

NEBRASKA TECHNICAL NOTE

U.S. Department of Agriculture
Natural Resources Conservation Service

September 28, 2010

Range and Pasture Technical Note #20

Michael Kucera, State Resource Conservationist, USDA-NRCS

Rich Walters, Implementation/Evaluation Coordinator, The Nature Conservancy

QUICK GUIDE TO INVASIVE PLANT TREATMENT



BACKGROUND:

This quick guide was prepared as an aid to conservation planners and land managers in making treatment decisions for invasive species common to riparian corridors and wetlands with the exception of Eastern red cedar which is also invasive on uplands. The suite of treatment choices and sequences were gathered from the recommendations of Weed Management Superintendents, landowners, conservation entities, as well as various federal and state agency professionals with experience in invasive plant management.

The guide is not all inclusive, nor does it replace the requirement to follow all laws, rules, and regulations including herbicide label requirements and guidance found in the current UNL Extension EC130 "Guide for Weed Management in Nebraska" when herbicides are used. If mechanical clearing or prescribed burning is planned to occur during the primary nesting season (April 1 to July 15) or at any other time which may result in the take of nesting migratory bird nests, then a field survey is needed, to determine the presence or absence of nests.

Invasive species control involves the use of integrated pest management including scouting, to verify the location, extent and growth stage of the invasive species and the use of integrated measures rather than single treatment measures. Treatment measures are highly dependent on the plant growth/growth stage, dead plant litter, weather and soil/site conditions.

Successful treatment typically requires a sequence of treatment methods and always requires adequate follow-up in successive years after the initial treatment. Common techniques used in subsequent treatment years include spot treatments of herbicides, mechanical treatments, prescribed burning, haying and targeted grazing. These techniques must be designed to reduce the plant vigor and extent of the invasive species.

The following matrix provides general treatment guidance for Siberian elm, Honey and Black locust, Salt cedar, Russian olive, Eastern redcedar, Phragmites, Purple loosestrife, Reed canarygrass, and Hybrid cattail. The columns are broken into the following:

Target Plant Species: Siberian elm, Honey and black locust, Phragmites, etc.

Treatment Sequence: Mechanical, treatment, herbicides and grazing, etc.

Description of Treatment: Simple description of the treatment method.

Year of Treatment: Year 1, Year 2, + means repeated as necessary.

Timing: Approximate growth stage or season when treatment is most effective.

| <i>Target Plant Species</i> | ¹ <i>Treatment Sequence</i> | ³ <i>Treatment Description</i> | <i>Year</i> | <i>Timing</i> |
|---|--|---|-------------|--|
| Siberian Elm, Honey and Black Locust | M&H>H | Mechanical cutting or shearing followed by immediate application with herbicides labeled for stump treatment. | 1 | When trees are in full foliage, usually June and actively growing. |
| | | Follow-up herbicide spot treatment on re-sprouts. | 2+ | When re-sprouts are actively growing, usually June. |
| | M&H>G>H or G | Mechanical cutting or shearing followed by immediate application with herbicides labeled for stump treatment. | 1 | When trees are in full foliage, usually June and actively growing. |
| | | Target grazing by goats ² or other browsing animals. | 2 | Fence goats/sheep into small areas when new seedlings or resprouts start growing. |
| | | Herbicide spot treatments or use of targeted grazing treatments for year 3 and beyond required for operation and maintenance. | 3+ | Spray when re-sprouts are actively growing, usually in June, target grazing the same as in year 2. |
| | | | | |

| <i>Target Plant Species</i> | <i>¹Treatment Sequence</i> | <i>³Treatment Description</i> | <i>Year</i> | <i>Timing</i> |
|------------------------------|---------------------------------------|--|-------------|--|
| Salt Cedar (tamarisk) | M&H>H | Mechanical cutting or shearing (trees>6') or mowing (trees<6') followed immediate application with herbicides labeled for stump treatment. | 1 | July through September on young plants that have developed from seed; June through October on established plants. |
| | | Foliar treatment with Garlon 3A, Habitat, or Habitat + Glyphosate, or basal treatments of Garlon 4/Remedy on re-sprouts according to label recommendations. | 2&3+ | Spray when re-sprouts are actively growing, usually in June, Do not disturb plants through two growing seasons if using Habitat. |
| | H>H and/or G | Foliar treatments using foliar treatment with Garlon 3A, Habitat, or Habitat + Glyphosate or other labeled herbicides when trees are actively growing, usually in late summer. | 1 | Actively growing stage, usually June-August. Do not disturb plants through two growing seasons if using Habitat. |
| | | Foliar treatment with Garlon 3A, Habitat, or Habitat + Glyphosate, or basal treatments of Garlon 4/Remedy according to label recommendations on re-sprouts and/or targeted grazing by goats ² or other browsing animals. Operation and maintenance is required to maintain effective control. | 2 or 3+ | June through October for herbicide follow-up with targeted grazing/browsing. Plants are most susceptible to browsing during active growth. |
| | G>H | Targeted grazing by goats ² or other browsing animals. (Most effective on plants <5'). | 1 | Target grazing during the entire growing season concentrated on infested areas only to reduce plant size and reduce plant vigor. Plants are most susceptible to browsing pressure during periods of active growth. Fence into small areas 2 acres or less when growths start and continue to target these areas whenever any additional growth occurs. |
| | | Foliar treatment on re-growth with Garlon 3A, Habitat, or Habitat + Glyphosate, or basal treatments of Garlon 4/Remedy according to label recommendations on re-sprouts and continued grazing by goats ² or other browsing animals and spot treatments of herbicides in succeeding years. | 2+ | Actively growing stage, usually June-August. Do not disturb plants through two growing seasons if using Habitat. |

| <i>Target Plant Species</i> | <i>¹Treatment Sequence</i> | <i>³Treatment Description</i> | <i>Year</i> | <i>Timing</i> |
|-----------------------------|---|--|---|--|
| Russian Olive | M&H>H | Mechanical cutting or shearing (trees>6') or mowing (trees<6') followed by immediate application with herbicides labeled for stump treatment. | 1 | When trees are in full foliage, usually June and actively growing. |
| | | Herbicide spot treatment on re-sprouts listed in the current weed management guide. | 2+ | When re-sprouts are actively growing, usually June. |
| | M&H>G>H or G | Mechanical cutting or shearing (trees>6') or mowing (trees<6') followed by immediate application with herbicides labeled for stump treatment. | 1 | When trees are in full foliage, usually June and actively growing. |
| | | Targeted grazing by goats ² or other browsing animals. | 2 | Fence goats/sheep into small areas when new seedlings or re-sprouts start growing throughout the growing season. |
| | | Herbicide spot treatments or targeted grazing treatments for year 3 and beyond required for operation and maintenance. | 3+ | When re-sprouts are actively growing, usually June. |
| | G&H>H | Targeted grazing by goats ² or other browsing animals. (Most effective on plants <6') and spot treatment on re-sprouts. | 1 | Yearlong to reduce plant biomass. Plants are most susceptible to browsing during active growth. |
| | | Follow-up herbicide spot treatment on re-sprouts. | 1 & 2+ | Actively growing stage, usually June-August. |
| | H>H or G | Foliar treatments using foliar treatment with 2,4-D+Dicamba, Remedy, Arsenal, Habitat or other labeled herbicides when trees are actively growing, usually in late summer. Pathfinder and Spike are listed as non-foliar treatments. | 1 | Periods of full foliage for foliar treatments. Do not disturb plants through 2 nd growing season. |
| | | Follow-up herbicide spot treatments or targeted grazing treatments for year 3 and beyond required for operation and maintenance. | 3+ | June through October for herbicide spot treatment. Year-long for targeted grazing. |
| | Young smooth barked Salt Cedar (tamarisk), Siberian Elm, Honey and Black Locust, and Russian Olive | H (basal bark treatment) | Basal bark treatment to control young smooth barked trees less three inches with 3:1 ratio of Crop oil and triclopyr (<u>Remedy</u> © or other herbicides with the chemical triclopyr – check label for instructions). Apply to the lower 12" of small trees (less than 3" diameter) with small sprayer or PVC wand. Apply 2" wet band on one side of smaller trees and 2" ring around circumference of tree stem on trees larger than 3" diameter. Works on any deciduous tree young enough to have thin smooth bark. Complete follow-up and treat trees that were missed in subsequent years. | 1 |

| <i>Target Plant Species</i> | <i>¹Treatment Sequence</i> | <i>³Treatment Description</i> | <i>Year</i> | <i>Timing</i> |
|--|---|--|-------------|---|
| Eastern Red Cedar (follow-up treatments of burning or individual cutting is needed for small volunteer trees for all treatment methods) | M | Mechanical cutting or shearing | 1 | Anytime |
| | B | Prescribed Burning, most effective on trees <6'. | 1 | Winter through early spring. |
| | G>B or M | Targeted winter grazing by goats ² on young trees <5'. Supplemental feed will be necessary for goats ² | 1 | Trees are the most palatable during late fall through winter. |
| | | Prescribed burning or hand cutting for small cedars that germinate is recommended. | 2+ | Same timeframe as listed above. |
| | M>B | Mechanical cutting or shearing and stacking at the base of slopes strategically near other large trees that are upslope within three to six months of conducting the prescribed burn. | 1-2+ | Cutting/stuffing at least 3-months before a prescribed burn but prior to dead trees losing needles. Prescribed burn same timeframe as above. |
| | H (foliar, basal, soil applied around tree base or herbicide injection) | Various herbicide treatments are listed in the current weed management guide. Foliar treatments are generally limited to 2 foot or smaller trees. There are also various spot treatments that can be applied at the base or smaller trees. Larger trees will generally need to have herbicides injected into evenly spaced notches from an ax or chainsaw at the tree base with approved herbicides. | 1 | Varies, generally best when trees are actively growing. |
| Phragmites | M or G & H>H | Mowing, haying or disking to reduce biomass, followed by herbicide treatment of Habitat, Rodeo or other labeled herbicide. | 1 | Mechanical treatment summer following by herbicide treatment in late summer-early fall when flowering through 2 weeks prior to first frost. |
| | | Second year foliar application of Habitat, Rodeo or other labeled herbicides. | 2+ | Flowering through 2 weeks prior to first frost |
| | H&M>H | Apply Habitat, Rodeo or other labeled herbicides then heavy disk. | 1 | Herbicide in the fall during flowering through 2 weeks prior to first frost then perform heavy disking to cut roots after plants are dead and dormant.. |
| | | Second year foliar application of Habitat, Rodeo or other labeled herbicides Spot treat areas as needed. | 2+ | Flowering through 2 weeks prior to first frost. |
| | H>H | Foliar application of Habitat, Rodeo or other labeled herbicides | 1 | Flowering through 2 weeks prior to first frost. |
| | | Second year foliar application of Habitat, Rodeo or other labeled herbicide. | 2+ | Flowering through 2 weeks prior to first frost. |
| | M>G | Mowing or disking to reduce biomass and to cut roots. | 1 | Late summer or fall |
| | | Target grazing in small fenced out areas by cattle, sheep or goats ² on re-growth. | 2+ | High intensity continuous grazing from the beginning to the end of the growing season to allow for continual use of green growth throughout the growing season. |

| | | | | |
|---|---------------------------------------|---|-------------|--|
| | B>H | Prescribed burning to reduce biomass. | 1 | Anytime during the late summer or early fall when plants are dry. *Burning after Habitat herbicide treatment is less effective due to loss of fine fuel over 2 growing seasons. |
| | | Foliar treatment on re-growth with Habitat or Rodeo or other labeled herbicide. | 2+ | Flowering through 2 weeks prior to first frost. |
| | G>G | High intensity targeted grazing to control expansion of existing plant populations. | 1+ | High intensity continuous grazing May-August to allow for continual use of green growth throughout the growing season. |
| Target Plant Species | ¹Treatment Sequence | ³Treatment Description | Year | Timing |
| Purple Loosestrife | H>H | Herbicide application with Habitat, Escort, Garlon 3A, Rodeo or other labeled herbicides. | 1 | Plants with active growth in bloom or later at least 2 weeks prior to first frost. |
| | | Spot treatment with Rodeo, Habitat or other labeled herbicides. | 2+ | Plants with active growth in bloom or later at least 2 weeks prior to first frost. |
| | M>H | Mowing or disking to reduce biomass. | 1 | Late summer or fall |
| | | Herbicide treatment on re-growth with habitat or rodeo or other labeled herbicides. | 2+ | When plants are actively re-growing, in bloom or later. |
| | G>H | Targeted grazing by goats ² or other browsing animals. | 1 | Continuous grazing during periods of active growth. |
| | | Follow-up herbicide treatment on re-growth with labeled herbicides. | 2+ | When plants are actively growing, in bloom or later. |
| Reed Canary-grass | H>H | Initial Herbicide treatment using Rodeo, Habitat or other labeled herbicides followed by another herbicide treatment. | 1 & 2+ | Seed setting and into fall (August through October) for long term control need to apply herbicide the next growing season, No single treatment seems to work for more than one year. |
| Reed Canary-grass and Hybrid Cattail | M&H>H | Mowing or disking to reduce standing biomass (recommend disking in wetlands to disturb rhizomes and promote other plant species to germinate; if in meadow system where soil disturbance is not desirable then mow) followed by herbicide treatment using Rodeo, Habitat or other labeled herbicides. | 1 | Early spring mowing or disking followed by late summer early fall herbicide treatment when RCG is forming seed following by tillage approximately 2-3 weeks after herbicide has killed plants. |
| | | Second year herbicide treatment using Rodeo, Habitat or other labeled herbicides. | 2+ | Late summer early fall herbicide treatment when RCG is forming seed. |
| | B&H+M>H | Prescribed burning in spring to remove/reduce biomass followed by Herbicide treatment using Rodeo, Habitat or other labeled herbicides. Two to three weeks after herbicide treatment then roto-till or other heavy tillage operation (soil disturbance is not desirable on meadows) | 1 | Early spring burn followed by late summer early fall herbicide treatment when RCG is forming seed following by tillage approximately 2-3 weeks after herbicide has killed plants. |
| | | Second year herbicide treatment using Rodeo, Habitat or other labeled herbicides. | 2+ | Late summer early fall herbicide treatment when RCG is forming seed. |

| | | | | |
|-----------------------------|---------------------------------------|---|-------------|---|
| | G&H> H | Graze or hay to reduce biomass and allow for even re-growth in the fall followed by herbicide treatment using Rodeo, Habitat or other labeled herbicide. (Note haying is more effective). | 1 | Target grazing when growth starts through July and haying during summer to allow for re-growth in late summer. Apply herbicide treatment during boot stage- forming seed. |
| | | Second year spot herbicide treatment using Rodeo, Habitat or other labeled herbicides. | 2+ | August through October, or first freeze, may want to go before seed set if no future management actions will occur. |
| | G>H | Graze or hay to reduce biomass and allow for even regrowth. (Note haying is preferred). | 1 | Graze season long, hay at least twice in the spring and again in the late fall. |
| | | Second year herbicide treatment using Rodeo, Habitat or other labeled herbicide. | 2+ | Late summer early fall herbicide treatment when RCG is forming seed. |
| Target Plant Species | ¹Treatment Sequence | ³Treatment Description | Year | Timing |
| Hybrid Cattail | H | 2-4D ester, Rodeo or Habitat or other labeled herbicides. | 1+ | From boot stage to flowering. |
| | G or M>H | Targeted grazing, mowing, or disking treatment to reduce standing biomass | 1 | Graze during periods of active growth. Mow or disk anytime. |
| | | Herbicide follow-up treatment on re-growth using Rodeo or Habitat or other labeled herbicides. | 2+ | From boot stage to flowering |
| | B&H>H | Prescribed burning in spring to remove/reduce biomass followed by Herbicide treatment using Rodeo, Habitat or other labeled herbicides. | 1 | Early spring burn followed by herbicide treatment from boot stage to flowering. |
| | | Second year spot herbicide treatment using 2-4D ester, Rodeo or Habitat or other labeled herbicide. | 2+ | From boot stage to flowering. |

¹Treatment Sequence where:

- M - Mechanical means (mowing, disking, cutting etc. preferred treatment will be shown in narrative)
- H - Herbicide treatments (refer to Current Guide for Weed Management in Nebraska and product labels)
- G - Targeted grazing (haying may be substituted in some cases). Targeted grazing is concentrated in small areas generally 2 acres or less throughout the growing season as soon as re-growth occurs.
- & - More than one treatment occurs in same year or treatment description/prescription
- > - Treatment sequence in second or subsequent year (listed in series)

²Goats generally will not graze in flooded or other areas with standing water, but are effective on plants growing on dry sandbars.

³Specific herbicides listed are listed for treatments in the Current Guide for Weed Management in Nebraska. Please refer to the current guide and product labels to ensure treatment methods are still applicable. NRCS does not endorse one product over another. All laws, rules and regulations related to herbicide use must be followed.

Support References:

- [Range and Pasture Technical Note #19 - WEED MANAGEMENT STRATEGIES – SALT CEDAR](#)
- [Range and Pasture Technical Note #18 - PROCEDURES USING TARGETED GRAZING – INVASIVE PLANT MANAGEMENT](#)
- [Current “Guide for Weed Management in Nebraska” UNL Extension EC130.](#)