As we move into the new year, spring is around the corner and with it comes a bevy of activity. Evaluating rangeland condition and developing improvement plans prior to the coming growing season is a common practice among progressive managers. Ideally, managers will appraise their current position, evaluate historic trends, develop targets, prescribe a practice (such as rangeland planting and brush management) and plan an implementation strategy, all the while being cognizant of the relative ecologic and economic risks. All too often, these risks drive the decision to implement the practice or not. Understanding key management points to mitigate these risks can aid in decision-making and ultimately increase the amount of rangeland improvement practices implemented successfully across the landscape.

Managing invasive woody brush species in the Great Plains is critical to meeting rangeland productivity and habitat goals.

How to Reduce Your Risk When Improving Rangeland

Jeff Goodwin, conservation stewardship lead and senior pasture and range consultant | djgoodwin@noble.org
habitats. Brush management can be either an initial treatment or a maintenance/follow-up practice. The two most commonly implemented techniques are mechanical and chemical applications. Both treatments have their own pros and cons; ultimately, the decision to use mechanical or chemical brush management comes down to evaluating the target species, stand density, application costs, follow-up practices, and a host of other factors.

Rangeland planting is often a practice initiated to follow mechanical brush management depending on the level of soil disturbance and presence of existing seed sources. Although this is a common practice following a brush management treatment, rangeland planting can be and is also commonly implemented as a standalone practice to restore croplands to perennial grassland or to revitalize degraded rangeland. Any and all of these scenarios can have their own unique pitfalls and associated risks. Below are a few key management points to consider in an effort to mitigate the risks associated with brush management and rangeland planting.

**BRUSH MANAGEMENT: MECHANICAL**
**(APPLICATION PERIOD — ANYTIME)**

**KNOW YOUR SPECIES**
With any mechanical brush management application, it is critically important to know your target species. The majority of the invasive brush species that we target in the Great Plains are “resprouters,” meaning if we remove the above-ground portions of the plant, it will resprout from the crown or the roots (typically into a multistemmed form that is increasingly difficult to control). Another consideration of warrant is the method of mechanical removal. If using an excavator or grubber to mechanically remove a resprouting target species, it is important to remove the plant below the first lateral root. This will ensure that all of the underground buds have been removed. However, some species, such as eastern redcedar, do not resprout but can be effectively controlled by removing the above-ground growth.

Knowing your target species and its potential response will aid in designing an implementation strategy that will be effective.

**KNOW YOUR TIMING**
The timing of the mechanical brush management application has less to do with the type of treatment and more to do with its effectiveness. Although mechanical brush management can be done at any time, soil moisture conditions should be considered. When excavating brush species below the soil surface and its first lateral root, ensure that adequate soil moisture is available. In periods of reduced soil moisture, plants commonly shear off above the first lateral root allowing them the opportunity to resprout.

**KNOW YOUR CONTEXT**
Understanding the ranch’s soils and ecological sites can provide keen insight into the potential return on investment of management activities. Some ecological sites on the ranch may be limited in productivity potential due to slope or soil depth. They may also limit mechanical options due to surface rocks. Ultimately, these sites will not provide an adequate ecologic return on investment in the form of meaningful forage response, much less an economic return. Consideration should be made to leave these areas out, apply prescribed fire and sculpt the brush for wildlife habitat. Knowing when and where to apply these treatments within your own context can save money before it’s spent.

Story continues on next page
BRUSH MANAGEMENT: CHEMICAL
(APPLICATION PERIOD — DEPENDENT ON TARGET SPECIES)

KNOW YOUR SPECIES
Knowing the target species is particularly significant with chemical brush management applications. Each species has a potential efficacy to a particular chemical application, both to the chemical and application technique. Depending on the species, a particular application can have 100% control, no effect at all or more commonly somewhere in between. Knowing the species and ultimately the most effective application technique to treat it, can save time and money.

KNOW YOUR TIMING
The timing of a chemical treatment is very important. Typically, it is the physiological stage of the plant and the intended application technique that determines the timing. For chemical applications that are foliar, meaning the herbicide is sprayed on the leaves of the plant, the physiological stage of growth is critical to ensure the herbicide can be translocated to the roots. This desired plant physiological stage drives the timing window for application and generally provides a smaller timing window for foliar applications. In contrast if using a basal bark or stem spray, the physiological stage of the plant is less important and the timing windows are much less restrictive. Regardless, consult the herbicide label regarding timing recommendations and restrictions.

KNOW YOUR RATE
When using any chemical application, knowing the effective rate of application is critical to not only its success but to reduce the risk of over- or under-application. Over-application may not only increase costs but can potentially have a negative impact on the desired plants and be against regulations. More is not always better with chemical brush applications. All chemical applications should be applied based on the product’s published label. Other helpful suggestions can be found in state extension publications like Texas A&M AgriLife Extension’s ERM-1466: Chemical Weed and Brush Control Suggestions for Rangeland. This publication provides chemical options that have been further tested for efficacy and rated by application method. Read more online at https://www.agrilifebookstore.org/Chemical-Weed-and-Brush-Control-p/erm-1466.htm.

RANGELAND PLANTING
(APPLICATION PERIOD — DECEMBER TO APRIL)

ASSESS THE SITE CONDITION
Understanding the current site conditions can aid in the success of the planting. Following mechanical brush management specifically, determine the extent of soil disturbance. If the disturbance is excessive, first evaluate if the site has the ability to regenerate on its own from an existing seed bank or if a seed source is in close proximity. Often, pastures are reseeded following brush management when an existing seed bank is available. In these cases, proper grazing management and time will allow the pastures to recover at a much reduced cost. However if reseeding is warranted, the condition of the soil prior to planting can influence species selection decisions. This is generally more of a concern on cropland conversions, where the soil has been tilled for successive years. In these situations, consideration should be made to select species in the right proportions that will be initially successful in a degraded soil. The remaining proportion of the mix can be high seral desirable species.

KNOWING THE SPECIES AND ULTIMATELY THE MOST EFFECTIVE APPLICATION TECHNIQUE TO TREAT IT, CAN SAVE TIME AND MONEY.

GROW THE BIOLOGY
Many of the sites that are reseeded across the Great Plains are in a degraded condition and have reduced biological activity. We are typically told to plant what we want growing in the field, generally high-seral, climax prairie grasses like big bluestem, indiangrass, switchgrass, etc. However, most of these high-seral prairie grasses are highly dependent on the health of the soil biology. Specifically, these species need the opportunity to develop associations with mycorrhizal fungi. If those soils have been tilled for the past 100 years, the likelihood of that opportunity is low. In an effort to speed up this process, consider efforts to increase the biological activity of the soil. This can be accomplished by planting a multispecies cover crop on the site for a couple of seasons then planting the desired mixture or by increasing the proportion of early/mid-seral plants in the initial seeding mixture.

GIVE THE SEED A CHANCE
There are multiple planting techniques that can be successful on rangeland plantings, from seed drills to broadcast planters. However, they all need to ensure that the seed makes solid contact with the soil. With no-till drills, this is less of a concern; however seed contact is critical with broadcast operations where the seed is broadcast on top of the soil. This concern can be alleviated by ensuring a firm, weed-free seed bed is prepared prior to planting and by rolling the site with a cultipacker following the seeding operation. The other consideration for native plantings is seeding depth. Often native seeds are planted too deep. Native plantings should be seeded on the soil surface and packed or planted no deeper than 1/4 inch.

DON’T FORGET PATIENCE AND PROPER PLANNING
In due course, reducing the risks associated with rangeland improvements can increase the manager’s confidence in making the investment and increase the likelihood of success. Patience and proper planning play key roles in all rangeland improvements. Given fluctuations in markets and less than predictable weather, all of which are out of the control of the manager, consideration should be focused on areas where we have control in order to greatly mitigate the risks to rangeland improvements. 🌿