

Memorandum of Understanding for Ft. Custer Vegetative Restoration
Rose Lake Plant Materials Center
2007 Progress Report

Background: Fort Custer Training Center (FCTC) in Southwest Michigan is 7500 acres of military tactical training area used by the Michigan National Guard and other branches of the armed forces. While FCTC is an important training facility, it is also home to a wide variety of natural resources, e.g., wildlife, forests, wetlands, surface water, and various rare plant and animal species. Moreover, historic and cultural resources are located on the property. The facility is federally-owned and operated by the Michigan Department of Military and Veterans Affairs (MDMVA).

Memorandum of Understanding: A memorandum of understanding between the NRCS Rose Lake PMC and the MDMVA was developed for restoration of native vegetation and habitats at Fort Custer. PMC staff will provide consultation and on-the-ground assistance for collection, propagation, establishment, and maintenance of native vegetation. PMC assistance with research and selection of proper native vegetation that meets the needs of the firing ranges, ammo bunkers, and convoy reaction course areas will mutually benefit MDMVA, FCTC, and NRCS.

Deliverables The following are being realized from the cooperative agreement between MDMVA and NRCS Rose Lake PMC:

- Identification and selection of specific native plant species for collection, increase, testing, and evaluation for conservation uses at FCTC, including grasses to reduce mowing needs on ammunition bunkers (see below) and firing ranges and native grasses for roadsides.
- Established production plots/fields of selected native plants (e.g., little bluestem, big bluestem, and Indiangrass) to provide seed to commercial growers and for use at FCTC for prairie plantings on post. Approximately 17,000 Indiangrass and 17,000 big bluestem plants were grown in the PMC greenhouse and transplanted into FCTC production areas in 2007.
- Technical expertise on plan development for establishing native prairie plants on the convoy reaction course.
- Consultation and hands on implementation of weed control, planting, plot/field production, and management.
- Protocols for harvesting, cleaning, and handling of seed. Approximately 2 lbs PLS of big bluestem seed and 80 lbs PLS of little bluestem seed from FCTC were cleaned by the PMC in 2007.

Ammunition Bunkers: Demonstration plots were established on an ammunition bunker so that vegetation species and establishment methods could be evaluated (Table 1). Treatment strips were 30 ft up-and-down the slope and 3 or 7 ft wide. Replicates were established to face northeast, east, and southeast, respectively. Evaluation will be conducted in collaboration with FCTC environmental staff. Criteria include ease of establishment, mowing and maintenance requirements, soil stabilization on the 30-40° slopes, fire hazard, etc.

Table 1. Vegetation and establishment methods for Ft. Custer ammunition bunker trials.

Common Name		Scientific Name	Establishment Method	Approximate Seed or Plant Population	Observations
Bermudagrass		<i>Cynodon dactylon</i> (L.) Pers.	Plugged into coir biodegradable mattress (with potting soil); established off-site; and transported to bunker in fall 2005	6 plants/ft ²	Greenup was slow in spring. Sod was green and well formed by end-of-season.
Periwinkle		<i>Vinca minor</i> L.	Plugged into coir biodegradable mattress (with potting soil); established off-site; and transported to bunker in fall 2005	Actual planting population not calculated due to stoloniferous nature of Periwinkle	Didn't provide adequate groundcover during 2006 growing season.
Sedum	Two row stonecrop	<i>Sedum spurium</i> Bieb. 'Tricolor'	Plugged into soil overlaid with 0.75-in X 0.75-in mesh coir fiber, biodegradable mats covering in summer 2005	3 plants/ft ²	Established well but vegetative growth was slow. Didn't provide adequate ground cover in 2006 growing season.
	Stone- crop	<i>Sedum acre</i> L.	Same as above	Same as above	
	Orange stonecrop	<i>Sedum kamtschaticum</i> Fisch. & C.A. Mey.	Same as above	Same as above	
	Orange stonecrop	<i>Sedum spurium</i> Bieb. 'Fudlaglut'	Same as above	Same as above	
Red fescue		<i>Festuca rubra</i> L.	Direct seeded on-site at bunker into soil overlaid with 0.5-in X 0.4-in mesh coir fiber, biodegradable mats in fall 2005	4 lbs/1000 ft ²	Good germination in fall 2005 and good sod formation during 2006.
			Established off-site by direct seeding into coir biodegradable mattress (with potting soil); overlaid with 0.5-in X 0.4-in mesh coir fiber, biodegradable mats and transported to bunker in fall 2005	4 lbs/1000 ft ²	Good growth and sod formation in mats off site and good establishment on bunkers in 2006.
Buffalograss		<i>Buchloe dactyloides</i> (Nutt.) Engelm. 'Top Gun'	Direct seeded on-site in summer 2006	3 lbs/1000 ft ²	Very poor germination.
Pink		<i>Dianthus</i> sp.	Transplanted into biodegradable mattress in summer 2006	≈1 plant/ft ²	Good stand was observed in 2007.

Local genotype grasses, sedges, and forbs: The Fort Custer Military Training Center has a large number of plant species whose genetics are believed to be native to the Training Center. Approximately 120 species of grasses, sedges, and forbs were located, identified, and collected by staff of Native Connections Nursery and provided to the Rose Lake PMC for propagation and re-establishment at the Training Center. The following species were collected in 2007 and provided to the Rose Lake PMC:

Species	Common Name
<i>Agastache nepetoides</i>	yellow giant hyssop
<i>Amorpha canescens</i>	Leadplant
<i>Anemone cylindrical</i>	candle anemone
<i>Anemone virginiana</i>	tall thimbleweed
<i>Aristida purpurascens</i>	arrowfeather threeawn
<i>Asclepias amplexicaulis</i>	clasping milkweed
<i>Asclepias exaltata</i>	poke milkweed
<i>Asclepias tuberosa</i>	butterfly milkweed
<i>Asclepias viridiflora</i>	green comet milkweed
<i>Aster laevis</i>	smooth aster
<i>Aster macrophyllus</i>	bigleaf aster
<i>Aster novae-angliae</i>	New England aster
<i>Aster oolentangiensis</i>	skyblue aster
<i>Aster umbellatus</i>	Flat topped aster
<i>Aureolaria flava</i>	smooth yellow false foxglove
<i>Brachyelytrum erectum</i>	bearded shorthusk
<i>Cacalia atriplicifolia</i>	pale indian plantain
<i>Calamagrostis canadensis</i>	Canada bluejoint
<i>Campanula americana</i>	American bellflower
<i>Carex bebbii</i>	Bebb's sedge
<i>Carex brevior</i>	shortbeak sedge
<i>Carex cephalophora</i>	oval-leaf sedge
<i>Carex lasiocarpa v latifolia</i>	wolly fruit sedge
<i>Carex muehlenbergii</i>	Muhlenberg's sedge
<i>Carex rosea</i>	rosy sedge
<i>Ceanothus americanus</i>	New Jersey tea
<i>Cirsium discolor</i>	field thistle
<i>Coreopsis lanceolata</i>	lanceleaf tickseed
<i>Coreopsis tripteris</i>	tall tickseed
<i>Cyperus filiculmis</i>	great plains flatsedge
<i>Danthonia spicata</i>	poverty oatgrass
<i>Desmodium canadense</i>	showy tick trefoil
<i>Desmodium illinoense</i>	Illinois ticktrefoil
<i>Desmodium obtusum</i>	stiff ticktrefoil
<i>Desmodium sessilifolium</i>	sessileleaf ticktrefoil
<i>Elymus riparius</i>	riverbank wildrye
<i>Elymus villosus</i>	hairy wildrye
<i>Euphorbia corollata</i>	flowering spurge
<i>Gentiana andrewsii</i>	closed bottle gentian
<i>Helianthemum canadense</i>	longbranch frostweed

Species	Common Name
<i>Helianthus divaricatus</i>	woodland sunflower
<i>Helianthus strumosus</i>	paleleaf woodland sunflower
<i>Hieracium gronovii</i>	Queendevil
<i>Hieracium scabrum</i>	rough hawkweed
<i>Hystrix patula</i>	bottlebrush grass
<i>Lathyrus ochroleucus</i>	cream pea
<i>Lechea villosa</i>	hairy pinweed
<i>Lespedeza capitata</i>	roughhead lespedeza
<i>Lespedeza hirta</i>	hairy lespedeza
<i>Lespedeza intermedia</i>	shrubby lespedeza
<i>Liatris aspera</i>	tall blazing star
<i>Liatris scariosa</i>	devil's bite
<i>Lobelia spicata</i>	palespike lobelia
<i>Lupinus perennis</i>	sundial lupine
<i>Monarda fistulosa</i>	wild bergamot
<i>Oenothera fruticosa</i>	narrowleaf evening primrose
<i>Pedicularis canadensis</i>	Canadian lousewort
<i>Penstemon digitalis</i>	talus slope penstemon
<i>Prenanthes altissima</i>	tall rattlesnakeroot
<i>Pycnanthemum virginianum</i>	Virginia mountainmint
<i>Rudbeckia hirta</i>	blackeyed Susan
<i>Sanicula canadensis</i>	Canadian blacksnakeroot
<i>Scirpus pendulus</i>	rufous bulrush
<i>Solidago hispida</i>	hairy goldenrod
<i>Solidago nemoralis</i>	gray goldenrod
<i>Solidago rigida</i>	stiff goldenrod
<i>Solidago speciosa</i>	showy goldenrod
<i>Spartina pectinata</i>	prairie cordgrass
<i>Symphyotrichum cordifolium</i>	common blue wood aster
<i>Taenidia integerrima</i>	yellow pimpernel
<i>Teucrium canadense</i>	Canada germander
<i>Thalictrum dioicum</i>	early meadow-rue
<i>Tradescantia ohimensis</i>	Bluejacket
<i>Verbena stricta</i>	hoary verbena
<i>Vernonia missurica</i>	Missouri ironweed
<i>Veronicastrum virginicum</i>	Culver's root
<i>Zizia aurea</i>	golden zizia