

Forage Quality and Quantity on Converted Marginal Areas

With Ducks Unlimited Canada & Farm Credit Canada

In 2025, Olds College Centre for Innovation (OCCI) in partnership with Ducks Unlimited Canada and Farm Credit Canada (FCC), evaluated forage quality and yields on converted marginal land at four sites in Alberta. Across sites and sampling periods, forage performance varied widely, with some treatments producing higher nutritional quality suitable for livestock maintenance diets, while others produced greater biomass but lower digestibility and feed value. Overall, the results show that low-input conversion of marginal cropland to perennial forage can generate meaningful economic returns from previously unprofitable land.

INTRODUCTION

Converting economical marginal cropland that is annually cropped to a perennial forage crop offers many potential benefits. However, the quality of these forages to be used as a feed is not well understood. Forage quality varies widely and directly influences animal performance, forage value and overall profitability, as nutritional requirements differ across livestock species. Forage quality is determined by a forage's ability to meet animal needs and is measured by factors such as palatability, digestibility and nutrient content.

OCCI in collaboration with Ducks Unlimited Canada and FCC, evaluated the quality and quantity of forage produced on marginal cropland converted to perennial grasses, flowers and legumes. This work builds on a three-year collaboration between OCCI and FCC that focused on improving management of marginal land at the Olds College Smart Farm, alongside Ducks Unlimited Canada's Marginal Areas Program, which supports producer access to harvested forages after July 1.

Unprofitable cultivated farmland in Canada is considered marginal and often farmed at a net loss. Converting these areas to perennial forages offers producers an opportunity to generate revenue or offset feed costs, though the forage value of restored marginal land remains poorly documented in Canada.

OBJECTIVES

- **Assess Forage Quality and Quantity** - Evaluate the nutritional value and yield of perennial forage grown on recently converted marginal crop land.
- **Determine Economic Value** - Estimate the financial value of the perennial forages of the marginal land based on feed quality and yields.
- **Educate and Engage Producers** - Share research findings with farmers, agronomists and industry stakeholders to encourage informed decision-making.

STUDY DETAILS

Forage sampling was conducted twice at each marginal land site during the 2025 growing season to capture differences in forage quality and yield across typical management windows:

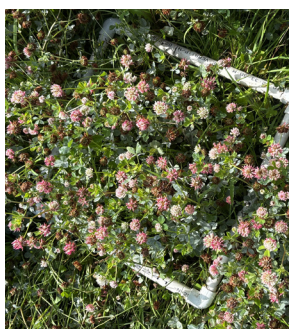
- Mid-July sampling represented the timing of an optimal first cut for perennial forages.

- Mid-September sampling represented the period when producers may access marginal land areas within cropped fields following their annual crop harvest.

Sampling was conducted at OCCI's converted marginal land sites at Field 18 and Steckler, as well as at two fields belonging to a Ducks Unlimited Canada partner producer in Rocky View County. In addition to collecting the forage clippings, during the mid-September sampling event, core samples were collected from round bales produced at each partner producer site for feed analysis.

At each location, a 2 ft² PVC quadrat was randomly tossed to select five sampling areas per forage type under assessment. The PVC square was reassembled at the base to encompass all plants within its 2 ft² area. Only plants rooted inside the square were included; any material outside this boundary was excluded to ensure that only vegetation within the defined sampling area was clipped. Utilizing an electric hedge shear, all material rooted inside the square was cut at the base and collected in an appropriately labelled bag.

Before Clipping



After Clipping



Collected plant material was taken back to OCCI's lab, where the wet weight of each sample was recorded. The samples were then placed in a lab-grade oven at 105°C for 24 hours. Samples were re-weighed to record their dry weights. Using the five samples per forage type, three composite samples were collected and sealed in bags for feed quality analysis.

To estimate the potential economic return of the converted marginal areas, forage yields were combined with the regional hay market prices available in September and October of 2025 to calculate gross revenue for each forage blend.

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RESULTS

Forage Blend	Harvest Timing	Yield Range (MT/ac)	Revenue Range (\$/ac)
Brine Master	July – September	3.3 – 4.2	\$640 – \$815
Flood Master	July – September	2.4 – 2.7	\$470 – \$520
Meadow Master	July – September	1.9 – 2.3	\$370 – \$445
Syngenta Operation Pollinator	July – September	5.5 – 6.0	\$860 – \$940
Proven Seeds Perennial Pollinator	July – September	5.0 – 5.9	\$780 – \$920
Partner Producer A (Clipped)	July	2.2	\$455
Partner Producer B (Clipped)	July	3.6	\$755
Partner Producer A (Baled)	August	2.1	\$440
Partner Producer B (Baled)	August	2.2	\$460

* September values for the partner producer sites are not reported due to the land being hayed in August.

The Steckler location consisted of the Meadow Master, Flood Master and Brine Master forage blends, showed moderate quality in July, dropping to low levels by September. Overall, a reasonable forage option for maintenance diets with minimal supplementation.

The Field 18 location, which consisted of the Syngenta Operation Pollinator and Proven Seed Perennial Pollinator blends, demonstrated low-quality forage across the board. Overall, consider this a low-quality feed that would require supplementation.

The Partner Producer Field “A” location, which consisted of a mixed blend of grasses, legumes and wildflower species, demonstrated the best forage quality results from all four sites. Quality, in many different aspects, was considered moderate to excellent during both sampling events. Overall, OCCI considers this a high-quality forage suitable for high-production livestock groups.

The Partner Producer Field “B” location, which used the same blend as Field “A,” performed on the lower to moderate side in July, then jumped to moderate to excellent by September. Overall, this is a lower-quality feed and should be allocated to maintenance diets.



The baled forage from both partner producer sites in September was considered moderate across the board. Overall, suitable for maintenance or moderate-production diets.

- Despite having a lower price point and poorer quality, the Syngenta Operation Pollinator and Proven Seed Perennial Pollinator blends consistently yielded the highest revenue due to their superior biomass production.
- The pricing levels along with the data suggest that yield is a much stronger driver of total revenue than the quality level. The blends with the lowest price per MT and lower quality actually produced the highest total revenue per acre as a result of their high yield.

Soil analyses further revealed that all recently converted marginal sites are capable of sustaining proper plant growth, as they display adequate organic matter and cation exchange capacity, with no severe nutrient limitations beyond potentially low phosphorus in some fields.

Across all sites, the converted areas demonstrated the capacity to produce meaningful forage yields, with quality sufficient for livestock maintenance and, in some cases, production-level feeding. The perennial pollinator blends on the Olds College Smart Farm consistently produced the highest yields, while the grass and legumes blends on the partner producer sites showed the greatest forage quality, underscoring the influence of management and blend selection.

Continued forage sampling at the same sites will take place during the 2026 season.