



Nutrient Management for Seasonal Feeding Areas

Introduction

Livestock seasonal feeding areas must be selected with care to ensure the well-being of the herd and the health of production areas are maintained, and to minimize the risk of environmental impacts.

Manure, urine, bedding and wasted feed in wintering areas all contain nutrients, such as nitrogen, phosphorus and potassium. Stewardship of these nutrients can create ‘winwin’ situations. Balancing the amount and distribution of nutrients deposited on the site in the winter with the needs of the pasture or hay crop, reduces the risk of offsite impacts and also benefits production by retaining and using them for crop growth. Excess nutrients however, are at risk of being lost through leaching into ground water, runoff with snowmelt or rainfall, or volatilization (conversion into a gas) to the atmosphere.



These losses from the system not only have potential negative impacts on the environment, they also represent a lost opportunity to maintain or enhance soils and crop growth with low-cost, high quality nutrients.

Environmental Issues

Nutrients lost to the environment can become a source of pollution with adverse effects on water and air quality, as well as potential impacts on biodiversity and human health. These include:

- Nitrate contamination of drinking water;
- Nitrous oxide and ammonia gases reducing air quality; and,
- Phosphorus and nitrates contributing to algal blooms that deplete oxygen in water bodies to the detriment of other aquatic life.

Production Issues

Excess soil nutrients may also adversely affect the health and production of your fields and herd. A large build-up of nutrients in excess of what the forage crop can absorb, can result in damage ('burning' or smothering) to forage crops.



Phosphorus transported to surface water can result in bluegreen algal blooms in stock water, potentially rendering them toxic. Nitrates in stock water also pose a health risk to livestock. And high levels of soil potassium or nitrates can result in forage unsuitable for some livestock.

Excessive manure, or wasted feed from winter feeding practices, can damage forage crops.

Nutrient Management Plans

Incorporating manure, bedding and waste feed into the soil profile will improve fertility and build good soil structure over time. When fertilizer, manure, compost or other soil amendments are added to production areas, it is beneficial to follow a Nutrient Management Plan (NMP). The NMP will aid in balancing nutrient sources (through fertilizers and winter feeding practices) with crop uptake.

It is good practice for all livestock producers that use seasonal feeding areas (that is, sites used both for winter feeding and crop growth the following season) to complete and follow a NMP. This is particularly true of livestock producers who:

- May be out of compliance with nutrient application legislation;
- Winter animals on sites situated over Moderately or Highly Vulnerable aquifers that are used for drinking water;
- Generate significant manure nitrogen (as determined in an Environmental Farm Plan screening assessment); or,
- Ranches located in phosphorus sensitive areas (where the surface water flows to a lake or pond - or areas designated in Schedule 5 of the Municipal Sewage Regulation) and have soil phosphorus levels greater than 80 ppm in the 0 to 15 cm depth soil profile.

More guidance on criteria for deciding when to complete a NMP can be found in chapter 6 of the *BC Environmental Farm Plan Reference Guide*. Assistance in completing the NMP may also be available through the Environmental Farm Plan program.

Collecting Data

NMPs require gathering information on each wintering site with respect to:

- Field size and history;
- Soil nutrient levels;
- Crop production and nutrient content;
- Manure nutrient levels;
- Livestock type and number;
- Manure spreading practices; and,
- Grazing information.

Gathering some of this information requires planning ahead. Soil tests are best conducted in the spring before crop uptake of nutrients from the soil. Similarly, nutrient testing of manure should be conducted early in the year before levels change through uptake or loss. Yields and crop quality data over several years improve the accuracy and applicability of the NMP.

Manure Distribution

In conventional nutrient management, manure is applied to cropland or pastures with application equipment calibrated to deliver the correct amount of nutrients accurately and uniformly across the site. This is balanced, if necessary, with supplemental fertilizer sources to achieve the optimal soil nutrient levels for forage production.

In seasonal livestock feeding areas the distribution of manure, bedding and wasted feed is primarily dependent on animal distribution and feeding practices throughout the wintering period. It is therefore of paramount importance to adopt all feasible beneficial management practices (BMPs) to ensure an even distribution of waste across the winter feeding area.



Avoid high livestock densities. Excess manure increases the environmental risk and can damage the next year's crop.

Managing the distribution of livestock manure is key to lowering the risk of environmental impacts, and also to capturing these nutrients on site to the benefit of the next season's forage production. Good practices include:

- Ensuring appropriate livestock densities are maintained;
- Rotating wintering areas among several sites;
- Rotating feeding, bedding and watering locations throughout the winter feeding period; and,
- Removing, or spreading manure accumulations at livestock gathering points.

Refer to *Managing Seasonal Feeding Areas* (Winter Feeding Stewardship Factsheet 2) for more BMP suggestions and information on managing livestock distribution on your wintering site.

Record Keeping and Monitoring

As with all NMPs, managing seasonal feeding sites will benefit from a systematic recording of the nutrient management practices that actually occurred and using that information to adjust your management over time. It is good practice to record:

- Crops grown, yields and quality;
- Dates, herd size and amount of feed provided during the wintering period;
- Notes on manure distribution throughout the wintering period and any management activities to remove or spread manure or other waste; and,
- Date, rate and method of supplemental fertilizer applications in the growing season.

Refer to the Nutrient Management Reference Guide for additional information on nutrient management planning.

Managing High Soil Nutrients

Some situations need special consideration to achieve a safe balance of nutrient additions in the wintering area and what can be used the following growing season by the crop. These may include resting a site from winter use for one or more years.

Soils with excess phosphorus (>100 ppm) should not receive additional manure inputs. Try resting wintering locations and removing hay crops from the site for feeding elsewhere until crops deplete soil phosphorus to more optimal levels (<75 ppm).

Likewise, soil potassium levels greater than 320 ppm may require rest from use as a wintering site for one or more years, and monitoring of soil levels. High potassium levels in forages can interfere with the uptake of calcium and magnesium in a cow's digestive tract. Take care and monitor forage quality when feeding animals with forage harvested from sites with excessive soil potassium. These feeds should be blended with low potassium feeds to avoid detrimental effects on herd health.

More Information

Selecting Seasonal Feeding Areas

Winter Feeding Stewardship Factsheet 1.

Published in 2014 by the BC Ministry of Agriculture.

Managing Seasonal Feeding Areas

Winter Feeding Stewardship Factsheet 2.

Published in 2014 by the BC Ministry of Agriculture.

Riparian Management Field Workbook

Published in 2005 by the BC Agriculture Council.

Disclaimer

This document is intended to help assess the environmental risks and stewardship options associated with seasonal livestock feeding areas in British Columbia.

Landowners have a responsibility to follow federal and provincial statutes that have been enacted to protect the environment.

The guidance and information presented in this publication is not a substitute for the requirements set out under the Fisheries Act, Public Health Act, Environmental Management Act, Drinking Water Protection Act, the Species at Risk Act, or any other legislation.

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