

# The Weed Watch



A Publication of Panhandle Research Integration for Discovery Education Weed Management Area in conjunction with High Plains, Sandhills, West Central, Platte Valley and Twin Valley Weed Management Areas and the Middle Niobrara Weed Awareness Group

SPRING 2018

## Harlan Lake Determined as Prime Stopover for Whooping Cranes

By Merle Illian, TVWMA Project Coordinator

Within the past decade, the U.S. Army Corps of Engineers (USACE) and the Twin Valley Weed Management Area (TVWMA) have formed a partnership that focuses on the elimination of noxious and invasive vegetation around the perimeter of Harlan County Lake. The species we have targeted consists of phragmites, saltcedar, Canada thistle, cattails and willows.

To date, over 3,100 acres of shoreline have been treated with herbicide; 2,400 acres were treated aerially and 700 acres treated from the ground. TVWMA provided assistance through the use of terrestrial spraying equipment and personnel to scout and

spray weed infestations. Work was also completed on 14 miles of Sappa Creek and four miles of Prairie Dog Creeks, both of which flow into the Republican River before it enters Harlan Lake. Excavators were used to remove debris from the creeks, providing unobstructed and increased water flow into the lake, as well as creating access to areas in need of treatment for saltcedar and phragmites. Initially, this project was funded using LB-701 funds; in subsequent years, grant funds from the Nebraska Environmental Trust and the Nebraska Department of Agriculture helped to continue the project.

At the time this project began, little thought was given to the benefits that might be created for migratory waterfowl or other wildlife species, namely Whooping Cranes. The USACE has recently agreed to work on a joint project with the Friends of the Wild Whoopers (FOTWW) to evaluate Whooping Crane "stopover habitats" on USACE lake properties between Texas and the breeding grounds in Canada. FOTWW is a non-profit organization whose mission is "to help preserve and protect the Aransas/Wood Buffalo population of wild whooping cranes and their habitat." This project involves part of the Central Flyway, namely the corridor within the states of Texas, Oklahoma, Kansas, Nebraska, South Dakota and North Dakota. FOTWW completed its evaluation of Harlan County Lake in November 2017, and will be making recommendations to the USACE for future habitat and management actions.

Whooping Cranes are the tallest bird in North America,

standing 5 feet tall with a wing span of 7 feet. Destruction of nesting habitat and overhunting decimated the population during the 1800's and early 1900's. Coupled with this is the loss of approximately 15 million wetland acres in the 6 state migration corridor. In 1943, there were only 16 whoopers remaining. With protection and habitat management the wild population has slowly increased to an estimated 431 birds in 2017 (FOTWW).

While there are four populations of Whooping Cranes in North America, only the population that uses the Central Flyway is considered self-sustaining.

This population nests and rears its young in Wood Buffalo National Park, Canada during spring and summer. After the chicks fledge, the population migrates 2,500 miles through 6 states in the midsection of our nation to Aransas National Wildlife Refuge on the Texas coast where it spends the winter.

Today, Whooping Cranes are facing more threats to their habitats. **During their 2,500 mile migration journey, they must stop 15 to 20 times to rest and feed. Secure stopover habitats are needed throughout the migration corridor approximately every 50 miles (FOTWW).**

Considerable areas of Harlan Lake's nearly 75 miles of shoreline are shallow and are available as good "stopover roosting areas" for the cranes. Whoopers normally roost in areas with a water depth of 2 inches to 10 inches to help protect themselves from predators.

"As of now the primary objective is to maintain shallow wetlands and continue invasive weed control around the perimeter of the lake," says Larry Janicek, Harlan Lake Project Manager. The intention of the USACE is to continue working with the TVWMA to control invasive vegetation through chemical applications. Future funding for this project is very critical.

FOTWW Wildlife Biologist, Chester McConnell, USACE Conservation Biologist, David Hoover, and the Natural Resource Management Specialist for Harlan Lake, Tom Zikmund, toured the lake property to examine the most likely place that would provide Whooping Crane stopover habitat. In the past, large areas along the shore were

infested with phragmites, saltcedar and Canada thistle. After the dense stands of noxious plants have been controlled, the recovered habitat can become valuable stopover areas for Whooping Cranes, waterfowl, wading birds and other wildlife species.



Excellent "stopover roost site" for whooping cranes. Number "1" points out the glide path for whooping cranes landing on the lake shore. The site is clear of obstructions and provides a gradual slope into the shallow water. Horizontal visibility around the roost site is good. Number "2" points out the shallow water from 2 to 10 inches deep in roost area. Whoopers can feed on aquatic animals in the lake and forage on insects and grains in nearby fields.

WHOOPING CRANES NEED LAKES, WETLANDS AND SMALL PONDS WITH THE FOLLOWING FEATURES AS "STOPOVER ROOST SITES" DURING MIGRATION:



- Lakes/small ponds/wetlands from 0.3 acres and larger in size
- Lakes/ponds/wetlands with some shallow areas 2 to 10 inches deep for roosting sites
- Flight glide path clear of obstructions for Whooping Cranes to land near roosting sites
- No thick bushes or trees in or near landing site
- Gradual or gentle slopes into lakes/ponds where water is shallow
- Little or no emergent or submerged vegetation in lake at roost areas
- Extensive horizontal visibility from roost site so predators can be detected
- 200 or more yards from human development or disturbance such as power lines
- Agricultural grain fields or pasture land within one mile of stopover site for foraging.

Citations: <http://friendsofthewildwhoopers.org>  
Tips on whooper id: <http://friendsofthewildwhoopers.org/whooper-identification>  
To report sightings visit: <http://outdoornebraska.gov/whoopingcrane>



Musk thistle (left), which only reproduces from seed, often grows as scattered plants throughout a pasture or along a roadside. A lone plant like this can produce as many as 100,000 seeds.



Canada thistle (right) with its extensive perennial root system often grows in a "patch". Canada thistle seedlings develop a perennial habit (the ability to reproduce from their root systems) about seven to eight weeks after germination. (K.G. Beck, CSU)

## The Battle Against Noxious Weeds

By Jan Bruhn, Founding Pride Boardmember

It has been said, "When going to war, one should know the enemy." The same is true in the war on weeds. Knowing the growth patterns or stages of growth of weeds means a more effective control strategy can be implemented.

All plants, including weeds, are placed in a category depending upon the plant's life cycle. The categories are annual, biennial and perennial. Most noxious and invasive weeds in Nebraska are either biennial or perennial. Control measures are different for biennial weeds than perennial weeds because of the life cycle involved.

For example, musk thistle, plumeless thistle, houndstongue and Scotch thistle are considered biennials. Biennials take two years to complete their life cycle. The first year the plants appear as a rosette, growing close to the ground and developing a single root to support their future growth. During the second year, biennials send up a stalk, or bolt, on which it will develop flowers and seeds. Biennial plants reproduce only from seeds. Therefore, it is essential to stop the seed production to control the weed. Biennial plants can be managed mechanically by digging the plants before flowering stage. The spread of biennial plants can be stopped by not allowing seeds to be produced.

Perennial plants, such as Canada thistle, leafy spurge and field bindweed begin their life cycle as a seedling or sprout from an established root. Perennial root systems develop quickly and can be very extensive. Sprouts or shoots help the weed send up flowering seed heads and gather nutrients to further spread the root system. Perennials will reproduce from both seeds and roots, and have a life cycle of three or more years. When dealing with perennial weeds, we must control seed production and attack the root system.

Because control and treatment methods differ for biennial and perennial weeds, please contact your local weed control professional to discuss a strategy that best suits your weed situation.

# Monitoring Weeds with GrassSnap

By Jack Arterburn, Extension Educator, University of Nebraska

Do you have a weed problem? Are you controlling or minimizing your weed problem? Do you remember what products you used for control? Do you have an accurate picture of the weed problem in your pastures? Photo monitoring is an easy way to track the impact of management actions to help you determine if and what management changes are needed.

If you have a weed patch and you want to track the success or progress of your management, GrassSnap is simple to use and easy to set up. **GrassSnap is a free, photo monitoring mobile-device app developed by Nebraska Extension to collect and organize photos and information.** Photos are then downloaded onto a computer for storage and to be compared to past photos to track changes. GrassSnap was initially developed to monitor grassland conditions, however the simple and easy to use design allows for use with other photo monitoring applications including invasive species monitoring. You can visually see the progression of a weed, or the reduction of a weed patch through photographs taken over time.

Within the weed patch, you will first set a field marker. The field marker can be a permanent marker (like a disc blade painted a bright color), or accurate GPS coordinates of the location. This allows you to see the same landscape year after year. GrassSnap will ask for and store the initial GPS coordinates for future monitoring and photo-stamp the GPS location on monitoring photographs. Record the direction you are facing when you take the photograph to help when you go back to monitor next year. Notes can be collected as comments under the "Grazing Index" or "Apparent TREND Score" page which are stored with the photos. Also include details such as herbicide type, application date, rate applied, and other information in the comment box.

At the field marker, take a photo, called a photo point, looking out at the horizon to give a broad

view of the area. We find it best to try to center the photo on a distinct point, such as a unique hill silhouette, hence the name photo point. Include a point of reference in the photo such as the shovel with the handle marked at 12 inch increments to allow a comparison of vegetation height between photos. GrassSnap also has an overlay feature, which will overlay a ghost image of the original photo point picture, so you can easily line up the silhouette of the hills every year. These techniques help ensure photos are taken from the same location every time which gives an accurate comparison of the shrink or growth of the weed patch.

The next step is to take photo plots. These are several photos looking down at the ground at a set interval. Starting at the field marker, take three to five paces (record the number of paces in the notes for you to repeat annually) take a photo plot picture. Again, include a reference marker such as the hoop. Repeat this several times per location. Photo plots give a more detailed look

at the plant community and the abundance of the weed you are trying to control.

To easily find the sampling locations for monitoring or spraying by using the "List view" feature which includes all the pasture names and corresponding GPS coordinates for you to enter into your GPS unit.

Be sure to download your photos to your computer because GrassSnap does not transfer between devices, so if you lose your phone, you will lose your photos. Also, the larger screen on your computer makes reviewing and comparing your photos easier.

To learn more about how to use GrassSnap and download photographs to your computer, visit [go.unl.edu/GrassSnap](http://go.unl.edu/GrassSnap). Another helpful resource to get started monitoring is the NebGuide G2212 "Getting to Know Your Pastures: Techniques to Enhance Monitoring".



GrassSnap can be used to document progress, such as on this blowout restoration. Try to include a photo point for comparison.



### TWIN VALLEY WEED MANAGEMENT AREA • TWINVALLEYWMA.COM

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# Cattle Trampling as a Potential Treatment for Yellow-Flag Iris Management

By Alex Stoneburner, CSU Graduate Student

The impacts of invasive species on biodiversity, soil properties, water systems, and economics have been a concern of both public and private land managers. One invasive plant that has disrupted native ecosystems along the Niobrara River in western Nebraska is Yellow-Flag Iris (*Iris pseudacorus* L.). Yellow-Flag Iris (YFI) is an invasive wetland species that forms extensive stands along rivers, irrigation ditches, lakes, and small ponds. Management actions to reduce YFI abundance vary widely based on the size and location of infestations. Historical records indicate that YFI was planted around a pond at Agate Springs Ranch in the early 1900s. Since then, YFI has spread miles downstream of the Agate Springs Ranch onto both public and private properties.

For the past several years Panhandle Research Integration for Discovery Education (PRIDE) Weed Management Area, Sioux County Weed Superintendent, landowners and other Sioux County groups have been tackling the infestation head-on, using chemical control methods and funding research to assess different treatment methods for managing YFI. One such study was performed by Jordan Spaak, a former graduate student at Colorado State University (2014-16). Spaak's study assessed the effectiveness of cutting and chemical control (glyphosate), revegetation, and human trampling on YFI abundance. Spaak's findings showed that trampling was surprisingly effective for reducing YFI shoot density and height. As a result, new research into trampling YFI with cattle is picking up where Spaak left off.

The new YFI cattle trampling study began this past summer on a private ranch, just east of Agate Fossil Beds National Monument. The owner graciously allowed Colorado State University graduate student Alex Stoneburner and her graduate advisor Dr. Paul Meiman to use the ranch's cattle to trample YFI on the ranch. Prior to trampling by cattle, seven cattle exclosures were built to serve as control plots (See photo 1). YFI height and density measurements were collected both inside and outside of each exclosure. Cattle grazed the pasture where the YFI study site is located from June until August. At the end of the trampling period in August, YFI plant density, height, and percent impact measurements were taken outside each exclosure.

June height measurements of YFI, prior to trampling, indicated that the average height of YFI plants was 40 inches. Post trampling height of YFI plants in September averaged 7.5 inches. Percent impact was split into two categories, 1) percent of YFI plants grazed, and 2) percent of YFI plants trampled. Early measurements from September suggest that roughly 90% of YFI outside the exclosures had been grazed, and 40% of YFI outside the exclosure had been trampled (See photo 2). YFI density and height measurements will be repeated in the spring of 2018, both inside and outside of the exclosures and 2018 data will be compared to 2017 data.

At this point it is too early to tell what long term impact cattle trampling had or will have on YFI. One interesting observation from the 2017 field season was the impact trampling apparently had on flower and seed production. September measurements indicate that a majority of YFI located inside the exclosures had produced seed and the YFI outside of the exclosures that was trampled did not produce seed. Again, it is too soon to tell if there will be a reduction in YFI during the 2018 growing season compared to 2017, but at this point we are hopeful!

Field observations from the first year of the trampling study have prompted plans for both the second year of the field study as well as some greenhouse work. A greenhouse study will begin this spring looking into optimal timing of trampling as well as potential impacts of saturated soil/water conditions on YFI carbohydrate reserves and response to trampling. It is hypothesized that the greatest reduction to YFI density, height, survival rates, and carbohydrate reserves from trampling will occur when YFI rhizomes are saturated. We hope that the greenhouse study will help us identify the most effective conditions for trampling to reduce YFI abundance.



Exclosures placed in June prior to any trampling impact.



Photo taken in September comparing trampled and grazed frames (outside exclosure) to untrampled/ ungrazed plots (inside exclosure).

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# One More Thing Your Smartphone Can Do...

# MAP WEEDS!

Avenza Maps allows the user to record GPS tracks and draw in areas using your smartphone or location enabled tablet computer.



free, are available for the majority of Nebraska and provide a good background map.

Once you have a map downloaded, you can record your GPS location around an area to create map features representing the infested area, or use the Draw and Measure function to draw in the infested area on your map. The app will then provide a basic information form where you can record information about the area you mapped, such as giving the location a title, attaching photos, and writing a site description. For map features that are drawn, the app will calculate the area and the perimeter of each drawn polygon and store that information with the title and description information. Polygon areas can be created from Recorded GPS Tracks, but it requires an Avenza Pro subscription.

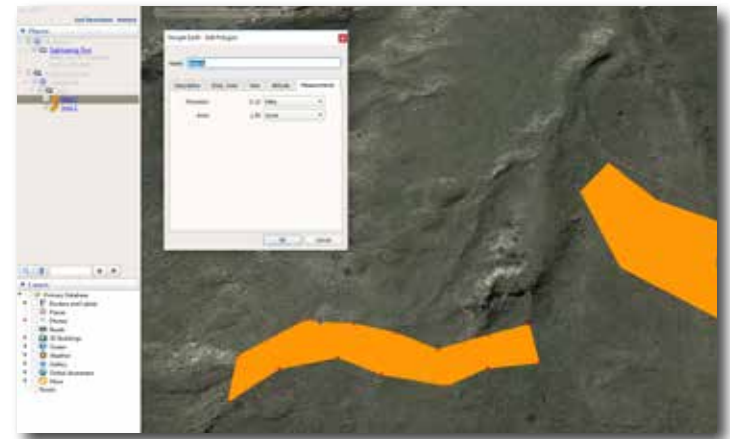
All of the map features created in Avenza Maps are stored as a layer within the map that was used as the background. This layer information can be exported into several formats (KML, CSV, or GPX) for use with many mapping software programs, Google Earth, and on other GPS devices. For more information about the Avenza Maps App, downloadable maps, and general user how-to guides, be sure to visit the Avenza Systems Inc. website <https://www.avenzamaps.com/index.html>.

Low cost, recreation grade GPS units, like Garmin, can be used to gather GPS data. These units are commercially available from a host of retailers. Data collected from these devices can be easily downloaded and converted into KML and SHP formats.

## WHAT CAN I USE TO EDIT, ANALYZE AND VISUALIZE MY GPS INFORMATION?

Free mapping software programs are becoming more and more available. Google Earth Pro is free to download and is probably one of the most popular free mapping platforms available. It can display data in many formats (GPX, SHP, KML, CSV, to name a few). Recorded GPS Tracks from Avenza or Garmin devices can be turned into infestation polygons with calculated acreages. One of the advantages of Google Earth Pro is it will display your data on top of satellite imagery, providing a visual double check that your GPS information depicts what you intend it to. For download information and additional help resources check out the Google Earth Pro website <https://www.google.com/earth/desktop/>.

Another free mapping software that can be used for advanced GPS editing is called QGIS and is available for download from <https://www.qgis.org/en/site/>. QGIS can be used in conjunction with the information collected with Avenza Maps or Garmin devices to edit, analyze and visualize data. Along with converting Recorded GPS Tracks into polygons, QGIS can be used to calculate



Google Earth Pro displays data exported from Avenza Maps on satellite imagery.

acreages and add additional information to GPSed areas. It should be noted that this software is capable of many advanced mapping functions and is not as intuitive as other software platforms like Google Earth Pro. Please refer to the QGIS website for more information on how to use the software and its many mapping functions.

What kind of information should I collect for each infested area? The amount of land an infestation occupies is clearly the main goal of GPS data collection. However, landowners may find that collecting additional information about the infested area can provide many benefits. When getting ready to collect GPS data on weed infested areas, consider what other information you may want to compare year to year. Common pieces of information that may be beneficial to collect include, but are not limited to: date, invasive plant species, plant density, type and amount of herbicide applied, weather conditions on day of application, and insect application information if using biocontrol (what kind and how many). Collecting the same types of information for each infested area year after year will help reveal trends as well as provide information for planning in future years.

While the idea of mapping weed infestations on your property may seem like a daunting task that requires a specialist with expensive equipment, it can be done quite economically with minimal training and equipment you may already have. Utilizing free software and smart devices anyone can create and maintain GPS information for weed infestations. If you are interested in gathering GPS information on your property be sure to check out the software mentioned in this article. You can also visit with your local county weed superintendent, Natural Resources Conservation Service/Farm Service Agency offices, Natural Resources District, or other land resource agencies for guidance on collecting GPS information.

By Sarlyn A. McCormick  
Geographic Information Systems  
Data Services Specialist  
USDA, Nebraska National Forests and Grasslands

Successful treatment of weed infested areas is not generally achieved in just one treatment. Infested areas require repeated yearly to twice-a-year treatment and monitoring. On public lands, weed infestations are generally mapped using GPS devices and costly mapping software to make re-treatment of infestations easier in subsequent years, as well as to track herbicide usage and infestation trends.

Private landowners may also benefit from yearly mapping of weed infestations. Mapping infestations can help landowners determine a baseline for how many acres are infested and subsequently if their treatments are achieving the desired effect. While it may sound like a difficult and cost prohibitive task, basic mapping can be done with smartphones or tablet computers at little to no cost. However, keep in mind that precision and accuracy can be limited when using free software. This article is intended to provide a brief overview of free and low cost methods of GPS data collection and analysis.

## WHAT CAN I USE TO GPS AREAS WITH WEEDS?

Location enabled smart devices such as smart phones and tablets can support numerous mapping programs. Avenza Maps™ by Avenza Systems Inc. is a free mobile map app (available in the Apple App Store and in Google Play) that allows you to download maps for offline use on iOS or Android smartphones or tablets as well as on Windows 10 devices. It then uses the device's built-in GPS to track your location on any map, plot locations and photos, and measure distance and area. The Avenza Map Store contains more than half a million maps (both free maps and maps for purchase). United States Geological Survey Topographic maps, which can be downloaded for

## HIGH PLAINS WEED MANAGEMENT AREA

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State Forester John Erixson examining redcedar encroachment near North Platte.

# The Business End of Eastern Redcedar

**By: Kyle Martens, Nebraska Forest Service**

If you keep an ear to the ground on the health of Nebraska's grasslands, there is no doubt you have heard about eastern redcedar. Generations of ranchers and farmers have tapped redcedar for everything from fence posts to windbreaks. Yet, within the last five years, this Nebraska native has started to catch serious flak.

The encroachment of eastern redcedar—according to the Nebraska Conservation Roundtable—has an array of negative impacts on forests and grasslands. Without adequate management, grasslands will start converting to cedar forest. This not only reduces pasture productivity and health, it takes over coveted habitat for grassland nesting birds and the countless other animals that rely on prairies.

For rural communities, the lack of defensible space around properties is another serious issue. The combination of dry conditions and strong winds can push fires into eastern redcedar stands, causing "flare-ups". These fires burn hot and move fast, making containment efforts by firefighters even more challenging. Just over a year ago, eight homes were lost and residents were evacuated after a grassfire spread to cedar trees at Lake McConaughy. It was a similar scene in McCook in March. A grassfire spread into the trees, forcing evacuations and injuring one person.

**There is no question that redcedar is severely impacting grasslands, forests, water resources, and wildfires on a large scale. Between 2005 and 2015, for example, the number of cedar seedlings in Nebraska doubled to nearly 275 million.** There are a host of reasons how it got so bad so quickly. The primary reason researchers and land managers point to is the lack of wildfires on today's

landscape.

There are, however, an array of opinions on how to bring the tree back under control. The Nebraska Forest Service (NFS) is one of many agencies that advocates for a multilayered attack, hinged on utilization.

NFS inventories estimate Nebraska's redcedar resource to be around 8.9 million tons, worth somewhere in the neighborhood of \$500 million. These trees can be used as sawlogs, fence posts, woodchips for fuel in wood energy systems, animal bedding, and many other wood-based products. The question then becomes not why should we harvest eastern redcedar but how.

Mechanized removal of redcedar costs around \$600 an acre. If we wanted to keep pace with the tree's expansion during 2005-2010, we would need to spend about \$23 million each year on management. This is where utilization comes into play, providing markets for what would otherwise be wasted wood. Estimates by the NFS show that if we could tap into the annual growth of eastern redcedar, we could sustainably and indefinitely generate between \$16 and \$22 million in wood chip sales every year.

There is no question Nebraska still has a way to go to make this a reality. The NFS and members of Nebraska's Conservation Roundtable have a plan in place. It includes everything from refining geospatial data on redcedar's spread to expanding cost-share funding for management. If redcedar encroachment is an issue on your horizon, you will want to read the group's position paper.

To read more about the Roundtable's issue paper and the economic opportunities, please visit: <http://bit.ly/eastredcedar>



## O'Rourke Family Honored with Leopold Conservation Award

*Congratulations to Jim and Lora O'Rourke and their children Seth and Shannon, who are the 2018 recipients of the Leopold Conservation Award in Nebraska! The award, which was presented to the O'Rourke family by the Sand County Foundation, is an annual award given to landowners that are "actively committed to a land ethic." According to the Sand County Foundation, this award is a way to "recognize and celebrate extraordinary achievement in voluntary conservation by private landowners, and provides a prominent platform by which agricultural community leaders are recognized as conservation ambassadors to citizens outside agriculture." The awards program is a joint effort between the Foundation and various organizations and agencies in each of the 14 participating states. In Nebraska, the Foundation partners with organizations and agencies such as the Alliance for the Future of Agriculture in Nebraska, Cargill, Nebraska Cattlemen, U.S. Department of Agriculture-Natural Resources Conservation Service, Nebraska Environmental Trust, Sandhills Task Force, Nebraska Game and Parks Commission, Nebraska Land Trust, and the Nebraska Department of Agriculture.*

*Jim, a Professor Emeritus at Chadron State College, was instrumental in starting and expanding the Rangeland Management program at CSC. Lora worked for the Bureau of Land Management and U.S. Forest Service as a Rangeland Management Specialist for 28 years, and is currently the President of the PRIDE Weed Management Association. Their twins, Shannon and Seth, who are sophomores at Chadron Public Schools, work side by side with their parents on the ranch.*

*You can find more information on the O'Rourke's and the Sand County Foundation at the following website: <https://sandcountyfoundation.org/>.*

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### WEST CENTRAL WEED MANAGEMENT AREA

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## PHOTO CREDITS

### PAGE 1

Friends of the Wild Whoopers

### PAGE 2

Chris Kelly, Kristi Paul, Lynn Myers

### PAGE 3

Colorado State University  
 Sarlyn McCormick.

### PAGE 5

Governor Pete Ricketts  
 Press Release, John Erixson,  
 Kyle Martens

### PAGE 6

Kristi Paul – absinth wormwood; Eric Coombs – Ore. Ag Dept.; Wilfredo Robles, MSU, Bugwood.org - common water hyacinth  
 Jill Swearingen, USDI NPS,

Bugwood.org - oriental bittersweet

Scott Robinson, GDNR, Bugwood.org - giant salvinia

Steve Dewey, USU, Bugwood.org

black henbane/Russian; Troy Evans, GSMNP, Bugwood.org - brittleleaf naiad

Robert Vid&#233;kj, *Doronicum Kft.*, Bugwood.org - hydrilla

Bonnie Million, National Park Service, Bugwood.org - halogeton

Nebraska Game & Parks, Ecoregion map

Rob Routledge, Sault College, Bugwood.org - Amur maple

Mike Haddock, kswildflower.org - Caucasian bluestem

Chris Evans, IWAP, Bugwood.org - garlic mustard

James R. Allison, GDNR, Bugwood.org - Japanese honeysuckle

Theodore Webster, USDA ARS, Bugwood.org - sulfur cinquefoil

Chris Evans, IWAP, Bugwood.org - Eurasian water-milfoil - cutleaf teasel

Norbert Frank, UWH, Bugwood.org - European black alder

### PAGE 7

Bernd Haynold, Bugwood.org - sickleweed; Chris Evans, U of Ill – absinth wormwood; Steve Dewey

USU Bugwood.org. – Common Teasel

Chris Evans, IWAP, Bugwood.org - garlic mustard

James R. Allison, GDNR, Bugwood.org - Japanese honeysuckle

Theodore Webster, USDA ARS, Bugwood.org - sulfur cinquefoil

Chris Evans, IWAP, Bugwood.org - Eurasian water-milfoil - cutleaf teasel

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Chris Evans, IWAP, Bugwood.org - garlic mustard

James R. Allison, GDNR, Bugwood.org - Japanese honeysuckle

Theodore Webster, USDA ARS, Bugwood.org - sulfur cinquefoil

Chris Evans, IWAP, Bugwood.org - Eurasian water-milfoil - cutleaf teasel

Norbert Frank, UWH, Bugwood.org - European black alder

Rob Routledge, Sault College, Bugwood.org - Amur maple

Mike Haddock, kswildflower.org - Caucasian bluestem

Aaron Hager, Illinois IPM – dicamba damage

Mitch Coffin, NDA

Loke T. Kok, VPI, Bugwood.org - bull thistle

John Cardina, TOSU, Bugwood.org - bull thistle

Howard F. Schwartz, CSU, Bugwood.org - field bindweed

Howard F. Schwartz, CSU, Bugwood.org - woollyleaf bursage

Steve Dewey, USU, Bugwood.org - Scotch thistle- houndstongue

John Cardina, TOSU, Bugwood.org - bull thistle

Jan Samanek, SPA, Bugwood.org - field bindweed

Sara Rosenthal, USDA ARS, Bugwood.org - diffuse knapweed

Jill Swearingen, USDI NPS, Bugwood.org - common reed

Jill Swearingen, NPS, Bugwood.org - Japanese knotweed

Steve Dewey, USU, Bugwood.org - plumeless thistle

Barbara Tokarska-Guzik,

University of Silesia, Bugwood.org - giant knotweed

Bonsak Hammeras, Bioforsk - NIAER, Bugwood.org - Canada thistle

Barry Rice, sarracenia.com, Bugwood.org - leafy spurge

Eric Coombs, ODA, Bugwood.org - purple loosestrife

Mike Haddock, kswildflowers.org - Sericea lespedeza

Steve Dewey, USU, Bugwood.org - Scotch thistle- houndstongue

John Cardina, TOSU, Bugwood.org - bull thistle

Jan Samanek, SPA, Bugwood.org - field bindweed

Sara Rosenthal, USDA ARS, Bugwood.org - diffuse knapweed

Jill Swearingen, USDI NPS, Bugwood.org - common reed

Jill Swearingen, NPS, Bugwood.org - Japanese knotweed

Steve Dewey, USU, Bugwood.org - plumeless thistle

Barbara Tokarska-Guzik,

University of Silesia, Bugwood.org - giant knotweed

Bonsak Hammeras, Bioforsk - NIAER, Bugwood.org - Canada thistle

Barry Rice, sarracenia.com, Bugwood.org - leafy spurge

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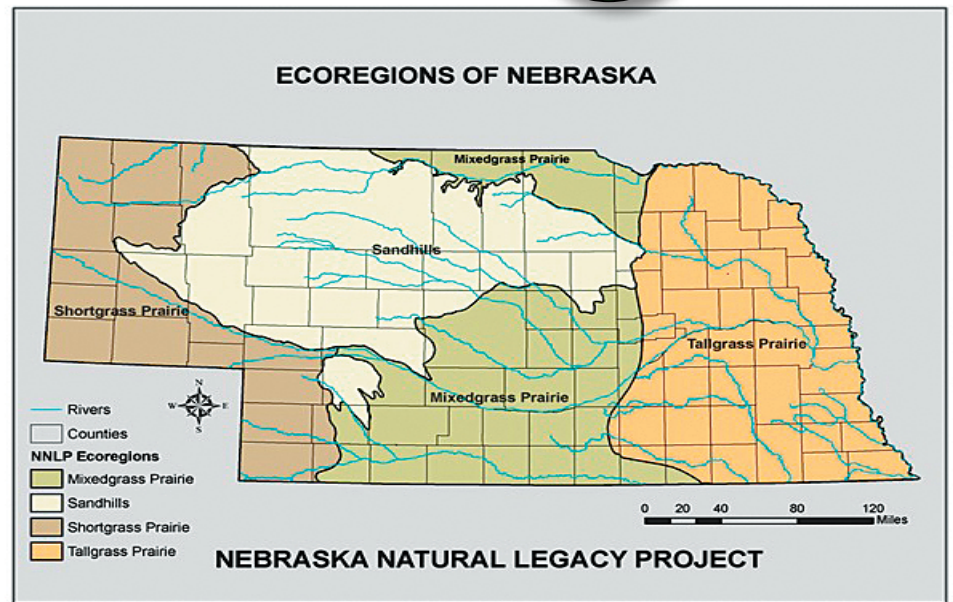
# Invasive Plants Watch List: 2018



**NEWS FLASH!**

*In 2018, absinth wormwood and yellow flag iris were added to Nebraska's Watch List in all ecoregions.*

These lists were developed to provide a region-based list of invasive plants to be "on the watch for" in Nebraska. Each ecoregion's species were categorized based on early detection and rapid response potential. A complete list and images of invasive plants in Nebraska can be found at <http://snr.unl.edu/invasives>.



## CATEGORY 1: Future Invasive Species

These 6 plants are the same for all ecoregions in Nebraska, as they pose a significant risk if introduced. The aquatic weeds are just one boat ride away from invading any Nebraska lake.



Giant Reed



Oriental Bittersweet



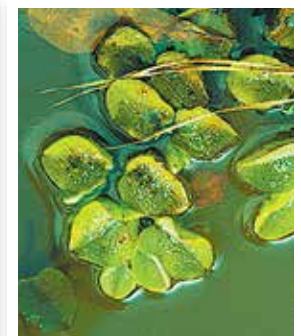
Water Hyacinth



Brittle Naiad



Hydrilla



Giant Salvinia

## CATEGORY 2: Shortgrass Prairie Ecoregion



Absinth Wormwood



Black Henbane



Houndstongue

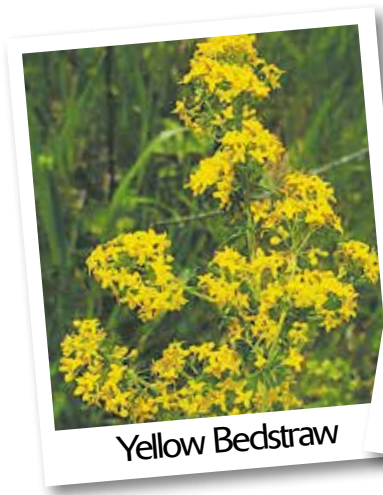


Russian Knapweed



Yellow Flag Iris

## CATEGORY 2: Sandhills Ecoregion



Yellow Bedstraw



Absinth Wormwood



Sulfur Cinquefoil



Eurasian Watermilfoil

ABSINTH WORMWOOD  
BLACK KNAPWEED  
EURASIAN WATER-MILFOIL  
HOUNDSTONGUE  
SULFUR CINQUEFOIL  
YELLOW FLAG IRIS  
PERENNIAL YELLOW BEDSTRAW

## CATEGORY 2: Mixed-grass Prairie Ecoregion

ABSINTH WORMWOOD  
AMUR MAPLE  
AUSTRALIAN BEARDGRASS  
(CAUCASIAN BLUESTEM)  
COMMON AND  
CUTLEAF TEASEL  
EURASIAN WATER-MILFOIL  
GARLIC MUSTARD  
JAPANESE HONEYSUCKLE  
RUSSIAN KNAPWEED  
SULFUR CINQUEFOIL  
YELLOW FLAG IRIS



Amur Maple



Garlic Mustard



Caucasian Bluestem



Common Teasel

## CATEGORY 2: Tallgrass Prairie Ecoregion



Cutleaf Teasel



Sickleweed



Japanese Honeysuckle

ABSINTH WORMWOOD  
AMUR MAPLE  
AUSTRALIAN BEARDGRASS  
(CAUCASIAN BLUESTEM)  
BLACK KNAPWEED  
CALLERY PEAR (NON-URBAN)  
COMMON AND  
CUTLEAF TEASEL  
CROWN VETCH  
EURASIAN WATER-MILFOIL  
GARLIC MUSTARD

GIANT REED  
HOUNDSTONGUE  
JAPANESE HONEYSUCKLE  
ORIENTAL BITTERSWEET  
PERENNIAL YELLOW  
BEDSTRAW  
RUSSIAN KNAPWEED  
SICKLEWEED  
YELLOW BLUESTEM  
YELLOW FLAG IRIS

The Invasive Plants Watch List also lists which counties in Nebraska have "County Added" noxious weeds. This list is described on page 11 of The Weed Watch.

*The complete list of Invasive Plants in Nebraska along with species photos can be found at the Nebraska Invasive Species Project website: <http://snr.unl.edu/invasives>*

# Impact of Dicamba Drift on Non-Dicamba-Tolerant Soybeans



By Stevan Knezevic, Weed Extension Specialist, UNL

Dicamba-resistant soybean, known as Roundup Ready 2 Xtend® Soybean was commercially available in the 2017 growing season. This new soybean cultivar, also known as DT-Soybeans, is genetically engineered to provide resistance to dicamba and glyphosate. XtendiMax®, Engenia® and FeXapan™ are the only three commercially available dicamba formulations labeled for application in Roundup Ready 2 Xtend Soybean. If you are interested in using any of the three products you must complete a Dicamba Applicator Training Program that is required by Law. Training is offered by several entities, including industry (Monsanto, BASF or DuPont), State Department of Agriculture, or UNL (contact your county Extension Office for more information about training). In addition, there are a number of other application requirements, such as use of specific nozzles, adjuvants, or downwind buffer requirements to reduce off target movement. Make sure to read and understand product labels completely, remember the label is the law.

With the increase in use of Dicamba-Tolerant (DT) soybeans (Roundup-Ready 2 Xtend®), the off-target movement of dicamba to non-DT soybeans and other broadleaf crops is of concern. Since the majority of soybean acreage was planted to non-DT varieties during the 2017 season, there were many cases of dicamba drift complaints, which have led to litigation. For example, the Nebraska State Department of Agriculture received over 90 complaints of dicamba drift onto non-DT soybeans with an estimated impact on 60,000 affected acres. In addition, there were over a thousand complaints across the Midwestern region. It is known that dicamba spray droplets have a tendency not only to drift with any air movement (even very slow wind), but also to move off target when fine aerosol droplets remain suspended during air temperature inversions. The drift can move from the target site well after the application for 36 hours and in some cases even 98 hours (4 days) after application. This drift can travel long distance (2-3 miles, or more) and finally be deposited onto nearby fields with various dicamba-sensitive crops including non-DT soybeans.

During the 2016 and 2017 seasons at Haskell Ag Lab, Concord, NE, we evaluated the influence of micro-rates of dicamba products (Engenia® and XtendiMax®) to growth, development and yield of three sensitive soybean types (Roundup Ready®, Liberty-Link® and conventional soybeans) at three different growth stages of application (second trifoliolate, start of flowering, and full flowering). The dicamba rates included: 0, 1/10; 1/50; 1/100; 1/500; and 1/1000 of products label rate (12.8oz of Engenia® and 22oz of XtendiMax®). To simplify visuals of the amount of the rates on a per acre basis, the 1/10th of the label rate is equivalent of a 3 tablespoons and 1/100th is a 1 teaspoon applied over a size of football field (1 acre).

The plots had four rows of each soybean type; Roundup Ready®, Liberty-Link®, conventional and dicamba-tolerant as a check. The 3 application times were second trifoliolate (V2), just before flowering (V7/R1), or at full flowering (R2). The V2 timing was chosen to simulate potential drift at an early stage of soybean growth, which would be the earliest expected time for a dicamba product application. The second and third timings were chosen to simulate potential drift at the later stages of soybean growth due to potentially different planting date differences between neighboring fields. For example some fields might be planted earlier, some later, thus these two timings would capture potential drift among neighboring fields around flowering time. Visual evaluation of injuries was conducted at 7, 14, 21, and 28 days after treatment (DAT). Soybean morphological development including plant height, number of branches, days to canopy closure (for V2 and V7/R1 only), days to flowering (for V2 only), number of

flowers (V2 and V7/R1), and days to maturity. Yields of all soybean types were harvested. Roundup Ready®, Liberty-Link®, and conventional soybeans were equally sensitive to all tested micro-rates of Engenia® and XtendiMax®. When micro-rates were increased, crop growth parameters were significantly impacted, including: reduction in plant height, alterations in branching pattern, delayed days to canopy closure and delayed date of flowering, a reduction in flower number, a delayed date of physiological maturity and most importantly a reduction in soybean yield. The foregoing negative impacts were dependent on correspondence of application date with the soybean growth stage, with V7/R1 stage being the most dicamba sensitive.

Engenia® and XtendiMax® reduced soybean height by as much as 30 inches, depending on the herbicide rate, which also delayed, or completely prevented canopy closure. Almost all rates (1/500 to 1/10) of Engenia® and XtendiMax® applied during early vegetative stage (V2) delayed soybean flowering by 10 days, across all soybean types. Based on ratings conducted at 65 days after planting, an Engenia® rate of 1/10 (1.6 oz/A) applied at V2 stage led to a 56% reduction in flower numbers and as much as 92% when applied at V7/R1 stage.

Both dicamba products delayed soybean maturity by 5-25 days depending on the growth stages of dicamba application and the dicamba rate. Both Engenia® and XtendiMax® injured non-DT soybean varieties in a similar fashion. The visual injuries ranged from 20-80%, depending on the growth stage of application and dicamba rate.

Yields of all non-DT soybeans were significantly reduced by both herbicides irrespective of application time. However, the V7/R1 stage appears to be the most dicamba-sensitive stage, followed by the R2, and then the V2 stages. For example, Conventional, Liberty-Link® and Roundup-Ready® soybeans yielded 58, 60, 60 bu/A in non-sprayed control plots. However, when the same

soybeans were sprayed at V2 stage with 1/10 of Engenia® rate, they yielded considerably less, i.e., 24, 22, and 27 bu/A, respectively.

Yields were further lowered to 18, 15 and 25 bu/A, respectively, when the spraying occurred at R2. Extremely low yields of only 3, 2 and 4 bu/A were measured when the spraying occurred at V7/R1 stage. Similar yield responses were measured in plots sprayed with XtendiMax®. In most cases, the 1/50 and 1/100 of the labels rates reduced soybean yields by 13-16 bu/A when applied at the V2 stage. Yields were also reduced even with "very low" exposures of 1/500 and 1/1000 of the label rate. For example, the 1/1000 of label rate of Engenia® applied at V2 stage reduced yields by about 4 bu/A in Conventional, 2 bu/A in Liberty-Link®, and 4 bu/A in Roundup-Ready® soybean. The same rates applied at V7/R1 stage reduced yields by 11 bu/A in Conventional, 3 bu/A in Liberty-Link® and 8 bu/A in Roundup-Ready® soybean.

Both Engenia® and XtendiMax® had very similar effects on the growth and development of all non-DT soybeans clearly showing that non-dicamba tolerant soybeans were sensitive to even very low micro-rates of Engenia® and XtendiMax®, hence, efforts must be made to avoid drift of dicamba onto sensitive soybeans.

For additional information contact Stevan Knezevic (sknezevic2@unl.edu, 402-404-0175)



Veins of young, affected leaves assume a parallel orientation following exposure to dicamba



Cupping of young trifoliolate leaves following exposure to dicamba

## SANDHILLS WEED MANAGEMENT AREA - MIDDLE NIOBRARA WEED AWARENESS GROUP\*

WMA Office – 308-346-3393  
Blaine/Thomas • Carol Conard – 308-346-4047  
Boone • Todd Buettner – 308-750-5214  
Brown • Scott Erthum – 402-760-0093\*

Cherry • Barbara Small – 402-322-1067\*  
Custer • Ridge Horky – 308-872-2410  
Garfield • Jimmy Petersen – 308-201-0045  
Grant • Cody Renkoski – 308-203-1454

Hooker • Neal Hayward – 308-546-2706  
Greeley • Walter Bjorklund – 308-428-5955  
Keya Paha • Travis Mundorf – 402-497-3800\*  
Loup • Zane Young – 308-214-0923

Nance • Chad Borowiak – 308-536-2443  
Rock • Rod Stolcpart – 402-822-0186\*  
Valley • Darrel Kaminski – 308-383-2701  
Wheeler • Doug Reiter – 308-654-3397



# Don't Let Absinth Wormwood be Present

By Kristi Paul, Sheridan County Weed Superintendent

A new invasive weed, absinth wormwood, was recently added to Nebraska's Watch List for all of the state's ecoregions. This invasive plant was first identified in Sheridan County in 2014, but has since been identified in more than 15 counties across

Nebraska. Absinth wormwood appears to have been introduced to Nebraska in hay containing wormwood seeds. Most infestations have appeared following the delivery of hay



Inconspicuous dull yellow flowers of absinth wormwood



Mature absinth wormwood

from out of state in 2012 and 2013, when moisture was low and imported forage was necessary. In Fillmore County, an infestation started around a pond where gravel containing absinth wormwood seed was delivered. Farmsteads, roadsides, and anywhere hay has been delivered, fed, or stacked are areas to watch for absinth wormwood.

Absinth wormwood is a perennial plant composed of several woody stems that grow 4 to 5 feet tall and 2 feet wide and a fibrous root system. This species of sage, native to North Africa, Europe and Asia, has silvery colored leaves and is known for its strong sage odor. The plant exudes an allelopathic chemical, which inhibits the growth of desirable plants around it. As with most invasive non-native plants, absinth wormwood is a prolific seed producer, capable of producing 50,000 seeds per stem. In addition to reproducing from seed, it re-grows at ground level each spring. The mature plant has inconspicuous dull yellow flowers that bloom July through August.

Since livestock avoid absinth wormwood due to its foul odor and bitter taste, it may be the only plant left standing in your corral or pasture. However, if livestock are forced to eat it, all parts of the plant are toxic. Absinth wormwood

was brought to the U.S. as an ornamental plant for gardens. It was originally used in ancient Egypt for healing and as an insecticide. Absinth wormwood contains a psychoactive ingredient, thujone, which can disrupt the nervous system, cause hallucinations, and psychotic behavior. Due to its toxicity, it was banned in several countries in the early 20th century.

Single plants on the state highways or county roads are likely the result of infested hay that has been hauled down those roads. If the plants go unnoticed, we will soon have patches of absinth wormwood throughout the counties and state. After learning how quickly absinth wormwood will grow and spread, work has been done to find which control methods are effective. Some control methods are:

- Tillage can control absinth wormwood. Tillage is recommended only for acres currently in cropland.
- If the site is accessible, mowing a new infestation before seed is produced can be effective. While mowing young plants will prevent seed production, herbicide application will be necessary to control established absinth wormwood plants.

• Clopyralid, dicamba, picloram, glyphosate, and 2,4-D have been used as herbicide control methods. Montana Weed professional Brian Ostwald of Carbon County said they have had the best results with 7 ounces of Milestone + 1 ounce of Telar per acre.

The more mature the plant, the more difficult it is to control with herbicide. At maturity, a quart of 2,4-D should be added to the mix.

- Prevention: Implementing proper grazing management to prevent the establishment of absinth wormwood is very important.

Since its discovery in Nebraska, education and awareness regarding absinth wormwood has been shared with weed professionals across the state. In an effort to prevent this plant from becoming a big problem in Nebraska, we are working to identify locations with absinth wormwood and control every known infestation. Please learn to identify absinth wormwood so it can be controlled before it gets a chance to spread across our state. (University of Nevada Cooperative Extension; King County, Washington; North Dakota State Extension)

**WHEN PURCHASING HAY FROM OTHER STATES, BE SURE TO PURCHASE CERTIFIED WEED FREE FORAGE TO PREVENT THE INTRODUCTION AND SPREAD OF OTHER STATE'S NOXIOUS OR INVASIVE PLANTS.**

## Controlling Noxious and Invasive Weeds Needs to Be Part of Your Management Plan

By Kristi Paul, PRIDE Founding Member, Sheridan County Weed Superintendent

Because all of Nebraska's noxious weeds are non-native, they require effort and planning for control. If one herbicide application could control them, they would never have been listed as noxious weeds. Because these invasive weeds require different control measures for different situations, home owners and landowners need to have a game plan for noxious weed control. Here are some tips and facts about managing noxious and invasive weeds:

- 1 It's the law. The Nebraska Noxious Weed Act states that it is the duty of landowners/managers to control noxious weeds on their property.
- 2 Noxious weeds decrease the value of the land and are detrimental to crop production and forage for livestock.
- 3 Noxious weeds often crowd out native plant communities, altering the habitat upon which wildlife depend for food and shelter.
- 4 Noxious and invasive weeds are prolific seed producers. Many of the seeds remain viable for several years up to 100 years.
- 5 Researchers and herbicide market companies spend many years and millions of dollars to get a new herbicide to market. Each product is created with a specific use. Rangeland, cropland, roadsides, or riparian areas can each require different herbicides for different noxious and invasive weed species. The label of each product states which plants can be controlled, where the herbicide can be applied, and what Personal Protective Equipment should be used or worn during the application. The label is the law.
- 6 Landowners/lessees should have a written agreement regarding the control of noxious weeds. Knowing up front will prevent questions later regarding who purchases and who applies the herbicide.
- 7 Be proactive, not reactive. A few dollars' worth of herbicide can control a small patch of noxious weeds. Having a small sprayer on your 4 wheeler, or in the box of the pickup can be handy for spot spraying. If not controlled, the size of the infestation and the cost of control can increase quickly.
- 8 Try not to infest clean fields or pastures. If you know where certain weeds are growing, don't move equipment or livestock into a clean field without first cleaning the equipment or holding the livestock in an area to prevent the spread of noxious weeds and seeds.
- 9 When purchasing hay or forage, always inquire whether the product is noxious weed free. This can prevent future noxious weed infestations on your property.
- 10 In addition to being required by law, controlling noxious weeds is all about being a good neighbor, doing the right thing, and being a good steward of your land.

# something for

# KIDS

OF ALL AGES

T M D E E W D N I B E F I R T S E S O O L E L P R U P  
 T U O B A D E E W P A N K D E T T O P S E P S H T E L  
 P L U M E L E S S T H I S T L E D I S N U L L R Q S E  
 D E E W T O N K E S E N A P A J L E V I L I E A A C T  
 N N U Y O R E S E A R C H L O O F I H I P H O G S O S  
 O H E M E R A L D A S H B O R E R O H D T D W M D T A  
 X A A B Y L K I T T E N S T E O U D H A V E I I A C W  
 I B C B R E L I D S O U N D N N N Z E F E E T T O H E  
 O I O L I A L A N L I O S M D A W W I D T W H E L T L  
 U T M A P T S L V G C H E S S E A E S T A P I S O H T  
 S A M R A R A K A E T N T Y E L L O W F L A G I R I S  
 W T O U R E I T A V T O E A E D W F I O E N H I T S I  
 E B N T I T S D O W N T G L D E A E G E A K P E N T H  
 E U M A A A A G E G M I A E R A L W G V K E L T O L T  
 D L U N N W A L U M B A W L T D N R Q I S S A S C E K  
 S B L A C K H E N B A N E T P H U A U T A U I A T T S  
 B U L L T H I S T L E T N A L P E H C A R F N W F T U  
 I G I R E T L A R T N E C T S E W R T N B F S I I D M  
 E S E G A S R U B F A E L Y L O O W W O E I R M R I N  
 N D N C E R U T S A P F F L S U O I X O N D E O D M W  
 N E R A E O L A U N N A B S I N T H W O R M W O O D A  
 I E M T O S A L T C E D A R D E E W T O N K T N A I G  
 A A Z E D E P S E L A E S I R E S S S D E E S C R A P  
 L W A M W A R T S D E B W O L L E Y L A I N N E R E P

- ABSINTH WORMWOOD
- NEBRASKA
- ACRE
- NEBRASKA WMA
- ANNUAL
- NOXIOUS
- BIENNIAL
- NOXIOUS WEEDS
- BINDWEED
- PASTURE
- BLACK HENBANE
- PERENNIAL YELLOW BEDSTRAW
- BULL THISTLE
- PLATTE VALLEY
- CANADA THISTLE
- PHRAGMITES
- COMMON MULLIEN
- PLUMELESS THISTLE
- CONTROL
- PURPLE LOOSESTRIFE
- DIFFUSE KNAPWEED
- PRIDE
- DRIFT
- RESEARCH
- DRIFT CONTROL
- RIPARIAN
- EMERALD ASH BORER
- SALT CEDAR
- ENVIRONMENT
- SANDHILLS

- FIELD
- SCOTCH THISTLE
- GIANT KNOTWEED
- SEED
- HABITAT
- SERICEA LESPEDEZA
- HIGH PLAINS
- SPOTTED KNAPWEED
- HOUNDSTONGUE
- TWIN VALLEY
- JAPANESE KNOTWEED
- WASTE
- LAWN
- WATER
- LEAFY SPURGE
- WEATHER
- MNWAG
- WEEDS
- MUSK THISTLE
- WEST CENTRAL
- NATIVE
- WMA
- NATURAL
- WOOLYLEAF BURSAGE
- WORKING TOGETHER WORKS
- YELLOW FLAG IRIS

**HIDDEN WORD FIND** - Responsible landowners take pride in their management efforts to control weeds on private lands in order to protect our environment. Sometimes the greatest challenge is to understand how invaders spread, the groups involved in treating them, and tools they use. Find the words listed to the right in the puzzle above. *Words are arranged horizontally, vertically, diagonally, forwards (left to right) and backwards (right to left) and top to bottom or bottom to top.*

If you have comments about this puzzle, send your name and address to:  
**PRIDE WMA, PO Box 449, Rushville, NE 69360**

# Find 10 Differences Kids Logic Game



Answer  ?

# COUNTY-ADDED NOXIOUS WEEDS



## FIELD BINDWEED

Banner Garden  
Box Butte  
Cheyenne  
Dawes  
Deuel

*5 to 6 feet long.  
Perennial - spreads by  
seeds and rhizomes.*



PRIDE serves as a cornerstone to build and maintain partnerships between the many cooperators in invasive weed management and education. With this collaborative effort, a more efficient and successful approach to invasive weed management and awareness is achieved. PRIDE's efforts in pooling of funds and resources from contributors will result in a compounding of investments and rewards.



## HOUNDSTONGUE

Dawes  
Sheridan

*1 to 4 feet tall.  
Biennial - spreads  
only by seeds.*



## SCOTCH THISTLE

Banner  
Box Butte  
Cheyenne  
Dawes  
Morrill  
Kimball  
Scotts Bluff  
Sheridan  
Sioux

*1 to 10 feet tall.  
Biennial - spreads  
only by seeds.*



## COMMON MULLEIN

Cheyenne  
County

*1 to 7 feet tall  
Biennial-  
spreads only  
by seeds.*



## BULL THISTLE

Rock

*1.5 to 6.5 feet tall.  
Biennial - spreads  
only by seeds.*



## WOOLLYLEAF BURSAGE

Banner

*1 to 2.5 feet tall.  
Perennial - spreads by  
seeds and rhizomes.*



## PERENNIAL YELLOW BEDSTRAW

Cherry

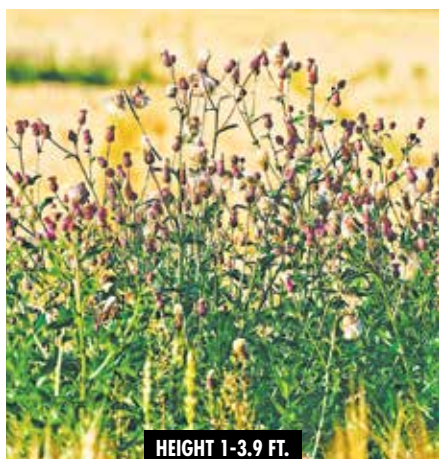
*2 to 4 feet tall.  
Perennial - spreads by  
seeds and rhizomes.*

# NEBRASKA'S NOXIOUS WEEDS

It is the duty of each person who owns or controls land to effectively control noxious weeds on such land.

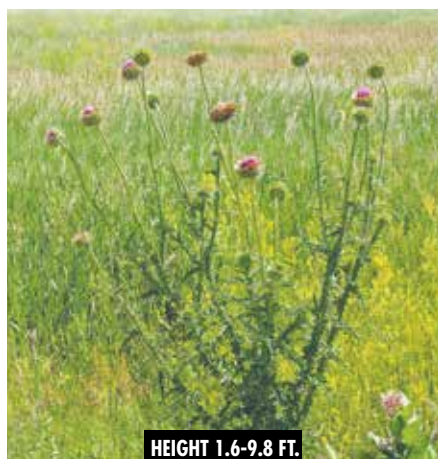
**Noxious weed is a legal term used to denote a destructive or harmful weed for the purpose of regulation.**

The Director of Agriculture establishes which plants are noxious. These non-native plants compete aggressively with desirable plants and vegetation. Failure to control noxious weeds in this state is a serious problem and is detrimental to the production of crops and livestock, and to the welfare of residents of this state. Noxious weeds may also devalue and reduce tax revenue.



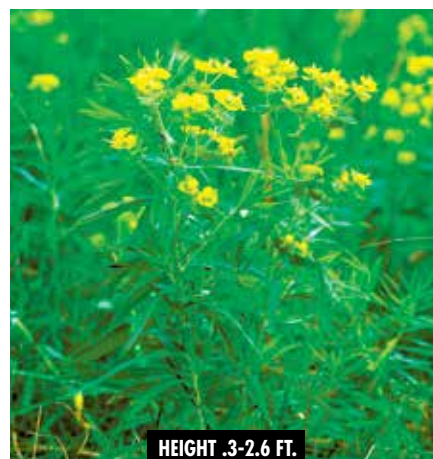
HEIGHT 1-3.9 FT.

Canada Thistle



HEIGHT 1.6-9.8 FT.

Musk Thistle



HEIGHT .3-2.6 FT.

Leafy Spurge



HEIGHT 1-3.9 FT.

Spotted Knapweed



HEIGHT 1-4.9 FT.

Plumeless Thistle



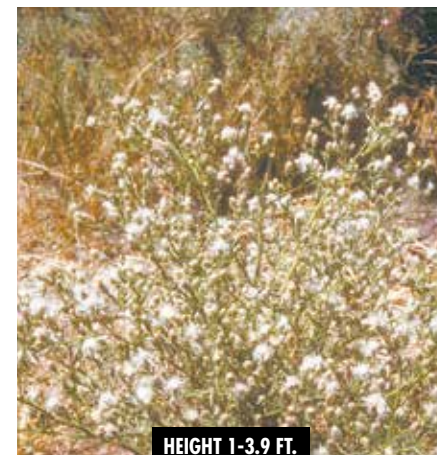
HEIGHT 3.3-20 FT.

Saltcedar



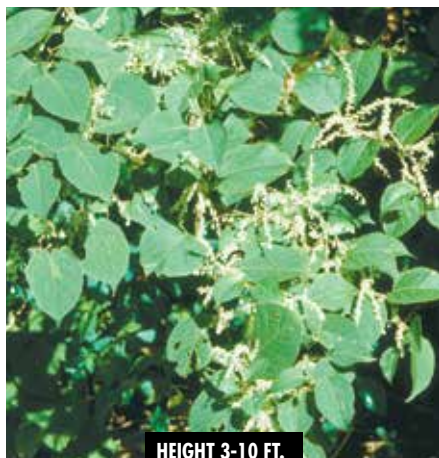
HEIGHT 3.2-20 FT.

Phragmites



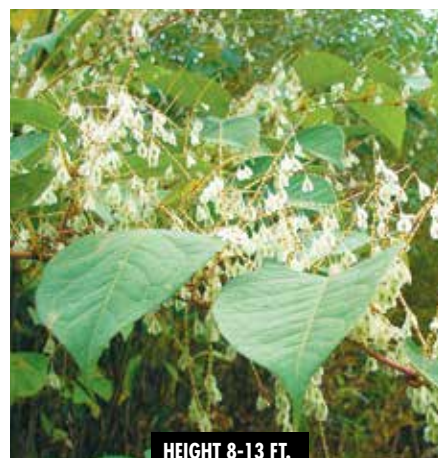
HEIGHT 1-3.9 FT.

Diffuse Knapweed



HEIGHT 3-10 FT.

Japanese Knotweed



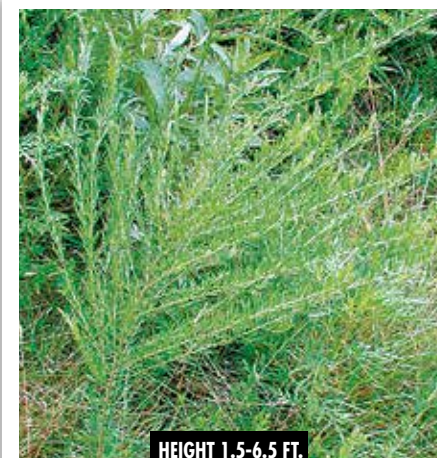
HEIGHT 8-13 FT.

Giant Knotweed



HEIGHT 1.3-8 FT.

Purple Loosestrife



HEIGHT 1.5-6.5 FT.

Sericea Lespedeza