



Renovating Cool-Season Pastures for Improved Grazing

UW-Madison Division of Extension

A high-quality forage base is the foundation of every successful grazing operation. Good grazing management and attention to soil fertility are central to keeping pastures healthy and productive, but there are times when renovation is the best option for improving productivity or fixing problems in a pasture. Pasture renovation is a collection of practices intended to improve pasture composition and performance. Renovation practices include everything from frost-seeding legumes to killing existing vegetation and reseeding into a prepared seedbed (complete renovation). Which approach you choose depends on your goals and what problems are present. Every grazing operation should review pasture renovation needs prior to each grazing season.

Before deciding to renovate, some pertinent questions should be answered – *what management practices contributed to the need for renovation, what are the goals for the renovation, and what approach should be used to achieve your goals?* Pasture renovations look different for each farm and each time you decide to renovate. The goal of this publication is to help farmers navigate these questions and determine the best renovation approach for their own farm.

Determine Your Renovation Goals

Assessing pasture stand composition, soil status, and causal factors should occur before seed is purchased or a renovation approach determined. Those factors contribute to the current condition of



Photo 1: A fall pasture with nitrogen-deficient grasses as a result of thinning legumes.

the pasture, cannot be changed retroactively, and most importantly, have a direct influence on which approach to use and whether it will be successful. They also impact which species should or should not be selected for renovation.

Species selected for renovation must be adapted to soil conditions and must complement the species currently in the stand. If few or none of the current species are desirable, then a more aggressive approach such as complete renovation may be necessary.

Assess Soil Status

Every pasture renovation starts with an assessment of current conditions. This must begin with the most intrinsic component – soil. Soil type, texture, and nutrient status all play significant roles in determining appropriate forage goals and the proper renovation method. Soil type and texture are not changeable but nutrient status is. It should be checked prior to renovation with routine soil samples – taken to a 6” depth every 3-4 years (*see Extension Publication A4034 for details on soil sampling for pastures*). Pasture renovations will not be successful if major soil deficiencies are not addressed.

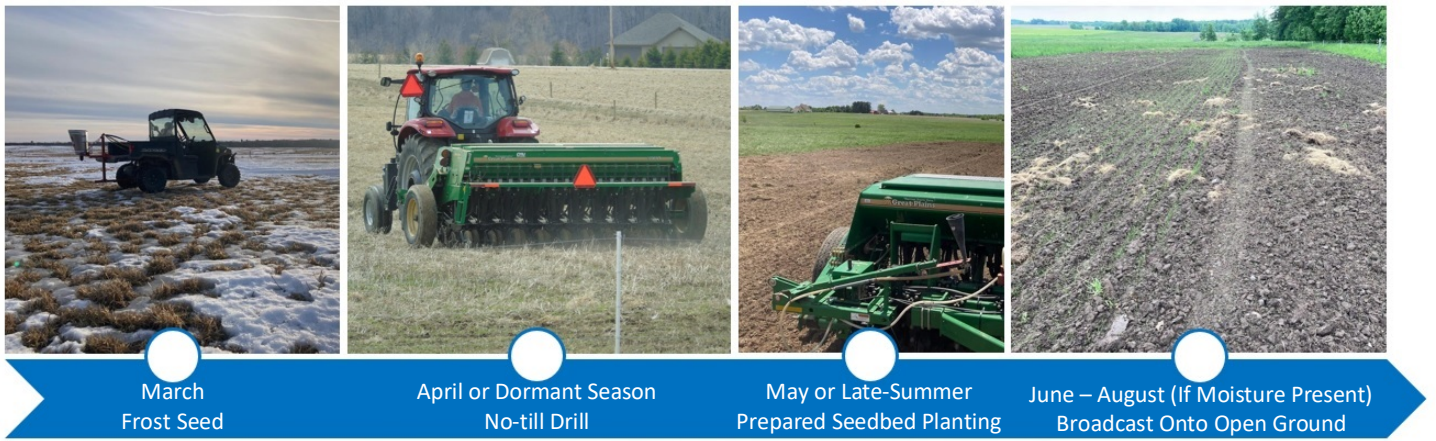


Figure 2. Renovation methods and the timing most conducive for each method.

Current Pasture Composition

It is important to know the forage species that exist in the pasture. This can be a difficult task as many cool season grasses and legumes look very similar to an untrained eye. These publications by the University of Wisconsin Division of Extension are helpful aids: *Identifying Pasture Grasses* and *Identifying Pasture Legumes* (Extension pubs. A3637 and A3787). It is also important to make note of which species are desirable for grazing and which ones are not – something that will vary greatly depending on location and livestock species, as well as which species complement each other, and which ones do not.

While taking inventory of forage composition, farmers should determine the percentage of ground cover or density of plants. This can be as simple as a visual assessment – estimated percentage of bare spots – or you can use the Natural Resources Conservation Service’s (NRCS) methods of pasture condition scoring using the resources available at the Field Office Technical Guide website (see Pasture Condition Score in references)

Why do I need to renovate?

Once the soil type, soil nutrient status, and forage composition of the pasture are understood, it is important to identify why renovation is necessary and how it has been influenced by your management. In many cases renovation is necessary simply because legumes have thinned in the stand over time. In other cases, renovation is desired to replace existing unpalatable or low

yielding grasses with improved, better-quality grasses. More information about cool season grasses and mixes can be found on page 4. Often lack of attention to rotation and rest has caused a progressive shift toward poor quality forages. If this is not acknowledged, investments in renovation will not be economical. In fact, the greatest potential for improving pastures is not through renovation, but rather with improved management.

Opportunities for Renovation:

1. Post-outwintering/damaged pasture
2. Mismanaged/overgrazed
3. Poor quality species mix
4. Thinning forage stand
5. Loss of legumes

Determine the Best Renovation Approach

The right renovation approach for the specific situation depends on a multitude of factors. Table 1 shows some possible scenarios and how species composition, soil fertility, management, and goals mesh to achieve success with a particular renovation approach. Keep in mind that renovation success may be limited or slow to manifest itself due to the inherent nature of the process: placing new seed into the highly competitive environment of an established perennial forage stand. One exception is complete renovation – completely starting over with a newly prepared seedbed. The bottom rows in Table 1 help to consider how to deal with the competition of the existing forage.

Time of year, weather conditions, and species selection influence the success of various renovation practices.

Additional Considerations for Selecting Renovation Approach:

1. Seed-soil contact and exposure to sunlight is critical for renovation. Seeding into an existing dense stand requires more aggressive site preparation.
2. Sandy soils may not be conducive to broadcasting or frost seeding due to inadequate soil moisture.

Figure 2 depicts how various renovation methods pair up with certain times of the season. Surface applications such as frost seeding are more successful for clovers than grasses because a harder seedcoat and heavier seed weight increases seed-soil contact through the natural freeze/thaw cycle or movement of snowmelt/rainfall. Grass seeds are softer and lighter and do not germinate or grow as readily in the early spring environment. If the renovation involves grasses, using a drill later in spring to ensure seed-to-soil contact and warmer soil is more successful. Broadcasting grasses can be successful if the soil is prepared beforehand, but seedbed preparation via tillage comes with the risk of losing soil moisture critical to seedling development and bringing weed seeds to the surface.

Importance of Maintaining Legumes

Legumes contribute positively to forage yield and nutritive value, and are the main nitrogen source for many grazing farms. The most common methods of maintaining legumes are frost seeding or interseeding with a no-till drill. Frost seeding can occur earlier than no-till drilling which gives the seeds a chance to become established and get a head start on the grass. No-till drilling ensures good seed-to-soil contact and more uniform seed distribution, improving the potential for success.

Frost Seeding Legumes – Low Cost, Big Impact:

- Frost seeding can occur early in the season and requires simple equipment.
- Many legumes work for frost seeding; red clover is the most versatile and successful.
- Red clover usually lasts about 3 years
- Frost seeding 1/3 of pastures each year is a low cost measure used by many farms.

Studies at the Marshfield Agricultural Research Station found that meadow fescue, orchardgrass, and tall fescue contained an average of 38% more nitrogen (N), mostly in the form of crude protein, in plant tissue when growing adjacent to red clover. Not only did this positively impact the forage with the additional yield of the red clover and a boost in grass yield, but it also increased the relative forage quality (RFQ) of the entire pasture by 35%.

Outwintered Damaged Pasture	Good Quality Grass Thin Legumes	Good Quality Grass Thin Grass/Legumes	Poor Quality Patchy Grass	Poor Quality Thick/Sod Grass
Return to Quality Pasture	Fill in/Maintain Legumes	Thicken w/Grass & Legumes	Transition Pasture to Quality Grass/Legumes	Replace Poor Grass w/ Quality Grass/Legumes
Determine Need for Replanting in Spring	Graze in Late-Fall	Graze in Late-Fall	Graze Tight in Fall	Complete Renovation
Broadcast or No-till Drill Grass/Clover	Frost Seed or No-till Drill in Spring	No-till Drill in Spring or Fall, Must Have Bare Spots	Frost Seed Clover or No-till Drill Grass/Clover	>50% Density of Grass (Brome, Bluegrass, Reed Canary, Quack)
May Not be Necessary Every Year	Clover – High Success Grass – Low Success	Use Grasses with Similar Palatability	Need Exposed Ground for Success (<50% Density)	Terminate (till, spray) or Outwinter, No-till Drill

Table 1: Considerations for determining proper renovation method based on current forage status (top row) and renovation goals (row 2).

Red clover is the most common legume for frost seeding because it is versatile and has shown the greatest success across various conditions. The recommended seeding rate for frost seeding or interseeding red clover into established pastures is approximately 2-4 lbs/acre (pure live seed). Small-seeded legumes such as ladino clover are seeded at 1-2 lbs/acre (Undersander, 2017). It is important to remember that an established pasture is a competitive environment and the success of frost seeding or interseeding will vary from year to year, and successful germination can range from 9-35%.

Link Between Potassium & Legumes

There are two reasons to think about potassium when considering renovating pastures:

1. Potassium plays a significant role in legume establishment and persistence.
2. Potassium is removed in significant quantities through grazing and harvesting pastures and is often a limiting nutrient.

Because of the impact of potassium on legumes, and the role of legumes in fixing atmospheric nitrogen, potassium plays an important role in nitrogen management of pastures. It makes sense to check the level of potassium in the soil before renovating, and to maintain adequate levels after.

What Are Good Quality Pasture Forages?

In recent decades, plant breeders have introduced many improved strains of common pasture species. Many of these new grass and legume cultivars offer improved production and yield distribution, winter hardiness, disease resistance, and increased palatability. Renovation is a good time to introduce these improved varieties into your pastures. The species listed in Table 2 are those most commonly used in cool season pastures in the Upper Midwest.

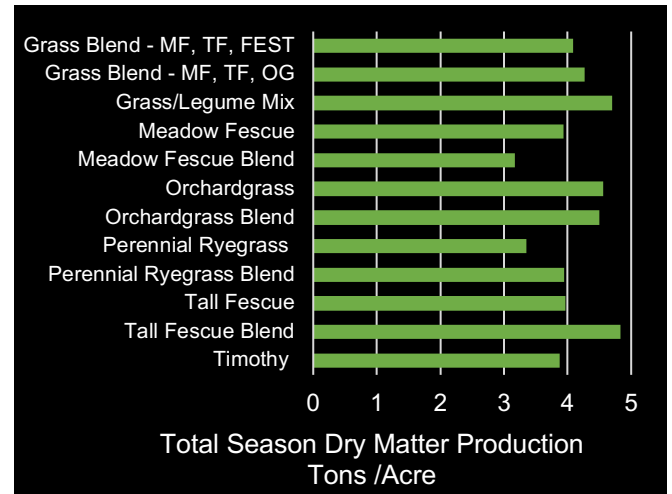


Figure 2: Total season production of cool-season grasses and grass/legume mixes that are considered desirable for grazing in 2022 in North Central WI. MF= meadow fescue, TF= tall fescue, FEST = festulolium, OG= orchardgrass.

Pasture renovation is an important component of every successful grazing operation. The best method of renovation will look different on every farm.

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