warm season species (e.g., millet, Sorghum-Sudan grass (see *Michigan State University* resource below regarding potential toxicity))
- Diverse polycultures which may include clovers, vetch, forage brassicas, and grasses. *\*\* Note: if some of these species go to seed, they may cause issues in cropping/pasture situations down the road; be mindful of intended use and outcomes for the re-seeded area.*

### ***ii. Fall Seeding for Early Season Spring Grazing***

Fall seeding options will be determined by soil moisture and timing. In some regions snow will come much earlier than in others and could be a limiting factor. Fall seeding a winter annual can provide early spring grazing and the option to replant once it has been grazed.

Options and considerations include:

- Cereals such as winter wheat, fall rye, or winter triticale. Adding a legume such as a hairy vetch, or a short-lived clover to the cereal may add value (such as protein, digestibility, or nitrogen fixation for the forage stand) If the vetch does not survive the winter, it could add nitrogen to the field.
  - Timing in different regions will vary for the deadline to seed. For example, more northern areas might focus on late August/early September and in more southern regions, seeding may be suitable for later September.
  - Although not ideal, cereals may be able to be planted in late summer without moisture and be able to survive until the rain.
- Diverse blends will be difficult in this scenario because they may not overwinter.

### **iii. Early Season Spring Grazing/Winter Forage**

Options and considerations include:

- Using a winter annual seeded in the fall, as noted in *section ii.* above, can include winter wheat, fall rye, or winter triticale. Depending on the establishment success of the winter annuals, they can provide enough feed capacity to get animals to spring turnout/grazing private pasture.
- Polyculture (mix of cool, and warm season species including legumes, forbs, and grasses). Using a polyculture can provide some flexibility, providing species that can make use of different growing temperatures/conditions, allowing for an initial harvest (grazing or mechanical) and regrowth later in season.

#### **Recommended Resources:**

- [Legumes for Resiliency & Non-Bloating](#) - Peace River Forage Association of British Columbia
- [Forage U-Pick Tool](#) - An interactive forage selection tool for Canada.
- [Forage Seed Mixtures for Different Regions of Canada](#) - Beef Cattle Research Council
- [Alberta Forage Manual](#) - Government of Alberta
- [Seeding, Establishing and ReVeg Resources](#) - Peace River Forage Association of British Columbia
- [Nutrient Management Calculator](#) - B.C. Ministry of Agriculture and Food
- [Sorghum-sudangrass pasture poses prussic acid and nitrate poisoning risk](#) - Michigan State University
- [Polycrop Potential: 12 Tips for Using Mixed Forage Crops.](#) - Beef Cattle Research Council
- [Forage Establishment](#) - Beef Cattle Research Council

### **B. Bale grazing**

Benefits of bale grazing include providing a nutrient source for future plant growth, but feed remnants, manure, and urine can become concentrated in areas where bales were located. It can be beneficial to distribute residues evenly across the field in the spring.

With the introduction of any management practice, ensure that monitoring is done, including the tracking of animal condition. Bale grazing can be beneficial to reseeding and some studies indicate that future forage value following bale grazing on pasture can be 3.3-4.7 times greater where cattle were wintered compared to where cattle were not wintered (BCRC, 2023).

Cautions for bale grazing include not bale grazing on environmentally sensitive areas or on native rangeland as it can introduce invasive or weedy seeds that can compete with native species (BCRC, 2023). Ideally, bales are tested and are from a source with minimal weed seeds.

## Recommended Resources:

- [Bale grazing and pasture rejuvenation](#) - Beef Cattle Research Council
- [Bale grazing improves your pasture](#) - Peace River Forage Association
- [Extended Grazing](#) - Beef Cattle Research Council
- [Recommended Principles for Proper Hay Sampling](#) - The National Forage Testing Association

## C. Managed Grazing

Implementing a managed grazing program may help to optimize forage use efficiency and provide benefits to the soil and plant health in terms of maintaining a perennial forage stand. *“Rotational grazing is to harvest the grass quickly and then give the forage time to recover and re-grow. This is accomplished by giving the livestock enough grass for the prescribed feeding period and then moving them to the new field,”* (OMAFRA, Kyle, 2011).

Managed grazing can allow for more efficient utilization of limited pasture while also allowing for appropriate rest periods of grazed areas, which can be critical during a drought. Plants may require longer rest periods for recovery when stressed.

Infrastructure including both fencing and water supply (whether permanent or temporary) is required to create multiple paddocks and additional monitoring of both plants and animals will be needed to prevent overgrazing or over utilization of pasture. Careful timing of animal moves among paddocks is important in order to leave plants with enough green leaf matter to provide a good photosynthetic surface area. This along with optimal conditions for regrowth are the keys to maintaining vigorous plants. It has been noted that when rotational grazing is implemented growth of pastures can persist longer in drought conditions and be faster to recover after rain (Teustch, University of Kentucky). [The Beneficial Management Practices Program](#) can provide funding for improved grazing management projects.

## Recommended Resources:

- [Grazing Management Guide](#) - B.C. Ministry of Agriculture and Food
- [Advanced Grazing Systems](#) - Canadian Forage Grasslands Association
- [Pasture 101](#) - Alberta Beef, Forage and Grazing Centre, Beef Cattle Research Council
- [Management Intensive Grazing](#) - Climate Change Adaptation Program
- [Managing Grazing Lands During Drought](#) - B.C. Ministry of Agriculture and Food

## 4. Implement

First and foremost an assessment of the stand needs to occur. This includes plant species, quantity, and state of plants as well as soils, which could include factors such as nutrient availability, moisture, organic matter, compaction, and an active soil biome (actively growing roots etc.). In general, excess nitrates may be present due to drought conditions and can pose a toxicity risk. Testing of any drought stressed feed sources is always a good idea. Additionally, determining available ground cover will be important for assessing potential risks of soil loss and the quantity and quality of the stand.

When implementing your selected strategy, keep the rules of thumb listed earlier in mind:

- Optimal germination requires a good seed to soil contact and moisture.
- In order to have success when seeding into perennial forages, there will need to be visible soil (e.g., less than 2 plants/sq ft and no rhizomatous species).
- For the next several years, management including the potential integration of rotations (grazing or crop type) will be fundamental for success of any of these strategies.
- Not all options may work for each operation and will depend on environmental and field conditions, be prepared to adapt.

When grazing regrowth on perennial forages, keep the following in mind:

- Over wintering perennials need time to reestablish their growing points in order to survive.
- If stressed perennials are heavily grazed when plants are preparing for winter (as they are putting reserves into the roots) it may compromise the plants' ability to initiate new growth in the following year.
- Available cover is needed for winter protection. There needs to be enough plant material to insulate the soil and limit the amount of bare ground.

### Recommended resources:

- [Nitrogen Management in Dry Conditions](#) - Government of Alberta
- [Maintain Ground Cover](#) - Meat and Livestock Australia
- [Rejuvenation of Hay and Pasture](#) – Beef Cattle Research Council
- Pasture 101: [Rejuvenating Tame Pastures – Rejuvenating Tame Pastures](#) - Alberta Beef, Forage and Grazing Centre, Beef Cattle Research Council
- [Pasture Recovery Following Drought](#) - Oklahoma State University Extension
- [Reviving Drought Stressed Pastures](#) - Kentucky Cooperative Extension Service
- [Fall Soil Testing in Dry Conditions](#) - Government of Saskatchewan

## **B.C. - specific Resources (Climate Change Adaptation Program):**

- Cariboo: [Demonstrating Innovative Pasture Rejuvenation Practices in Central and Northern Interior of BC](#) (2023); [Multi-functional pasture rejuvenation in the Cariboo](#) (2023)
- Peace: [Interseeding to improve forage quality and quantity in the Peace River](#) (2023); [Legume alternatives to alfalfa: fact sheet](#) (2017)
- Buckley-Nechako and Fraser-Fort George: [Dryland forage selection in the Buckley-Nechako and Fraser-Fort George regions](#) (2023)
- Fraser Valley: [Maximizing forage yield with integrated cropping system](#) (2021)

## **5. Monitor, Adjust, and Long-Term Care**

Following reseeding/revitalization of a pasture or forage field, good management practices including rotations, managed grazing and monitoring of crop health and species will be important. Managing pasture and forage fields can also contribute to resilience and preparation for the next drought event.

Monitoring the plant stand into the year following a drought or stress event will allow adjustments in management to be made as needed. Perennial plants can be slow to establish and may take time to be ready for grazing at pre-drought levels. Monitoring may also include reassessing the inventory determined in section one and reevaluating any related goals.

Additional drought management resources can be found at: [Drought in Agriculture](#).

### **Sources Cited:**

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