

MEMORANDUM FOR: All Garrison Project Employees

SUBJECT: Garrison Project Office SOP #14 – Vegetation Mitigation

1. Purpose: To control and regulate the indiscriminate or excessive removal, large-scale, clear-cutting and destruction of trees/vegetation and to control, standardize and prevent conditions such as: degradation of sensitive areas or wanton destruction which cause an increase in storm water runoff, sedimentation, soil erosion, loss of wildlife habitat, air or noise pollution or inhibit aquifer recharge or impair the ambiance or physical appearance of the property. The guidance contained in this SOP is designed to limit such adverse impact while not interfering with the right of an entity to appropriately remove trees/vegetation in accordance with the guidance set forth herein below.

2. Policy: It is the policy of the Garrison Project Office to seek restitution and/or mitigation for any vegetation removed, destroyed, or damaged on USACE lands managed by the Garrison Project Office.

3. Applicability:

a. The terms and provisions of this SOP shall apply to real property located on Garrison Project lands, in all cases of parcels upon which new activities will take place, cases of maintenance or demolition of existing structures, cases of environmental spills/contamination, and/or any other destruction of public property otherwise not stated above.

b. Unless specifically exempted herein, it shall be prohibited for any person to remove/damage or cause to be removed/ damaged any vegetation, under the circumstances set forth in paragraph a. above without first having obtained documented project permission to do so. Definition of vegetation includes but is not limited to grasses, forbs, crop cover, shrubs, and trees.

c. The removal of vegetation by a private party for the purpose of View Management is prohibited. This SOP will not be used as a mitigation plan to remove vegetation for View Management, but may be used in conjunction with Title 36 authority for restitution and mitigation of any View Management violations.

4. Vegetation Mitigation Plan: A vegetation mitigation plan shall be submitted by the applicant and consist of the following:

a. A site plan, survey or plot plan of one (1) inch equals twenty (20) feet or less, showing the location of existing vegetation and clearly marked property boundaries. There shall be a list identifying the number and species of trees/shrubs inventoried and a description of species of grasses, forbs, or crop cover affected with corresponding acreage. The site plan shall include the legal land survey description.

b. The location(s) on the parcel where vegetation removal is to take place or where damaged vegetation is located. Shape files of the location are highly encouraged.

c. The total square footage of the area being utilized or affected.

d. Vegetation Inventory: Trees shall be inventoried using diameter breast height (DBH) measurement, which is the tree's diameter, measured approximately 54" from ground level. Trees with a DBH of two (2) inches or larger shall be individually counted and trees with a DBH smaller than two (2) inches and all shrubs shall be

clump counted by square foot. Clump count by square foot is defined as taking the complete square footage of an area of small trees or shrubs and the count equals 1 small tree or shrub per square foot. To obtain the measurement for a multi-stem tree, each stem is to be tallied separately having its own DBH measurement.

- i. Inventory of the total number of existing trees/shrubs, by size and species, with a DBH of two (2) inches or greater, which are to be mitigated.
- ii. Inventory of the total number of existing trees listed by species with a DBH smaller than two (2) inches which are to be mitigated, clump counted by square foot.
- iii. Inventory of the total number of existing shrubs listed by species with a DBH smaller than two (2) inches which are to be mitigated, clump counted by square foot.
- e. A planting detail and description for replacement of vegetation.
- f. All specific plans for mitigation of affected vegetation shall be based on the following requirements:
 - i. The replacement vegetation shall be planted on the property where the vegetation was removed or damaged, or planted in a location designated by the USACE.
 - ii. All inventories/informational documents must be provided to the USACE and approval must be obtained prior to commencement of work.
 - iii. Should a road be constructed a specific seed mix will have to be applied to the ditches.
 - iv. The use of erosion control methods will be required as needed.
 - v. Replacement vegetation must be planted within one year after the applicant's project has been completed.

5. Replacement Tree/Shrub Value Calculations:

- a. Pre-existing dead and diseased trees/shrubs as determined by the USACE shall not be included in the mitigation plan.
- b. The USACE may elect, in lieu of planting replacement trees/shrubs, to have the applicant provide compensation/restitution (a sum of money for each tree/shrub that is to be removed or was damaged). These monies will either be sent to the Omaha District, check payable to "USAED-FAO, Omaha District", or placed towards an In Lieu project determined by the USACE.
- c. Tree/shrub vegetation affected by an environmental spill/contamination or likewise injured shall be assessed after one growing season after cleanup procedures have been completed. If tree/shrub displays approximately 50% or more crown decline after one growing season, each tree/shrub shall be inventoried and mitigated for according to this SOP. All other ground vegetation shall be inventoried and shall be restored according to this SOP.
- d. The replacement value of all trees and shrubs that are removed or damaged will be as follows:

Ratio/Value of Replacement Trees

<u>Size of Tree/Shrub Removed (Inches DBH)</u>	<u>Replacement Ratio</u>	<u>Replacement Value</u>
Two, but not more than four (2"-4")	2:1	\$200.00
More than four, but less than eight (4"-8")	3:1	\$400.00
More than eight, but less than twelve (8"-12")	4:1	\$800.00
More than twelve, but less than eighteen (12"-18")	5:1	\$1000.00
More than eighteen, but less than twenty-four (18"-24")	6:1	\$1600.00
More than twenty-four (24" +)	7:1	\$2000.00
Trees with a DBH smaller than 2" clump counted by square foot	4:1	\$200.00
Shrubs with a DBH smaller than 2" clump counted by square foot	4:1	\$200.00

6. Replacement of Ground Cover: Any disturbed ground cover (e.g. crop cover, forbs, grasses) are to be reclaimed to its original state or as determined acceptable by the USACE. Reclamation requirements may include, but are not limited to, the following:

- a. Redistribute soil materials in a manner similar to the original vertical profile.
- b. Reduce compaction to an appropriate depth (generally below the root zone) prior to redistribution of topsoil, to accommodate desired plant species.
- c. Provide suitable surface and subsurface physical, chemical, and biological properties to support the long term establishment and viability of the desired plant community.
- d. Protect seed and seedling establishment (e.g. erosion control matting, mulching, hydro-seeding, surface roughening, fencing, etc.)

7. Species Requirements: The recommended and approved USACE Tree/Shrub list, USACE Grass Species list, and Wildflower Species list contains species or their varieties acceptable for planting on USACE property. The chief objective of the replacement plantings is to enhance habitat for wildlife. Other vegetative species or their varieties not listed may be planted on USACE owned property at USACE discretion, but only desirable vegetation of good appearance, health, and suitability that are generally free from injurious insects, diseases, or other limitations. Where certain planting sites have been assigned a particular species or variety, only that designated species or variety shall be planted on such sites, unless an alternative plan is approved by the USACE.

8. Planting Requirements:

- a. Size - All small trees and their cultivars or varieties shall be in the minimum age classes of: 1-2, 2-1, 3-0, or 2-2 with a top height no less than (8) inches. (The number preceding the hyphen relates to the years the tree spent in a seed bed and the number following the hyphen is the years the tree spent in a nursery field. As such, a 2-2 would be a 4 year old tree.) In some instances, USACE may recommend or require 1-3" DBH trees to be planted as replacements instead of the smaller 3-4 year-old tree saplings, thus reducing the replacement ratio by two according to the chart above, but not less than a 2:1 ratio. (e.g. an 18"-24" DBH tree replacement ratio will be 4:1, and a 4"-8" DBH tree replacement ratio will be 2:1)

b. Grade - Unless otherwise allowed for specific reasons, all trees shall have comparatively straight trunks, well developed leaders and tops, and the roots should be characteristic of the species. They shall have acceptable balance between top and root. At the time of planting, all trees must be free of objectionable features that tend to affect the future health, growth, strength, form and beauty of the plant such as root bound, mechanical injuries, and crown decline. Replacement stock must be purchased from USDA Plant Hardiness zones 3b and 4a.

c. Location and Spacing - No tree shall be planted within a utility easement or closer than thirty (30) feet from overhead utility lines to allow room for line maintenance. No shrubs shall be planted under utilities if its eventual height will interfere with said utility lines. Selection of planting site and species will be approved by the USACE. Spacing of trees shall be determined by the USACE in accordance with local environmental conditions; the species, cultivars or varieties used, and their mature height, spread and form. Generally, all large and medium sized trees, at maturity, shall be spaced a minimum of ten (10) to twelve (12) feet apart, center-to-center, and all small trees shall be spaced a minimum of six (6) to eight (8) feet apart, center-to-center.

d. Methods of Planting and Support - Most small trees and shrubs may be moved bare-rooted unless otherwise indicated. Roots of bare-rooted trees and shrubs must be protected against drying out. All coniferous trees shall be moved balled and burlap. Balled roots should be prevented from drying out at the surface of the ball and they should be protected against freezing. Pits for the planting of bare-root and balled root plants shall be at least two to three times larger in diameter than the diameter of the root system in order to accommodate the roots without crowding and provide room for proper backfill. Small bare root trees/shrubs may also be planted in rows utilizing a mechanical tree planter for the planting of large numbers of trees/shrubs. Plants shall be planted no deeper than previously grown, with due allowance for settling. When planting balled and burlapped trees, wire baskets and non-degradable strings shall be removed completely, and degradable string and burlap shall be removed from the top 1/3 of the root ball. When the planting is completed, the entire root area shall be thoroughly saturated with water. Any 1-3" DBH tree replacements shall have 4" depth of hardwood mulch applied to the extent of crown width, have their trunks suitably wrapped, and guyed, or supported in an upright position, according to accepted arboricultural practices. The guys or supports shall be installed so that they will neither girdle or cause serious injury to the tree nor endanger public safety.

9. General Maintenance Requirements:

- a. A minimum of 80% of the replacement vegetation must be living at the end of 3 growing seasons in order to meet the mitigation requirements.
- b. The use of tree fabric greatly increases tree survivability and reduces the amount of moisture needed for survival. In some instances USACE may recommend or require that fabric is utilized for a large tree/shrub plantings, thus reducing the replacement ratio by two according to the chart above, but not less than a 2:1 ratio. (e.g. an 18"-24" DBH tree replacement ratio with fabric will be 4:1, and a 4"-8" DBH tree replacement ratio with fabric will be 2:1)

10. Penalty for Non-notification:

- a. If vegetation is removed without prior approval, the following protocol will be followed:
- i. If the DBH can be calculated, use the chart above for mitigation or restitution purposes.
 - ii. If cut tree or shrub stumps are only visible, each stump will be marked, tallied, and measured at ground level. The following chart shows the value per stump diameter inch. If a cut stump measures 1" or less, the value is set at \$20/stem.

Stump Diameter (in)	Value per Inch
1.1 – 5.0	\$40
5.1 – 10.0	\$55
10.1 – 15.0	\$70
15.1 – 20.0	\$85
20.1 +	\$100

iii. In the event that it is unknown how many trees/shrubs were removed, the number of trees requiring replacement shall be computed by assuming ten (10) trees having twelve (12) – eighteen (18) inches DBH per half acre of disturbed area were removed. The number of shrubs shall be computed by assuming twenty-five (25) shrubs per half acre of disturbed area were removed.

iv. Crop cover, grasses, and forbs will be reclaimed to prior condition at USACE discretion.

b. Any person who violates, or fails, or refuses to comply with this SOP, shall be liable to a penalty set forth in the USACE Title 36 CFR 327.14(a) "Public Property" of not less than two hundred fifty (\$250.00) dollars.



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USACE Tree List

American Linden (<i>Tilia americana</i>) — Jamestown	http://www.ag.ndsu.edu/trees/handbook/th-3-123.pdf
Balsam Poplar (<i>Populus balsamifera</i>)	http://plants.usda.gov/java/profile?symbol=POBA2
Black Hills Spruce (<i>Picea glauca</i> var. <i>densata</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-175.pdf
Box Elder (<i>Acer negundo</i>)	http://plants.usda.gov/java/profile?symbol=ACNE2
Bur Oak (<i>Quercus macrocarpa</i>)	http://plants.usda.gov/java/profile?symbol=QUMA2
Common Hackberry (<i>Celtis occidentalis</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-119.pdf
Colorado Blue Spruce (<i>Picea pungens</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-177.pdf
Cottonwood (<i>Populus</i>)	http://plants.usda.gov/java/profile?symbol=POPUL
Honeylocust (<i>Gleditsia triacanthos</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-121.pdf
Laurel Willow (<i>Salix pentandra</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-141.pdf
Peachleaf Willow (<i>Salix amygdaloides</i> Andersson)	http://plants.usda.gov/java/nameSearch
Ponderosa Pine (<i>Pinus ponderosa</i>)	http://plants.usda.gov/java/profile?symbol=PIPO
Quaking Aspen (<i>Populus tremuloides</i>)	http://plants.usda.gov/java/profile?symbol=POTR5&mapType=nativity&photoID=potr5_002_avp.jpg
Rocky Mountain Juniper (<i>Juniperus scopulorum</i>)	http://plants.usda.gov/java/profile?symbol=JUSC2&mapType=nativity&photoID=jusc2_001_avp.tif
Sandbar Willow (<i>Salix interior</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-65.pdf
Silver Maple (<i>Acer saccharinum</i>)	http://plants.usda.gov/java/profile?symbol=ACSA2

USACE Shrub List

American Plum (<i>Prunus Americana</i>)	http://plants.usda.gov/java/profile?symbol=PRAM&mapType=nativity&photoID=pram_002_ahp.jpg
American Cranberry Bush (<i>Viburnum trilobum</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-17.pdf
Black Currant (<i>Ribes americanum</i>)	http://plants.usda.gov/java/profile?symbol=RIAM2
Common Chokecherry (<i>Prunus virginiana</i>)	http://plants.usda.gov/java/profile?symbol=PRVI&mapType=nativity&photoID=prvi_001_avp.jpg
Elderberry (<i>Sambucus</i>)	http://plants.usda.gov/java/profile?symbol=SAMBU
Freedom Honeysuckle (<i>Lonicera</i> x 'Freedom')	http://www.ag.ndsu.edu/trees/handbook/th-3-29.pdf
False Indigo (<i>Amorpha fruticosa</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-31.pdf
Golden Currant (<i>Ribes odoratum</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-19.pdf
Hawthorn (<i>Crataegus arnoldiana</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-79.pdf
Juneberry (<i>Amelanchier alnifolia</i>)	http://plants.usda.gov/java/profile?symbol=AMAL2&mapType=nativity&photoID=amal2_002_ahp.tif
Redosier Dogwood (<i>Cornus sericea</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-21.pdf
Silverberry (<i>Elaeagnus commutata</i>)	http://plants.usda.gov/java/profile?symbol=ELCO&mapType=nativity&photoID=elco_001_avp.tif
Silver Buffaloberry (<i>Shepherdia argentea</i>)	http://plants.usda.gov/java/profile?symbol=SHAR&mapType=nativity&photoID=shar_001_ahp.tif
Skunkbush Sumac (<i>Rhus trilobata</i>)	http://plants.usda.gov/java/profile?symbol=RHTR&mapType=nativity&photoID=rhtr_001_ahp.tif
Smooth Sumac (<i>Rhus glabra</i>)	http://plants.usda.gov/java/profile?symbol=RHGL
Snowberry (<i>Symphoricarpos occidentalis</i>)	http://plants.usda.gov/java/profile?symbol=SYOC
Western Sandcherry (<i>Prunus besseyi</i>)	http://www.ag.ndsu.edu/trees/handbook/th-3-45.pdf
Woods Rose (<i>Rosa woodsii</i>)	http://plants.usda.gov/java/profile?symbol=ROWO

USACE Grass Species Mix NO. 1	PLS
Canada wild rye	15%
Blue grama (bad river)	20%
June grass	5%
Big bluestem	10%
Little bluestem	25%
Indian grass	5%
Switchgrass	5%
Side oats grama	15%

Seeding dates: May 1 – June 15

USACE Grass Species Mix NO. 2

Species	Variety	Common Name	% of Mix	Actual PLS Mix Pb/Acre	Broadcast Actual PLS Lbs/Acre
Grasses Cool Season:					
Agropyron smithii	Rodan	Western wheatgrass	40%	4.00	8.00
Stipa viridula	Lodorm	Green needlegrass	30%	3.00	6.00
Grasses Warm Season					
Calamovilfa longifolia	Goshen	Prairie sandreed	30%	3.00	6.00
Total of All Species			100%	10.00	20.00
Cover Crop: 1 of 3				4.00	8.00
	Mandan	Oats or Barley or Canadian Wild Rye			
Total Pounds per Type				14.00	28.00

Seeding dates: May 1 – June 15

The recommended seeding rate would be 12 lbs PLS/acre if broadcasted or if drilled a seed rate of 8-10 lbs PLS/acre will be used.

Use of Pure Live Seed (PLS) for calculating seed mixtures

All of the seed mixtures in this guide give the rate of pure live seed (PLS) for each species per acre. These rates were derived using three basic figures: percent of each species desired by composition, number of seeds per pound according to species, and total number of PLS per square foot.

The following equation should be used to calculate how much seed is needed to provide the required pounds of PLS needed.

% purity x germination rate % = % PLS
pounds of PLS desired divided by % PLS = Pounds of Seed Required

An example of this is: 10 pounds of PLS is required. The given seed lot for this species has a purity of 95% and a germination rate of 85%. How many pounds of seed will be necessary to have 10 PLS?

.95 (purity) X .85 (germination rate) = .81 (% PLS)
10 (required poundage) divided by .81 (%PLS) =12.3
12.3 pounds of seed will be necessary to provide 10 pounds PLS of seed.

USACE Wildflower Species

Purple coneflower (<i>Ratibida columnifera</i>)	Yarrow (<i>Achillea millefolium</i>)
Upland goldenrod (<i>Solidago ptarmicoides</i>)	Stiff sunflower (<i>Helianthus rigidus</i>)
Wild lupine (<i>Lupinus perennis</i>)	Wild bergamot (<i>Monarda fistulosa</i>)
White prairie clover (<i>Petalostemum candidum</i>)	Purple prairie clover (<i>Petalostemum purpureum</i>)
Fragrant giant hyssop (<i>Agastache foeniculum</i>)	Gray goldenrod (<i>Solidago nemoralis</i>)

*Any species not included on our approved lists that is considered non-native or invasive will NOT be deemed as an option for replacement or reseeding stock.

