University of Nebraska–Lincoln Extension EC166

Noxious Weeds of Nebraska

Common Reed

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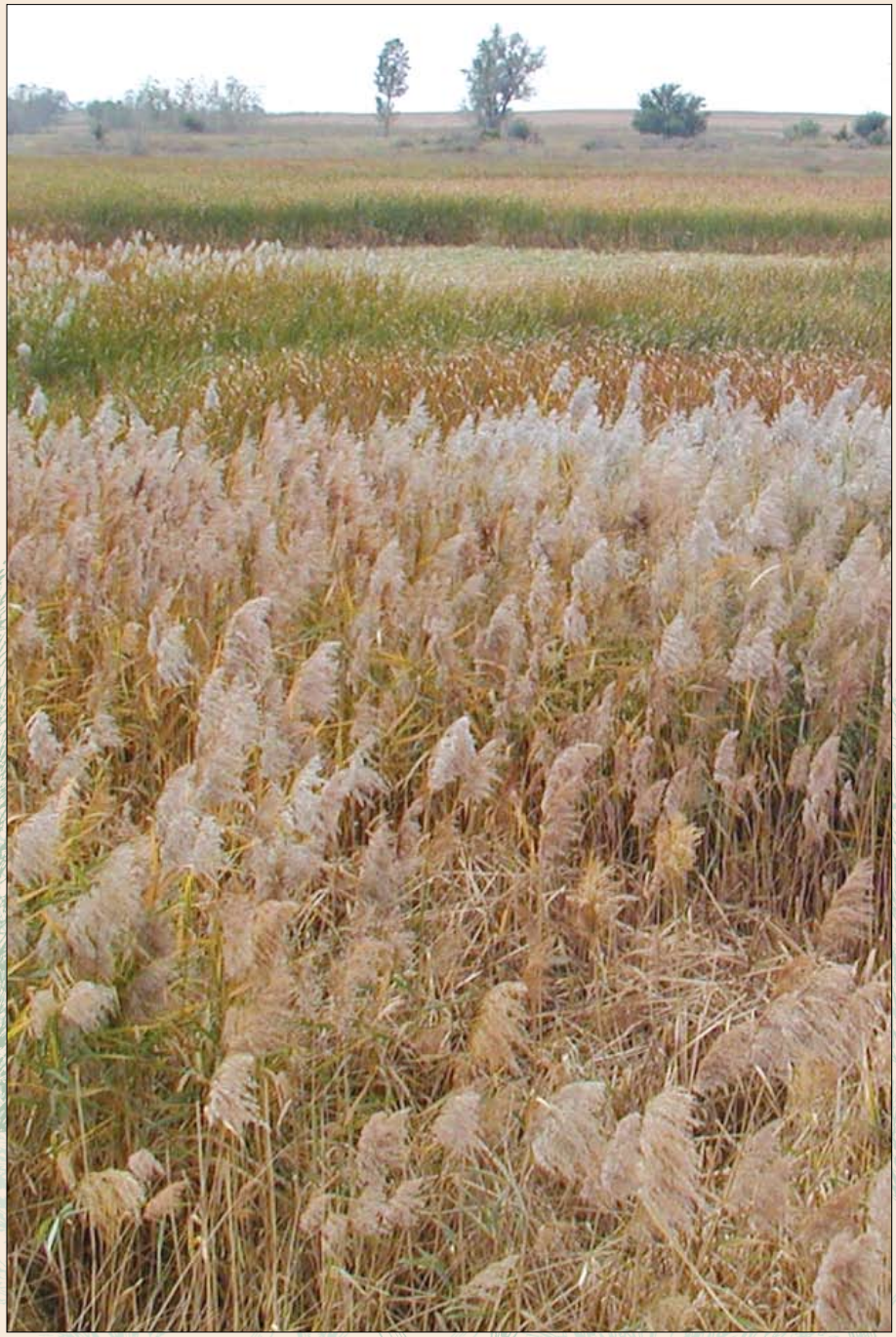


Biology
Identification
Distribution
Control

Common Reed

Phragmites (*Phragmites sp.*), also known as common reed, is a major weed species in Nebraska wetlands. Two biotypes of common reed grow in Nebraska, the native common reed (*Phragmites australis* subsp. *americanus)* and a non-native biotype (*Phragmites australis* subsp. *australis*), which is highly invasive. Populations of the native common reed pose little or no threat to other native species. On the other hand, the non-native common reed is a fast spreading species that is invading wetlands in many parts of the state, especially along the Platte River. Once non-native common reed invades a wetland, it outcompetes most of the native plants, changing wetland hydrology, altering wildlife habitat, and increasing fire danger. The large biomass of non-native common reed blocks light to other plants and occupies most of the growing space above and below ground, resulting in a monoculture. A single control measure is unlikely to provide long-term, sustainable control of this weed. An integrated approach, using a variety of mechanical, cultural, biocontrol and chemical control methods, is necessary for long-term suppression.

Figure 1. Non-native common reed infestation along Platte River in Nebraska.

Figure 2. Narrow water channel due to infestation.

Impacts

Over the past several decades, populations of non-native common reed in North America have dramatically increased in both freshwater and brackish wetlands. Once established, populations can expand rapidly to form dense monocultural stands (*Figure 1*). Such stands reduce plant species diversity, prevent growth of more desirable species, and create an unsuitable habitat for various bird species, including migrating waders and waterfowl species. The rare and threatened bird species, commonly associated with native, short-grass habitats, are also excluded by non-native common reed invasion.

Non-native common reed negatively impacts the native wetland habitats, resulting in reduced productivity of native plants and loss of biodiversity. Loss of native habitat and wildlife interferes with various levels of the ecosystem and influences many recreational activities, creating a negative effect on the social and economic well being of local communities. With the loss of recreational land for fishing, hunting and boating, the local communities also lose revenue from tourism. The non-native common reed has few natural enemies on our continent and quickly forms a monoculture along lakes and waterways. Native riparian plants such as cattails are quickly displaced by non-native common reed, which then displaces native grasses and forbs.

Through rhizomes and stolons, non-native common reed proliferates, creating dense stands which change ecosystem processes and have a negative impact on native plant and wildlife. There are wetlands along the Platte and Republican rivers that are completely covered by non-native common reed (*Figure 1*). In these areas, hydrology has changed, forcing increased sediments and narrowing river channels (*Figure 2*). This decreases habitat, particularly for migratory waterfowl. Other channels also are disappearing due to sediment deposits, forcing this braided river system to only a few channels. This also directly reduces the water available for irrigation.

Biology

Biology of native and non-native common reed is almost identical. Therefore, further description will be made only for the non-native common reed. Non-native common reed is a perennial grass that produces a vigorous system of roots, including rhizomes (below ground, *Figure 3*) and stolons (above ground, *Figure 4*), which all form dense stands of monotypic communities (*Figure 1*). Vegetative structures are the driving force for quick land invasion with annual lateral spread of the rhizomes ranging from 1 to 10 feet (*Figure 3*), and stolons growing up to 80 feet long (*Figure 4*). Roots can penetrate soils 3 to 9 feet deep and be very difficult to remove. Many times a single node can sprout and produce rhizomes that spread below the ground and stolons that spread above the ground (*Figure 5*). This growth pattern can produce up to 200 stems per square yard that can reach up to 12 feet in height (*Figure 6*) with a large fluffy seed head (inflorescence) (*Figure 7*). The upright, aerial stems are derived from rhizome buds which are formed during the previous year's growth. At the end of each growing season, all the aerial stems die and growth in the following year continues from pre-existing rhizome buds (*Figures 3 and 5*). Flowering occurs from July to September.

Figure 3. Rhizome of non-native common reed.

Figure 4. Stolon of non-native common reed.

Figure 5. Single stem producing rhizome (white color) and stolon (green color) .

Although the predominant means of spreading is through rhizomes and stolons, seed dispersal also occurs. Along rivers and shorelines, fragments of both vegetative parts (rhizomes, stolons) and seeds (*Figure 8*) can be washed downstream to new sites where they can establish. Seeds also can be dispersed by wind and birds when they mature. Rhizome fragments also may be transported between sites by heavy machinery.

Figure 6. Author Stevan Knezevic standing in 12-foot tall non-native common reed along the Missouri River.

Figure 7. Inflorescence of non-native common reed.

Figure 8. Non-native common reed seeds.

Identification

A number of morphological characteristics can be used to distinguish native from non-native common reed (*Figure 9*).

Native common reed:

1. Most leaf sheaths are not adhered to the culms, and if present, are loosely attached.
2. A reddish colored stem is visible when the leaf sheath is removed. The texture of the stem is smooth and shiny.
3. Overall plant color is lighter yellow-green than the non-native type.
4. Small round black spots are visible on the stem if leaf and leaf sheaths are stripped from the plant (*Figure 10*).
5. Stem density is low.

Non-native common reed:

1. Most leaf sheaths are present on the culms.
2. A green stem with yellowish nodes is common. The stem texture is rough and dull.
3. Plant color is a darker blue-green.
4. Small round black spots are absent from the stem.
5. Stem density is high.

Figure 9. Non-native invasive (left) compared to native (right) common reed.

Figure 10. Black spot on stem of native common reed.

History

The native common reed has a nearly worldwide distribution, occurring on every continent except Antarctica. In North America the native common reed has been documented along shorelines and brackish waters for the last 250 years. The distribution of the native genotypes is not well documented, but appears to be more common in the western part of the continent.

On the other hand, the non-native common reed, which was introduced from Europe in the late 1800s, is distributed throughout the United States, except Alaska and Hawaii. Its presence is most visible along the Atlantic coast. In Nebraska, the most problematic infestations of the non-native common reed are along the Niobrara, Platte, and Republican rivers. Some of the worst infestations are highly visible along the Platte River, from North Platte to Columbus (*Figure 14*).

Control Methods

Management of non-native common reed is challenging. Control methods should include a combination of mechanical (burning, cutting, grazing, dredging, draining, mowing, disking, pulling, mulching, etc.), biological and chemical control. Selection of control method depends largely on the characteristics of the infested area (eg. layout of the land) and the funding available. In most cases, an integrated management approach works better than an individual control method, with long-term objectives (containment, reduction, or elimination) in mind.

Mechanical

Mechanical control of non-native common reed includes disking, mowing, burning, draining, flooding, grazing, and digging. Mechanical control is possible during dry periods in areas that are periodically flooded. Mechanical control used alone is unlikely to kill the plants; rather, it slows down the spread of established stands. Methods such as cutting, grazing, and mowing which remove or destroy the aboveground plant biomass are not adequate. At best these methods result in a temporary setback to the stand, and at worst they could actually increase stand density, particularly if applied in the spring or early summer.

Disking. A rotary disk (*Figure 11*) can be used to chop through rhizome-packed substrates, creating openings in dense stands with reduced aboveground biomass. Repeated disking contributes significantly to common reed control. Disking in summer or fall reduces stem density, while disking from late winter to midsummer stimulates bud production and results in stands with greater stem density. Disking is more effective than plowing because it creates smaller rhizomes that are less aggressive due to low food reserves. The most effective time for cutting rhizomes is late in the growing season (September-October). In drier areas, when disking is done in fall, rhizome fragments above ground may dry out or freeze.

Mowing. Many wetland areas that are dry during summer can be mowed with sicklebar mowers, rotary brush cutters or other mowing implements. Repeated mowing, conducted several times during the season, is more effective than a single mowing. Common reed stands mowed (*Figure 12*) in the spring will recover with shorter but denser

Figure 11. Disking operation.

Figure 12. Mowing operation.

growth than the original stands, and will almost always develop fully within the same season. Thus, mowing is most effective in August and September.

Burning. Fire used alone as a control measure is not effective in controlling common reed because the original stand is simply replaced with a more vigorous growth. Burning common reed late in the growing season reduces stand vigor temporarily because few replacement buds are available. Furthermore, reserve energy is in the rhizomes by then and cannot be used for winter bud production.

Drainage. Drainage is neither a practical nor a desirable solution for common reed control on many wetlands. Draining water from established stands allows more desirable species to grow and compete with common reed, but drying may require several years to degrade a stand.

Flooding. This method can be used along the edges of small lakes or ponds. Colonies of common reed will not expand if water depth is maintained at least a foot deep, but flooding will not alter established stands. Runners won't anchor at this water depth and will float to the surface and seedlings are easily killed by raising water levels. Timing of water-level manipulations must be carefully planned to be both effective and avoid conflicts with other management objectives.

Figure 13. Cattle grazing on non-native common reed.

Grazing. Intensive grazing for a long time removes aboveground young buds and shoots, reducing size and biomass of stands (*Figure 13*). Grazing does not control the rhizomes and when grazing is stopped, primary shoots that are grazed may produce secondary shoots, thus increasing stem density. Grazing animals also may trample desirable vegetation, dislodge or fragment rhizomes and increase turbidity in wetlands.

Digging. Digging the rhizomes is not recommended for larger areas infested with common reed because it is very labor intensive to remove the entire rhizome. This is only practical for small colonies growing in loose or sandy soils. With digging there is also a chance of common reed re-invasion as it disturbs the soil which may provide excellent conditions for re-infestation.

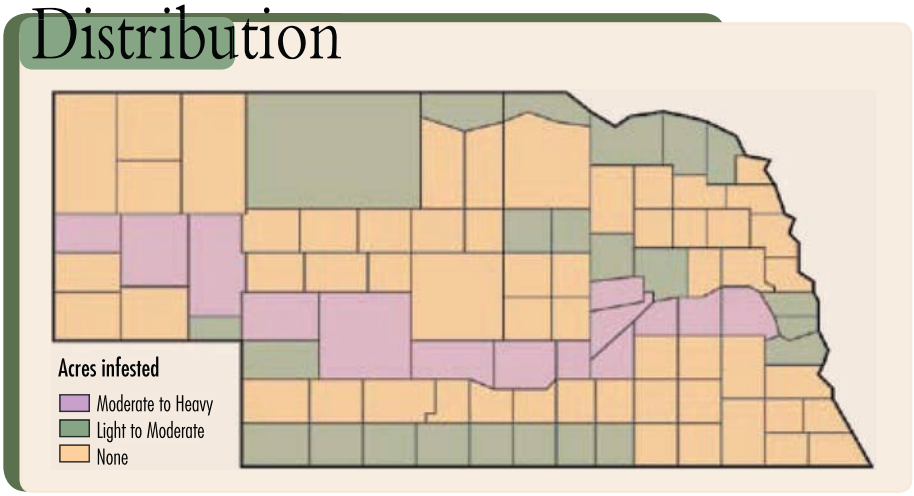
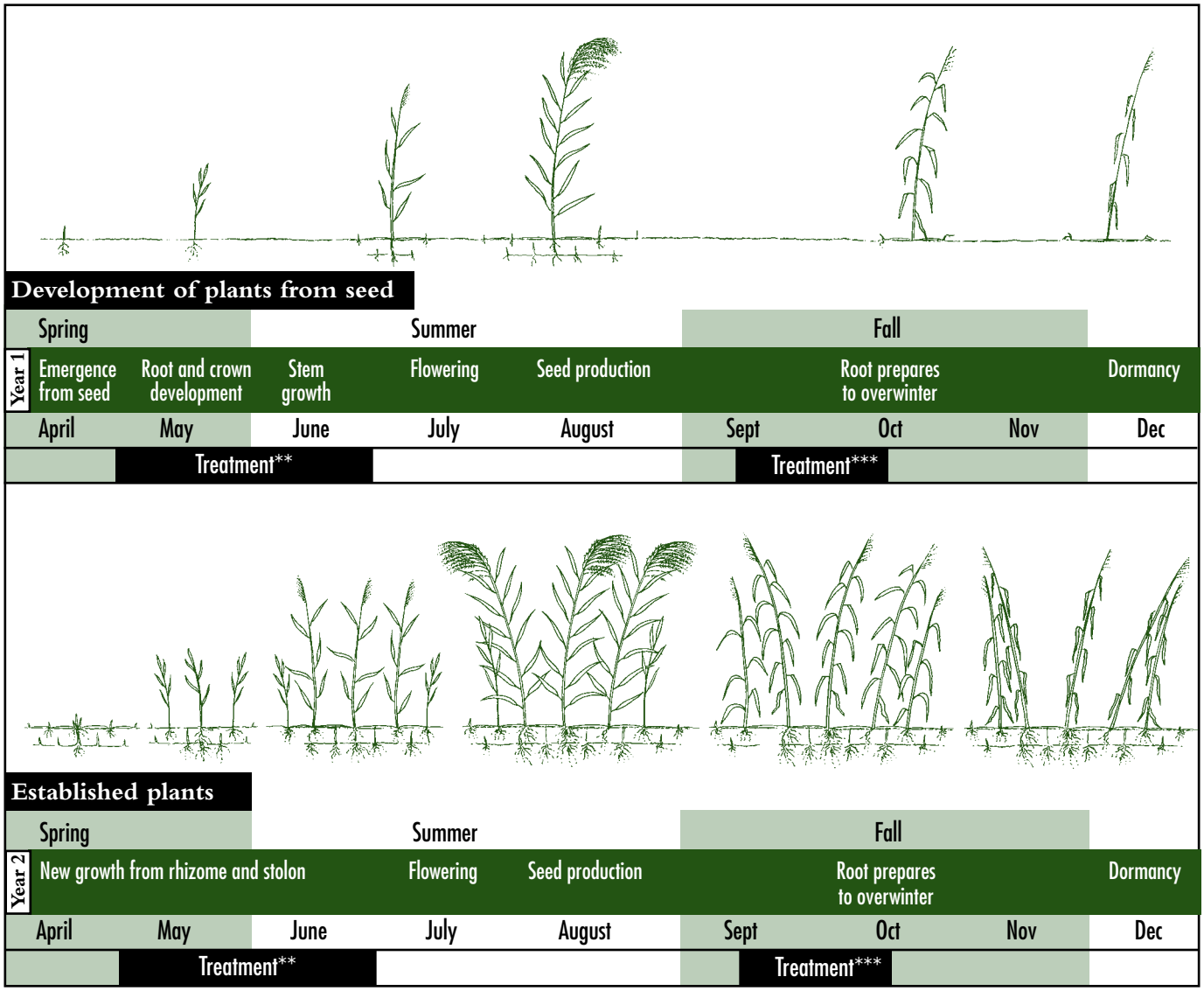


Figure 14. Distribution of non-native common reed in Nebraska in 2008.

Biological

Currently 26 herbivores are known to feed on common reed species in North America. Only a few feed strictly on the non-native common reed and are thus potential biocontrol agents. They include the rhizome-feeding noctuid moth

Figure 15. Perennial life cycle of common reed in Nebraska.



*Life cycles in Year 2 and consecutive years are similar.
**Spring treatment should be at 2-3 feet of growth.
***Fall treatment should be 2-3 weeks before killing frost.

(*Rhizedra lutosa*), the gall midge (*Lasioptera hungarica*), and the aphid *Hyalopterus pruni*. In addition, the mite *Steneotarsonemus phragmitidis* was recently discovered in the Finger Lakes Region of New York and the rice grain gall midge *Giraudiella inclusa* in the northeastern U.S. Adults of the shoot-boring moth *Archanara geminipunctata* lay eggs on green reed shoots where they overwinter under the leaf sheets. A single larva needs several shoots to complete development. Attack by this shoot-boring moth can cause wilting of shoot tips and reduce shoot height by 50 to 60 percent. Research into the life history, host specificity, and current distribution of these herbivores is being conducted before any recommendations are given for their widespread use.

Chemical

Chemical control is probably the most widely used method for non-native common reed control. Herbicides can be applied in the spring when 2-3 feet of green growth occurs, or in late summer to early fall after the plant has flowered. Herbicide applications of aquatic glyphosate products (Rodeo, AquaMaster), imazapyr (Habitat), or a mixture of the two have been successful. Nebraska's study showed that spring applications of both products can provide as much as 100 percent control for more than a year (*Table 1*), although it is often necessary to do repeated treatments for several years to prevent any surviving rhizomes from re-sprouting. Similar studies in Virginia also reported up to 82 percent and 93 percent control of non-native common reed with glyphosate (2 percent v/v) and imazapyr (1 percent v/v), respectively, in the following April after either June or September applications.

Table I.

Herbicides, recommended rates for spring applications, and percent phragmites control at 90 and 365 days after treatment (DAT).

Herbicide	Active Ingredient	Rate/Acre	Percent Control	
			90 DAT	365 DAT
1. Rodeo	Glyphosate	1 qt	80	60
2. Rodeo	Glyphosate	2 qts	92	80
3. Rodeo	Glyphosate	3 qts	100	85
4. Habitat	Imazapyr	1 pt	87	50
5. Habitat	Imazapyr	2 pts	97	95
6. Habitat	Imazapyr	3 pts	100	100
7. Rodeo + Habitat		0.5 qt + 0.5 pt	90	70
8. Rodeo + Habitat		1 qt + 1 pt	98	80

Typically, non-native common reed is most effectively controlled by combining treatments. For example, a combination of chemical and mechanical treatments can be effective and easily applied in semi-dry areas. Stands that are repeatedly mowed, disked, and treated with herbicides can be better controlled than ones where a single weed control method is used.

Studies in other states also demonstrated the effectiveness of an integrated approach. For example, researchers from Virginia found that mowing every two, four, and eight weeks during the growing season reduced common reed growth by 93 percent, 81 percent, and 69 percent, respectively, at four months after initiation of the cutting treatments, but had only reduced regrowth by 55 percent a year later. Applying glyphosate at 2 percent volume/volume either one month after a mowing or two weeks prior to mowing provided approximately 90 percent control of common reed one year after application. Mowing or herbicide application should be repeated in the second growing season for complete eradication of common reed. Some suggested a glyphosate application in late summer or early fall followed by prescribed burning in spring for effective control.

Monitoring the impact of control methods is crucial for the overall success of the control program. Monitoring information is needed to determine if the control methods were effective under Nebraska's environmental conditions and if further control methods are required. At many sites, common reed control may require a long-term effort, thus we suggest monitoring such sites for several years.

A Message From the Nebraska Department of Agriculture

The State of Nebraska has had a noxious weed law for many years. Over the years, the Nebraska Legislature has revised this law.

The term "noxious" means to be harmful or destructive. In its current usage "noxious" is a legal term used to denote a destructive or harmful pest for purposes of regulation. When a specific pest (in this case, a weed) is determined to pose a serious threat to the economic, social, or aesthetic well-being of the residents of the state, it may be declared noxious.

Noxious weeds compete with crops, rangeland and pastures, reducing yields substantially. Some noxious weeds are directly poisonous or injurious to man, livestock and wildlife. The losses from noxious weed infestations can be staggering, costing residents millions of dollars due to lost production. This not only directly affects the landowner, but erodes the tax base for all residents of the state. The control of noxious weeds is everyone's concern and their control is to everyone's benefit. The support of all individuals within the state is needed and vital for the control of noxious weeds within Nebraska.

It is the duty of each person who owns or controls land in Nebraska to effectively control noxious weeds on their land. County boards or control authorities are responsible for administration of noxious weed control laws at the county level. This system provides the citizens of Nebraska with "local control." Each county is required to implement a coordinated noxious weed program. When landowners fail to control noxious weeds on their property, the county can serve them with a notice to comply. This notice gives specific instructions and methods on when and how certain noxious weeds are to be controlled.

The Director of Agriculture determines which plants are to be deemed as "noxious" and the control measures to be used in preventing their spread. In Nebraska, the following weeds have been designated as noxious:

Canada thistle (Cirsium arvense (L.) Scop.)
Leafy spurge (Euphorbia esula L.)
Musk thistle (Carduus nutans L.)
Plumeless thistle (Carduus acanthoides L.)
Purple loosestrife (Lythrum salicaria L. and L. virgatum — including any cultivars and hybrids)
Knapweed (spotted and diffuse) (Centaurea maculosa Lam. and C. diffusa Lam.)
Saltcedar (Tamarix ramosissima Ledeb.) and small flower Tamarix (Tamarix parviflora DC.)

Whether farmer or rancher, landowner or landscaper, it's everyone's responsibility and everyone's benefit to aid in controlling these noxious weeds. If you have questions or concerns regarding noxious weeds in Nebraska, please contact your local county noxious weed control authority or the Nebraska Department of Agriculture.

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