



Wetland Restoration Plan

Kerby Skurat

**1143 South Shore Drive
Medicine Lake, MN**

AE Comm. # 14322

May 5, 2016



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Executive Summary

Anderson Engineering of Minnesota, LLC was retained to develop a wetland restoration plan for the impacted portion of a wetland located at 1143 South Shore Drive in the City of Medicine Lake, Minnesota, within the jurisdictional boundaries of the Bassett Creek Watershed Management Commission. The purpose of this restoration plan is to establish the actions that will be necessary to ensure that the impacted portion of the wetland is adequately restored according to federal, state, and local standards. This document includes site background and regulatory expectations, recommended restoration actions, maintenance and monitoring activities, and performance standards.

Background

On April 14, 2016, Technical Evaluation Panel (TEP) representatives from the Bassett Creek Watershed Management Commission, the Minnesota Department of Natural Resource, the US Army Corps of Engineers, and the MN Board of Water and Soil Resources met at 1143 South Shore Drive to inspect a potential filling of a wetland. The following course of action was agreed to by all parties present after walking the site and talking with the property owner, as prepared by Brad Scheib, Planning Consultant for the City of Medicine Lake:

- The property owner is to secure a site survey that identified topo and defines the flood plain elevation of 890.3. The survey is to be done by a licensed surveyor.
- The property owner is to secure a wetland delineation to be complete by a qualified wetland specialist.
- The property owner is to remove all materials that were placed in the area that was observed to be wetland areas. The materials include root debris and top soil scraped from the site and some piles of sawdust or wood chip like materials. The material is either to be retained on site in an upland area or trucked off site to an appropriate area. Removal of material shall be completed immediately or immediately following completion of the wetland delineation.
- The wetland delineation and survey shall be submitted to Karen Wold with Barr for approval by the Bassett Creek Watershed District as the LGU for Medicine Lake.
- A restoration plan shall be prepared by a qualified wetland restoration specialist and submitted to Karen Wold at Bassett Creek Watershed District for review and approval of the restoration plan. The restoration plan must include seeding with a native seed mix appropriate for the site conditions and that the silt fence must be maintained in good condition until the restoration is complete and all disturbed areas revegetated.
- Once the restoration plan has been approved, the property owner shall have a qualified expert implement the restoration plan on site. Upon approval of the restoration, Karen Wold shall inspect the work and approve the work.
- A good faith effort shall be made to complete all work within 2 to 4 weeks from 4/15/2016. Reasonable adjustments will be made should inclement weather prevent any site work.
- No restoration order will be issued unless the property owner does not make a good faith effort to implement these provisions.

Site Assessment

Environmental Associates Ben Hodapp and Lucy Kozub visited the site to assess the conditions present on April 21, 2016. At the time of the site assessment, the majority of the fill material had been removed from the wetland, as requested by the TEP. The historic boundary of the wetland was field delineated, as described in the *Wetland Investigation Report*, and the disturbed area was investigated to determine whether or not additional materials will need to be removed from the wetland. Based on the soil profile observed in the disturbed area, as well as the location of the remaining buckthorn roots that had not been fully removed, it appears that 0.5 to 2 inches of fill material remains within an approximate 100 square foot area of the delineated wetland boundary, as depicted on Figure 1 in Appendix A. The area containing fill material was staked in the field with lath that was marked to indicate the approximate depth of material that will need to be removed.

The property was also surveyed by a certified professional to locate the floodplain elevation boundary of 890.3, as requested by the TEP. The site survey is included in Appendix B for reference.

Recommended Restoration Actions

1. Assess the integrity of the existing silt fence that was previously installed downslope from the disturbance along the eastern edge of the disturbed area. Silt fence must be in place and fully functional downslope of all disturbed areas prior to beginning earth work and restoration activities.
2. Remove any loose tree/shrub roots and woody debris on the soil surface of the disturbed areas
3. Remove the remaining 0.5 to 2 inches of fill material from the area depicted on Figure 1 in Appendix A, based on the depths indicated on the lath staked in the wetland
4. After removing the fill, it may be necessary to spread 2-4 inches of black organic topsoil on the disturbed area to ensure an adequate seed bed. This step will not be necessary if adequate topsoil remains after the fill is removed.
5. Prior to seeding, lightly rake/smooth the soil surface to prepare the seedbed
6. Purchase approved seed mixes to be broadcast in the disturbed (bare soil) wetland and upland areas within the seeding zones identified on the seeding plan included as Figure 2 in Appendix A. The disturbed wetland areas shall be seeded with a native wet prairie seed mix such as State Mix 34-262 (included in Appendix C) or an equivalent mix that is approved by the TEP. The disturbed upland areas shall be re-established with commercially available turfgrass seed (such as Kentucky bluegrass or red fescue) in order to stabilize the previously vegetated upland area. Note that only a portion of the seeding zone areas identified on the Seeding Plan are disturbed, and that only the disturbed areas will need to be seeded as specified above.
7. Broadcast specified seed mixes at recommended rates (or approved equivalents) in the disturbed wetland and upland areas, as indicated by the seeding zones depicted on Figure 2 in Appendix A.
8. After seeding, roll, tamp, or loosely rake the seeded areas to ensure proper seed to soil contact and to lightly cover seed with approximately 1/8 to 1/4 inch of soil. Seeds should be no deeper than 1/4 inch.
9. Apply an erosion control blanket or weed free mulch at a rate of 1 ton per acre within the seeded area. Mulch should be 1/2 to 1 1/2 inch deep. Mulch should be crimped into the soil to a depth of 1 to 2 inches immediately after it is applied. After mulch has been spread, apply water with a fine spray.
10. After germination of the broadcast seeding, hand-seed the specified mixes into disturbed areas that did not germinate, and lightly rake the hand spread seed into the soil.

Maintenance & Monitoring

Restoration areas require maintenance and monitoring to prevent growth of unwanted non-native/invasive species and to promote native species development. To ensure successful restoration, the property owner shall contract an approved restoration specialist to visit the site a minimum of two times throughout the growing season to assess the condition of establishment, identify any problems or issues, and provide the property owner with recommended corrective actions (if applicable). Monitoring shall continue for up to three years, or until the TEP deems the disturbed area to be adequately restored. The restoration specialist shall submit an annual report to the TEP at the end of each monitoring growing season (September) that summarizes observed site conditions, any problems, and any recommended corrective actions.

Non-native and Invasive Plant Control

The largest threats for this particular site are likely the establishment of buckthorn and reed canary grass as well as the unintentional disturbance of the restoration area. Eradication of non-native and invasive species will be conducted as necessary to minimize competition that could prevent the establishment of native

species. Non-native and invasive plants should be removed by hand or controlled with proper herbicides, as approved by the restoration specialist. Particular care should be taken to remove buckthorn seedlings from the restoration area by hand, before the plants develop flowering heads. Guidance on managing buckthorn (prepared by USDA Natural Resources Conservation Service) has been included in Appendix D for reference.

Other Pests

Insects, vertebrate pests, disease and herbivore predation will be monitored. Generally speaking, there will be a moderate threshold of tolerance before control measures are considered. All applicable federal and state laws and regulations will be closely followed.

Fertilization

Fertilizer will not be applied.

Mowing

Mowing is an essential step in the establishment of native vegetation. Mowing at least twice during the first growing season and at least once during the second growing season is necessary for native vegetation establishment. Mowing shall commence when weed species reach 6-10 inches, before the plants form flowering heads (weeds usually reach 12-14 inches). The mowing height shall be set so that the vegetation in the restoration area is left at minimum height of 5 inches after mowing is complete. Mowing height should be raised as native plants establish. Primary goals of mowing are to allow sufficient light to reach native plant seedlings and preventing weed seed production. Care should be taken to not mow desirable species in the planting if possible (the species listed in the seed mix). For example if the weed species are 12 to 14 inches and the native species are 7 to 8 inches high, the mowing height should be set at 9-inches.

Performance Standards

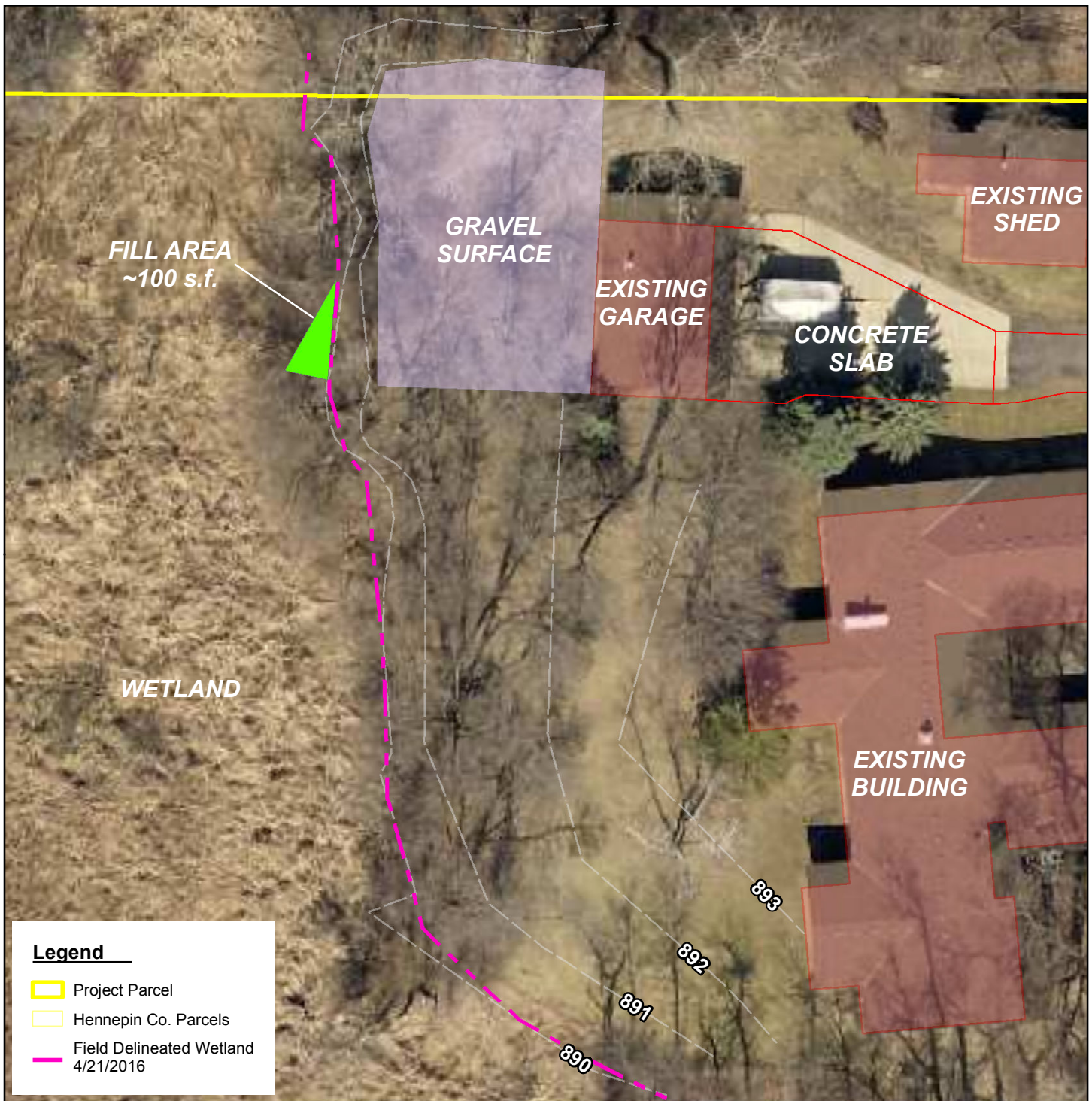
The restoration area shall be expected to meet the following vegetation performance standards during the growing season under normal conditions:

- Year 1:** Minimum of 50% areal cover of native non-invasive (NNI) hydrophytes, a minimum of 4 NNI perennial plant species at a minimum 10% frequency, and at least 50% or less areal cover of non-native and/or invasive plant species.
- Year 2:** Minimum of 70% areal cover of NNI hydrophytes, a minimum of 8 NNI perennial plant species at a minimum 10% frequency, and at least 30% or less areal cover of non-native and/or invasive plant species.
- Year 3:** Minimum of 80% areal cover of NNI hydrophytes, a minimum of 12 NNI perennial plant species at a minimum 10% frequency, and at least 20% or less areal cover of non-native and/or invasive plant species.

In addition, the target hydrology performance standard (for a Type 2 wetland) for the wetland restoration area consists of a water table within 12 inches of the surface for a minimum of 28 consecutive days, or two periods of 14 consecutive days, during the growing season under normal to wetter-than-normal conditions.

APPENDIX A

Figures

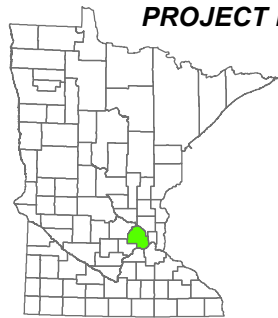


Legend

- Project Parcel
- Hennepin Co. Parcels
- Field Delineated Wetland 4/21/2016

PROJECT LOCATION

SOURCE: MN DNR, USDA, ESRI, TIGER, Bing, Hennepin Co., Anderson Engineering
 Note: Topographic data provided by Hy-Land Surveying



Hennepin County
State of Minnesota



City of Medicine Lake
Hennepin County, MN

1 in = 30 feet

0 15 30 60
Feet

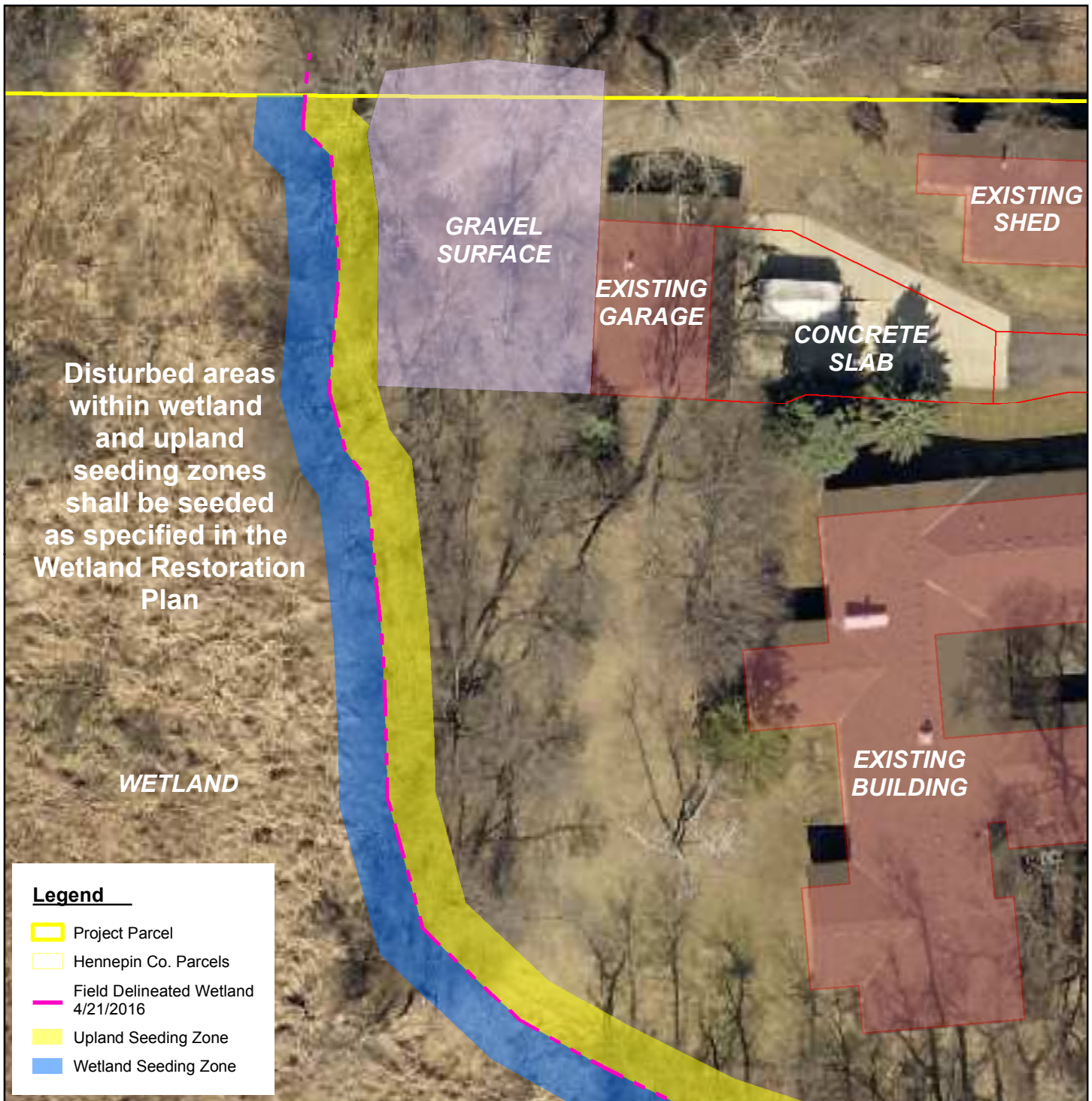
1143 South Shore Drive
Medicine Lake, Hennepin County, MN
PID: 053-361182220002

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**EXISTING CONDITIONS - FIGURE 1
 SKURAT PROPERTY
 WETLAND RESTORATION PLAN**



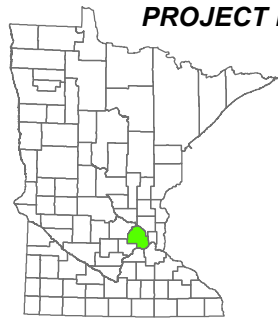
Disturbed areas within wetland and upland seeding zones shall be seeded as specified in the Wetland Restoration Plan

Legend

- Project Parcel
- Hennepin Co. Parcels
- Field Delineated Wetland 4/21/2016
- Upland Seeding Zone
- Wetland Seeding Zone

PROJECT LOCATION

SOURCE: MN DNR, USDA, ESRI, TIGER, Bing, Hennepin Co., Anderson Engineering



Hennepin County
State of Minnesota



City of Medicine Lake
Hennepin County, MN

1 in = 30 feet

0 15 30 60
Feet

1143 South Shore Drive
Medicine Lake, Hennepin County, MN
PID: 053-361182220002

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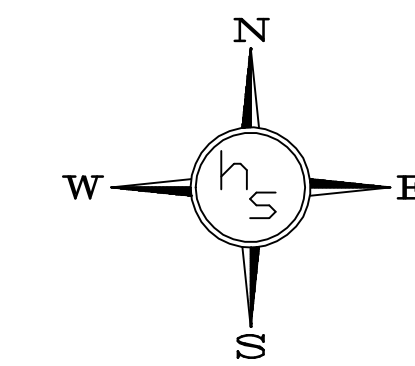
**SEEDING PLAN - FIGURE 2
SKURAT PROPERTY
WETLAND RESTORATION PLAN**

AE Comm.# 14322 Date: 5/3/2016 By: JLA

APPENDIX B

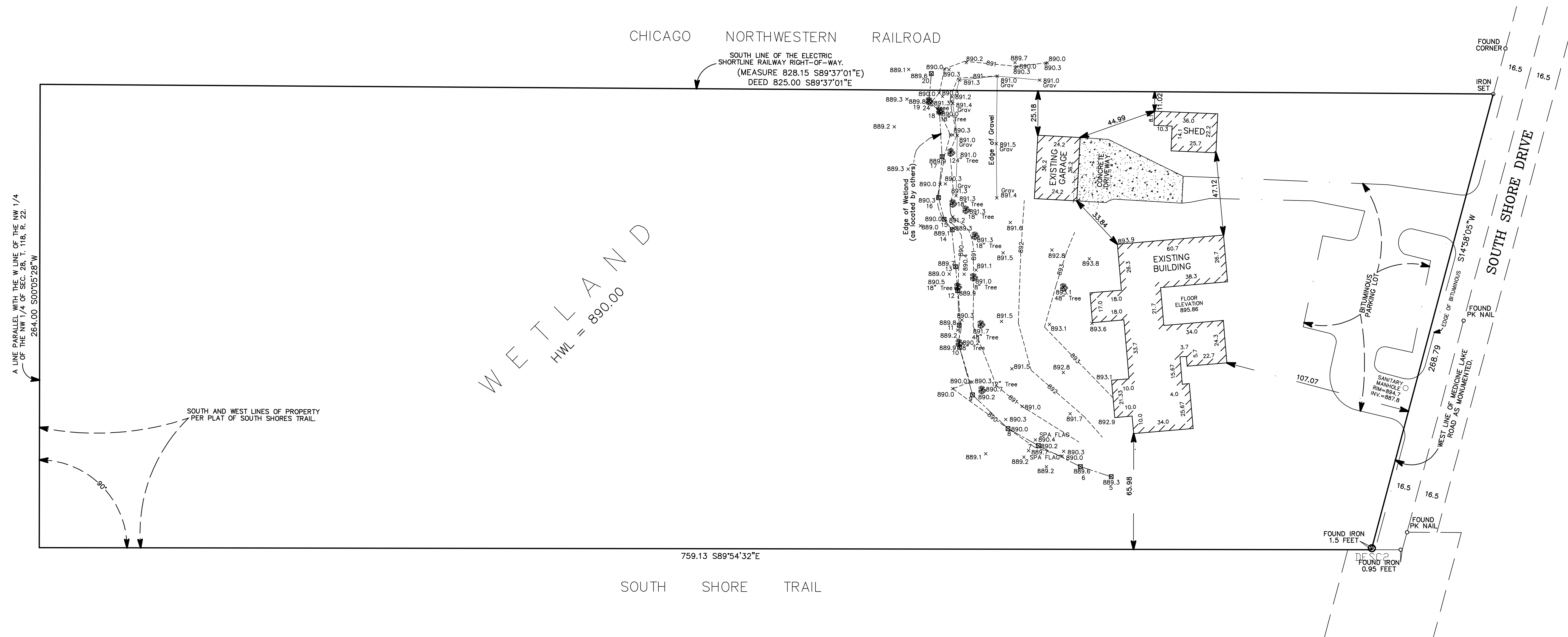
Site Survey

BOUNDARY SURVEY FOR 1143 SOUTH SHORE DRIVE



0 30 60 90
SCALE: 1 INCH = 30 FEET

- ☒ Denotes Wetland Flags by Others
- Denotes Edge of Wetland
- - - - - Denotes Existing Contour
- 🌳 Denotes Existing Tree



LEGAL DESCRIPTION:

THE LAND REFERRED TO IN THE COMMITMENT IS DESCRIBED AS FOLLOWS:

THAT PART OF THE NORTHWEST 1/4 OF THE NORTHWEST 1/4 OF SECTION 36, TOWNSHIP 118, RANGE 22, DESCRIBED AS FOLLOWS:

COMMENCING AT A POINT MADE BY THE INTERSECTION OF THE WEST LINE OF MEDICINE LAKE ROAD AND THE SOUTH LINE OF RIGHT OF WAY OF ELECTRIC SHORT LINE RAILWAY COMPANY AS EACH OF THE SAME ARE NOW LAID OUT AND USED OVER AND ACROSS SAID 40 ACRE TRACT; THENCE WESTERLY ALONG THE SOUTHERLY LINE OF SAID RIGHT OF WAY 825.0 FEET; THENCE SOUTH AND PARALLEL TO THE WEST LINE OF SAID 40 ACRE TRACT 264.0 FEET; THENCE AT RIGHT ANGLES EAST TO THE WEST LINE OF MEDICINE LAKE ROAD; THENCE NORTHERLY ALONG THE WEST LINE OF SAID ROAD TO BEGINNING, HENNEPIN COUNTY, MINNESOTA.

Note: Benchmark from AS BUILT Sanitary Sewer Plans from the City of Plymouth.

LEGAL DESCRIPTION:

o - Denotes Iron Monument

DRAWN BY: MILT

JOB NUMBER:

33,868

FIELD BOOK NUMBER:

314/49&50

SURVEYOR'S CERTIFICATION

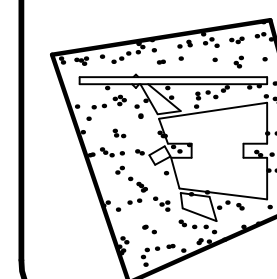
I hereby certify that this survey was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

Surveyed by us this 29th day of April, 2016.

Signed: *Milton E. Hyland*
Milton E. Hyland, Minn. Reg. No. 20262

HY-LAND SURVEYING, P.A. ©
LAND SURVEYORS

11947 IDAHO AVENUE N.
CHAMPLIN, MN. 55316
PHONE: 763-323-1300



APPENDIX C

State Seed Mix 34-262

34-262

Wet Prairie

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/sq ft
big bluestem	<i>Andropogon gerardii</i>	1.12	1.00	6.89%	3.67
fringed brome	<i>Bromus ciliatus</i>	1.68	1.50	10.38%	6.08
bluejoint	<i>Calamagrostis canadensis</i>	0.04	0.04	0.27%	4.00
Virginia wild rye	<i>Elymus virginicus</i>	1.96	1.75	12.07%	2.70
tall manna grass	<i>Glyceria grandis</i>	0.17	0.15	1.02%	3.80
fowl manna grass	<i>Glyceria striata</i>	0.12	0.11	0.73%	3.50
switchgrass	<i>Panicum virgatum</i>	0.84	0.75	5.16%	3.85
fowl bluegrass	<i>Poa palustris</i>	0.22	0.20	1.39%	9.60
Indian grass	<i>Sorghastrum nutans</i>	0.56	0.50	3.44%	2.20
prairie cordgrass	<i>Spartina pectinata</i>	0.56	0.50	3.41%	1.20
	Total Grasses	7.29	6.50	44.76%	40.60
wooly sedge	<i>Carex pellita</i>	0.06	0.05	0.32%	0.47
tussock sedge	<i>Carex stricta</i>	0.02	0.02	0.17%	0.48
fox sedge	<i>Carex vulpinoidea</i>	0.11	0.10	0.66%	3.50
dark green bulrush	<i>Scirpus atrovirens</i>	0.11	0.10	0.72%	17.74
woolgrass	<i>Scirpus cyperinus</i>	0.03	0.03	0.18%	16.00
	Total Sedges and Rushes	0.34	0.30	2.05%	38.19
Canada anemone	<i>Anemone canadensis</i>	0.03	0.03	0.21%	0.09
marsh milkweed	<i>Asclepias incarnata</i>	0.09	0.08	0.55%	0.14
Canada tick trefoil	<i>Desmodium canadense</i>	0.56	0.50	3.41%	1.00
flat-topped aster	<i>Doellingeria umbellata</i>	0.06	0.05	0.34%	1.20
common boneset	<i>Eupatorium perfoliatum</i>	0.03	0.03	0.23%	2.00
grass-leaved goldenrod	<i>Euthamia graminifolia</i>	0.02	0.02	0.11%	2.00
spotted Joe pye weed	<i>Eutrochium maculatum</i>	0.04	0.04	0.30%	1.50
autumn sneezeweed	<i>Helenium autumnale</i>	0.06	0.05	0.35%	2.39
sawtooth sunflower	<i>Helianthus grosseserratus</i>	0.06	0.05	0.38%	0.30
great blazing star	<i>Liatris pycnostachya</i>	0.02	0.02	0.17%	0.10
great lobelia	<i>Lobelia siphilitica</i>	0.01	0.01	0.05%	1.40
blue monkey flower	<i>Mimulus ringens</i>	0.01	0.01	0.05%	6.40
Virginia mountain mint	<i>Pycnanthemum virginianum</i>	0.09	0.08	0.55%	6.50
red-stemmed aster	<i>Symphotrichum puniceum</i>	0.09	0.08	0.56%	2.40
blue vervain	<i>Verbena hastata</i>	0.17	0.15	1.06%	5.25
bunched ironweed	<i>Vernonia fasciculata</i>	0.03	0.03	0.23%	0.30
Culver's root	<i>Veronicastrum virginicum</i>	0.02	0.02	0.14%	6.00
golden alexanders	<i>Zizia aurea</i>	0.28	0.25	1.76%	1.03
	Total Forbs	1.68	1.50	10.45%	40.00
Oats or winter wheat (see note at beginning of list for recommended dates)		6.95	6.20	42.74%	2.76
	Total Cover Crop	6.95	6.20	42.74%	2.76
	Totals:	16.25	14.50	100.00%	121.55
Purpose:	Wet prairie reconstruction for wetland mitigation or ecological restoration.				
Planting Area:	Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.				

APPENDIX D

Buckthorn Management Guidance

Pest Management – Invasive Plant Control

Buckthorn (Common and Glossy)

Conservation Practice Job Sheet

MN-797



Glossy buckthorn

Gil Wojciech (Polish Forest Research Inst.)



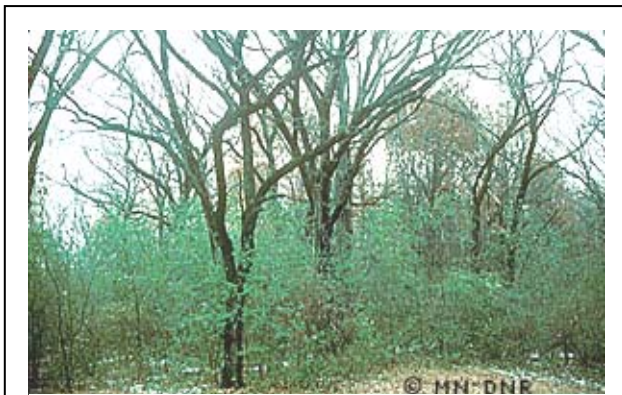
Buckthorn spines

Chris Evans (University of Georgia)



Buckthorns

Common or European buckthorn, *Rhamnus cathartica* and glossy buckthorn, *Rhamnus frangula*, invade the understory of woodlands and forests to the exclusion of other plants or seedlings in the lower canopy.



In this woodland the whole understory has been infested with buckthorn.

Photo by MNDNR

Both species of buckthorns are considered restricted noxious weeds in Minnesota which means the importation, sale and transportation of the plants or parts of plants is prohibited. The buckthorns were brought into this country in the 1800s for use as hedges, shelterbelts and wildlife plantings.

Habitat

Both buckthorns are natives of moist woody habitats of Eurasia. In Minnesota, common buckthorn infests woodlots, fence rows, roadsides, ditches and abandoned or neglected areas around farmsteads. It can be found in both upland and lowland habitats and thrives on well-drained soils. Glossy buckthorn invades the same areas as common buckthorn however it prefers the upslope areas around ditches, wetland prairies and marshes. They tolerate full sun to deep shade conditions.

Ecological Threat

The sale of common buckthorn was halted in the 1930s after it was discovered that it is an alternate host to oat crown rot, a fungal disease of oat crops. However, many windbreaks, shelterbelts and hedges were established with this plant and it silently and perniciously invaded the Minnesota landscape. In 2001 it was discovered that this plant is a winter host to the soybean aphid, a new insect pest introduced in to the US.

Cultivars of glossy buckthorn continued to be imported and sold in nurseries until its restriction in 2001. This plant has spread widely near urban areas, wetlands and native woods.

Buckthorns grow aggressively and out-compete native vegetation for space, light, water and nutrients. They have a longer growing season than native plants both in the spring and in the fall. This means that leaves break buds very early in the spring and the plants stay actively growing well into early winter. The green leaves are persistent; they stay on the twigs longer than other trees or shrubs and remain photosynthetically active until leaf fall.

It was mistakenly believed that birds and animals benefited from eating the abundant fruit. However due to its laxative nature, wildlife get no nutritional value from eating it. The fruit has a cathartic (laxative) effect (note the species name '*carthartica*') and is eliminated without digesting. However the seeds are eliminated without damage and get dispersed. They are very prolific staying viable up to 6 years on the ground. It is thought that these plants contain an allelopathic compound that suppresses other plants from growing near it.

Buckthorn thickets are so dense no herbaceous layer is possible beneath it. The ensuing monoculture harms song bird habitat and destroys the natural biodiversity of the invaded area.

Description

Buckthorns are fast-growing tall shrubs or small trees reaching about 20 feet tall at maturity. Usually they have multiple stems from the base. The brown bark has prominent pale colored protuberances called lenticles. The wood itself is orange or yellow. Glossy buckthorns have spines erupting from the stem and branches unlike common buckthorns that have spines located at the ends of twigs between the terminal leaves.

The leaves of buckthorns are oval or elliptical, more or less alternate but may appear almost opposite. The veins curve up toward the tips of the leaves. Leaf edges of glossy buckthorn are smooth and slightly wavy; those of common buckthorn are finely toothed. The leaves do not turn color in the fall and eventually senesce (fall off), still green, in early winter.

The flowers are fragrant yet very small. Those of common buckthorn bloom in May and are light green to yellow-greenish. Flowers of glossy buckthorn are pink or white, and the plant can bloom from May through September. The plants are dioecious (separate male and female plants) and only the females produce fruit. Common buckthorn has black

fruit while glossy buckthorn fruit changes from red to black throughout the growing season. The fruit and seed of both species float in water.

Buckthorns look similar to plums and cherries; especially choke cherry, so it is important to positively identify plants in the areas designated for treatment. There are many references to consult for plant identification.

Control Methods

Cutting, removal, burning and herbicides offer the best solutions for control. However there are specific procedures that must be followed for a successful control or eradication program.

Disposal

It is important to consider how the stems, branches and trunks generated from control or eradication methods will be handled. Stems and branches without berries can be left on the site to provide hiding places for wildlife. For small diameter trunks make sure all roots are exposed to prevent re-rooting. Other solutions include burning or removing the material for appropriate off-site disposal. If berries are present, destroy the branches by burning. Decide how the excess material will be disposed before beginning any treatment method.

Biological Control

There are no biological controls for buckthorns at this time. Current studies for biological controls indicate that few organisms are available for study and none appear to be effective.

Mechanical or Manual Control

Methods for mechanical or manual treatments are suitable for areas with small infestations and young plants or in areas where chemicals are not practical or allowed. These methods work best with stem diameters less than 2 inches.

Mowing

For very young stems no more than 2 years old mowing the infested area in the early spring and again in the fall, after nesting season, will control the spread of buckthorn and eventually kill the plants and deplete the seed bank. Obviously this will be most effective in pastures, cleared landscapes and newly restored wetlands, prairies and marshes.

Pulling, Digging or Wrenching

If stems are less than ½ inch in diameter hand pulling is effective since the whole root system is likely to be removed. This method works best if the soil is moist, not wet, and should not be tried in dried soil. It is necessary to shake soil off the exposed root system and tamp loose soil back into place to protect the treated area from erosion. If possible replace the organic matter and leaf litter. Plant back any native plants that were dislodged during pulling. Repeat treatments may be necessary as clearing the area may result in sprouting from any existing seed bank.

Stems larger than ½ up to 2 inches in diameter can be dug up with a shovel. Start digging about 6 to 8 inches away from the stem completely severing the lateral root system from the ground. Pull out the whole plant and shake off excess soil to fill in the hole, tamp down loose soil. If possible replace the organic matter and leaf litter as well as any desirable plants. Single stems are easier to treat with this method than multiple stemmed plants.

A weed wrench may be used for plants that are hard to pull or dig, up to 2.5 inches in diameter. This is a specially designed lever that grabs the stem so it can be pulled out. As above, replace soil, organic matter and leaf litter and replant uprooted desirable plants as much as possible.

Stem Cutting (Hacking)

Cutting or hacking stems up to 4 inches in diameter will reduce the spread of infestation, but to eradicate the plants it will need to be done several times during the growing season and on an annual basis until the plants no longer sprout. Buckthorns root from cut stems if not followed by chemical treatments. The minimum length of the cut stump is 2 inches and the maximum is 6 inches. Cut all stems present 2 to 6 inches above the base of the trunk. Tools such as hand pruners, loppers, pruning saws, brush cutters or chain saws, depending on the size of the site and the diameter of the plants, are all used to cut stems or trunks.

If stems are cut between flowering and fruit set, the rate of spread will be reduced by decreasing seed dispersion. This is an annual treatment and consistency of the treatment is key to its effectiveness. If the stump of the cut plant is small enough to fit into an inverted metal can such as a coffee can, attach a can with a long enough nail to keep it from falling off. Be sure the stump is no more than 1 inch shorter than the height of the can and that the can is touching the

ground when it is secured. Any sprouts that appear will not be able to escape the can and die, eventually the root system will be exhausted and the plant will die. Heavy gauge black plastic or fabric will also work if tightly secured. Remove the can or plastic after one or two growing seasons.

Girdling

Girdling involves removing a strip of bark including the cambium layer around the circumference of a tree or shrub. If the strip is too narrow or not completely cut through the tree will heal and survive. Without the cambium layer, water and sugars are prevented from feeding the top of the plant and it slowly dies. This method works best with single stemmed trees or shrubs with stems < 3 inches in diameter. If there are more than 2 trunks, the method is less effective and may result in basal sprouts.

Use this method in the summer after the leaves have fully developed or winter after leaf drop; not during the spring growth period nor in the fall when sugars are moving into the roots. Just above the base of the plant, remove a 1 inch wide strip of bark, including the cambium (green layer just under the bark), by cutting two parallel lines, about an inch apart into the stem or trunk. Be sure you are slicing through the thin cambium layer but not deeper than that. Bang on the strip between the two cuts with a blunt object like the back of an ax and pull away the strip. For stems less than 2 inches in diameter, the cambium can be killed with a torch by applying 5-seconds of flame in sections to completely scorch the circumference of the stem.

Girdling sometimes results in sprouting below the girdle or from the roots. The plant is responding to the trauma of girdling by sprouting before it dies or before herbicides get to the root system. To keep this from happening, leave a couple of 1 inch strips with the bark intact between the girdle cuts and apply the basal bark treatment, as discussed below. Less trauma to the plant may prevent this survival response.

Prescribed Burning

In prairies or savannahs where there is enough material for a hot burn, prescribed burning can be used to control buckthorn seedlings less than 1 inch in diameter. Larger plants may need a follow-up burn, or chemical or mechanical treatment for complete control or eradication. Refer to the NRCS Conservation Practice Standard, Prescribed Burn, Code 338, for information on burning.

Mature buckthorns will be a seed source if they are located near a burned area. The exposed soil creates a desired habitat for buckthorn seedlings especially if the area is a wetland, wet prairie or marsh that experiences drying after the burn.

If there are buckthorn seedlings revegetating a treated site or resprouts from cut stumps following treatment, a prescribed burn is effective in knocking back the regrowth.

Chemical Control

The right chemical applied at the right amount at the right time is very effective in controlling buckthorns. Chemical treatments work best when plants are storing energy or dormant. For buckthorns, the most effective time for chemical application is mid-summer through winter (July to March) when the plant is moving sugars to the roots or dormant. The nature of the plants can work against them between mid-fall and early winter because their green persistent leaves can be easily identified against native fall colors and bare branches.

Chemical treatments involve several methods including: basal spraying, cut-stump, injection, hack and squirt,

Important Note

Mention of specific pesticide products in this document does not constitute an endorsement. These products are mentioned specifically in control literature used to create this document.

Follow all label instructions when applying pesticides including “grazing and re-entry level restrictions” and application site restrictions (Is the product labeled for “the application site” you are considering?)

By law, herbicides may only be applied as per label instructions. If the plant to be controlled or eradicated is not listed on the label, it is illegal to use the product on that plant.

Most products listed in this series of invasive plant control job sheets are not acutely toxic but have high potentials to move off-site via leaching or runoff under certain conditions. Off-site movement potential can be minimized by following the instructions in the “foliar treatment” and “cut-stem” portions of these job sheets. Specifically, avoid over-spraying or

application to the point where products are reaching or dripping onto the ground.

Keep in mind that glyphosate is a broad spectrum herbicide and kills anything it touches. Triclopyr kills broadleaf and woody plants and is a safer choice for prairies and grasslands. Be very careful when using herbicides in wetlands.

Hack and Squirt

This is the most effective and most preferred method for controlling or eradicating buckthorns. ‘Hack and squirt’ refers to cutting off the trunk or stems and applying herbicide to the cut end(s). It is imperative that the herbicide is applied as soon as possible but no more than 2 hours later for most chemicals to be effective. Refer to the first paragraph under Stem Cutting for information on ‘hacking’.

The chemical can be applied with a squirt bottle, low volume sprayer, a wick or wand, or a paint brush. A spray bottle set to ‘stream’ with the nozzle placed against the cut end with a gentle squeeze will apply the herbicide effectively without delivering a spray to surrounding plants. Soaking the cut end is not necessary since the herbicide concentration is sufficiently strong to kill the plant. The most efficient and effective placement is to target the ring of cambium (green layer) just inside the bark.

If using glyphosate, prepare a 25% concentration by adding 1-part of a 50% active ingredient product (such as Roundup) to 3-parts of water, and shaking or stirring to mix well. Apply the solution as above to all the cut stems on a plant. Avoid applying at temperatures below freezing or if snow covers the base of the plants.

Basal Bark

The basal stem treatment works through the bark eliminating the need for cutting stems or trunks. Use on buckthorns with stems less than 3 inches in diameter. A low volume sprayer is needed to use this method. Triclopyr ester is mixed with an oil diluent (Bark Oil Blue, kerosene or diesel oil) at a rate of 1-part product (such as Garlon 4) to 3 parts oil and applied directly to the bark from the root collar up to about 12 to 18 inches. The buckthorn plants can be left standing for wildlife purposes or cut later. This method can be used as part of a ‘hack and squirt’ treatment by spraying the cut end and the remaining bark around the stump.

Management After Treatment

Buckthorns are very prolific seeders. The seeds are long-lived and sprout vigorously when given the chance. Areas newly cleared of buckthorn are quickly inundated with seedlings or stump sprouts if follow-up is not adequate or consistent.

Post-treatment of the area includes destroying the seedbank and stump sprouts and replanting with desirable species. Seed the treated area with temporary cover and see if seedlings or sprouts appear. Mow, apply herbicide or annually burn until the seedlings and stump sprouts are completely eliminated. Once the seedbank is exhausted, plant the desired species mix to reclaim the site. Inventory or monitor the site and treat any buckthorn seedlings that are dispersed into the treated area. If nearby sites are the source of buckthorns, try to get those site cleared as well.

Many native plants can be substituted for buckthorns. Choices include high-bush cranberry, nannyberry, chokecherry, grey dogwood, pagoda dogwood, American hazelnut, black chokeberry, blue beech, ironwood, downy serviceberry, common ninebark, witchhazel and many others.

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BUCKTHORN CONTROL QUICK GUIDE

Control Activity	Appropriate For	Pros	Cons	Tools	Process/Info.
Manual Pulling by hand or weed wrench or grubbing out with shovels	Small plots or parks < ½ acre, back yards Natural areas, sites where herbicides can't be used	No chemicals No cost for pulling	Slow, may injure back, may pull or dislodge desirable plants, soil disturbance. Weed wrench can be expensive	Gloves, container for disposing plants if not leaving on site Weed wrench, shovels	Best on plants <1/2 to 3/8 inches in diameter. Soil must be moist, loose. Shake soil off root and lightly tamp in hole.
Cover with black plastic or fabric or tin can	Small plots or parks < ½ acre, back yards; places where people won't trip over cut stumps	Low \$\$ for used cans, plastic or fabric, nails, wire	Plastic or metal debris to clean up, slow	Gloves, nails, cans or plastic, plastic ties or wire	Leave 2-6 inch stump, cover, secure cover to the ground to keep out all light
Girdling stems	Small plots, stems less than 3 inches in diameter	Inexpensive, kills only treated plants	Time consuming, ineffective without herbicide follow up, may result sprouting	Sharp blade, ax, maul, herbicide, safety apparel, herbicide application equipment	Girdle from 2 to 6 inches above the base of the plant, cut through cambium, follow up with covering stump or herbicide.
Glyphosate – 25% active ingredient	Fresh cut surfaces, hack and squirt, girdling, stem cutting methods.	Cost for herbicide, applicator of choice	Non-selective herbicide, keep off desirable plants	Saw, loppers, tank applicator, spray bottle, eye protection, gloves	Spray or squirt herbicide onto cambium or inner bark of cut stem.
Basal Bark Spraying	Larger plots, can be done any time of year.	Use on stems up to 6 inches in diameter, very effective, low toxicity, no cutting Dead stems provide wildlife habitats	Expensive materials and chemicals	Ultra Low volume sprayer and wand, Triclopyr, gloves	Wet bark from base to 6 inches above base for plants up to 1 inch in diameter, scale up to 18 inches above base for larger plants.
Cut stem with chainsaw	Large stems > 4 inches	Fast on large stems, should follow up with herbicides	Dangerous, loud, high maintenance, costly	Chainsaw, safety apparel, partner, chemicals	Leave stumps no longer than 6 inches above the base. Treat with herbicide or cover stumps.
Cut with brush cutter	Larger plots	Fast on stems < 2 inches, should follow up with herbicides	Noisy, costly, restricted during nesting time	Brush cutter, safety apparel, gas, oil	Cut stems and treat with herbicide of choice.
Drag out, load and dispose stems	Small to medium areas. Fire prone areas Areas where aesthetics is important	Reduces fire fuel, enhances aesthetics,	Messy, physically hard, time consuming, may spread berries and seeds through the site	Gloves, saws, ropes or chains, small tractor or bobcat	Drag cut stems to a burn pile or hauler.
Leaving cut stems on-site	Any size area where fire danger is low or aesthetics is unimportant	Inexpensive, no effort	Piles or brush Looks 'messy' May add to seed bank	None	Avoid blocking trails when piling or leaving brush
Burn piles	Open area appropriate for burning	Reduces fire fuel, enhances aesthetics,	Smoke, burn in winter only	Burning permit, DNR or other assistance	Use for stems killed by the ultra low volume spray or girdled
Misting wand to control sprouts	Up to a medium sized area Use on resprouts from cut stumps	Low labor and chemical use	Late fall only	Mist wand, herbicide, safety apparel and equipment	Use in late fall; non selective herbicide will not harm dormant plants (Garlon3 or Roundup)
Mist Blower with Electrostatic Accessory to charge and attract droplets to live foliage	Large area with young seedlings from seed bank or newly treated sites	Low labor and chemical use for large area	Late fall only, drift, equipment costs	Mist blower and electrostatic accessory, safety apparel and equipment	Use in late fall; non selective herbicide will not harm dormant plants. (Garlon3 or Roundup)