01-037W

Botanical assessment and vegetation cover types of the Buehler parcel, Jo Daviess Conservation Foundation, Galena IL

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Introduction: The Buehler parcel was acquired via donation by The Joe Daviess Conservation Foundation (JDCF) in the late 1990s. The parcel consists of a roughly 18-acre site north of the city of Galena, bordered by the channelized and partially bermed Galena River to the north and west, and by the Illinois Central railroad right of way to the east. The parcel contains hilly woodland in the eastern portion, and a large flat floodplain area which had been periodically mowed for hay in past years.
Murn Environmental Inc. (MEI) was contacted by JDCF about performing a vegetation survey of the parcel, for purposes of establishing baseline information, and using this information to prioritize management and enhancement activities. MEI staff have extensive experience in field biology, restoration ecology and best management practice option identification for natural areas.
JDCF authorized the survey work in March 2000; interim reports were submitted in October 2000 and April 2001.

Materials and methods: Survey work began in spring 2000 and continued through fall 2001. Examination of the site at several different times during the growing season allowed a more complete identification and categorization of individual plant species. MEI personnel who performed the site work and subsequent taxonomic work emphasized the following:
--as complete an identification of all plant species as possible
--categorization of the general condition of the vegetation communities
--management needs and restoration potential
Each field visit was videotaped; plant samples were taken where appropriate for identification purposes.
The wooded hills adjacent to the RR ROW were known to contain some intact native vegetation associations, and plant identification was emphasized in this area. The floodplain, which had been degraded by the river channelization, was studied both for diagnostic native and non-native flora, and also for restoration potential.
Copies of our interim reports, and a results and discussion section, are attached.

Thomas J. Murn / Murn Environmental Inc.
Beloit WI

10/23/00 report to:

Nancy Winter
Jo Daviess Conservation Foundation
Galena IL

report by: Thomas Murn, Keirston Peckham
Murn Environmental

re: interim report - 2000 field work

Dear Ms. Winter,

As per our recent meeting and correspondence, we have started landscape cover assessment work at the above site. Following is our interim observation report, and timetable for completion of work.

After our initial site inspection in August 2000, we returned to the site on 10/10/00 to more completely identify and categorize vegetation, especially fall-flowering or fruiting groundlayer vegetation.

Trails had been mowed through the flat lower portion of the parcel; all areas within the parcel were examined and videotaped, from the channel and adjacent low woodland disturbance areas, to the steeper hills along the railroad right-of-way.

At time of inspection, water levels appeared to be below-normal in the river channel, although soils adjacent to,and perched some 6-10 ft above the channel, were partially saturated. Some of the lower swales between the river and railroad ROW, at the southern end of the parcel, had recently dried down, as evidenced by duckweed still green on top of the mud flats, as well as a solid growth of carices. Condition of the flatter open area between the channel disturbance trees, and the railroad, was that of early succession from mowed area. Larger asters and goldenrods, with some other rough native or disturbance species, have begun to dominate the shorter field grasses. Some woody species invasion is also evident.

The hills along the railroad right of way were of two separate conditions: we noted areas where presence of some few ephemerals and ferns indicated a relatively intact groundlayer. In other areas, where existing trees were smaller dbh and thus younger, mainly disturbance species were dominant in the groundlayer, e.g. Ribes (gooseberry), Allaria (gárlic mustard). Generally, the more intact groundlayer areas face the river, and the more disturbed areas face the railroad ROW. In all these areas, the Allaria has started to invade and will represent a significant threat to vegetation community integrity in a few years.

We will return to the site in 2001 to complete our vegetation assessment work. This work will pay special attention to woodland groundlayer areas on the hills. We will then issue a final report to you. This report, as we had previously proposed, will contain a species list, maps with identification of vegetation zones, and other ancillary data and observations, including suggestions for management.

Please call or write if you have any questions about this information. We look forward to completing this work and discussing it with your Board of Directors.

Summary of April 2001 field inspection

visiting site of staff: Tom Murn, Keirston Peckham, Andrew Hipp
Time of visit: circa noon to 2:00 pm.
Weather conditions: Warm (ca. 65-70F), sunny.

Site overview: The site has already been characterized by Murn and Peckham (above). Based on the field visit, the site can be classified readily into several coarse vegetation types:

Brushy north-facing berm. The upland portion of the site closest to the north-south levee is dominated by box-elder (*Acer negundo*) with a thick brushy undergrowth of Missouri gooseberry (*Ribes missouriense*), chokecherry (*Prunus virginiana*), and hybrid honeysuckle (*Lonicera* x *bella*), with some raspberry (*Rubus occidentalis* and perhaps 2 other spp), elderberry (*Sambucus canadensis*), and common buckthorn (*Rhamnus cathartica*). Additional trees include several small American elms (*Ulmus americana*, perhaps with some *U. rubra* as well), hackberries (*Celtis occidentalis*), and black cherries (*Prunus serotina*).

The soil is clayey in at least the lower portions of the slope. The understory is dominated by garlic mustard (*Alliaria petiolata*) which is largely outcompeting (in this portion of the site) many native species commonly found in brushy woodlands: early meadowrue (*Thalictrum dasycarpum*), Virginia waterleaf (*Hydrophyllum virginianum*), white trout-lily (*Erythronium albidum*), smooth woodland sedge (*Carex blanda*), false Solomon□s seal (*Smilacina racemosa*), white avens (*Geum canadense*), woodland violet (*Viola sororia*), bedstraw (*Galium triflorum* and *G. aparine*), small-flowered buttercup (*Ranunculus abortivus*), and shoots of Virginia creeper (*Parthenocissus quiquefolia*) that were just leafing out at the time of our visit. A few additional weeds are present in small numbers: Dame□s rocket (*Hesperis matronalis*), dandelion (*Taraxacum officinale*), motherwort (*Leonurus cardiaca*). Of these, only Dame□s rocket presents a long-range risk to the community. Two woodland herbs that tend to be somewhat conservative are present: Solomons seal (*Polygonatum biflorum*) and bloodroot (*Sanguinaria canadensis*). Both have a relatively wide ecological amplitude but tend (at least in my opinion) to have greater fidelity to less disturbed natural communities than do the other native herbs found at this site.

Mesic north-facing berm. East of the above area is a shadier site dominated by sugar maple (*Acer saccharum*). It has the dark soil, leaf litter, and herb layer of a typical southern Wisconsin mesic (maple-basswood) forest. Notable species are Dutchman□s breeches (*Dicentra cucullaria*), wild ginger (*Asarum canadense*), white-bear sedge (*Carex albursina*), spring beauty (*Claytonia virgniana*), zigzag goldenrod (*Solidago flexicaulis*), and *Osmorhiza claytonii*, as well as many of the other common herbs found on the brushy north-facing berm. Also present on this slope are red oaks, which generally show up early in succession on rich forest soils. This portion of the site is remarkable for its lack of garlic mustard.

Dry plateau. At the top of the mesic slope is a xeric plateau dominated by white oak (*Quercus alba*), black oak (*Q.* cf. *velutina*, though this might alternatively be hill□s oak, *Q. ellipsoidalis*, or a hybrid between the two), and some red oak (*Q. rubra*) and sugar

maple, with a few red-cedar (*Juniperus virginiana*) individuals. The trees on this plateau, like on the rest of the site, are relatively small. This fact, combined with the junipers, suggests a history of human disturbance.
Species atop the plateau include: yellow violet (*Viola pubsescens*), woodland violet, spring beauty, wild ginger, smooth woodland sedge, false Solomon's seal, *Aster sagittifolius* or *A. shortii*, woodland phlox (*Phlox divaricata*), and a woodland sedge that appears to be either *Carex projecta* or *C. normalis* (pending further study). While garlic mustard is not a great problem on the plateau (perhaps because of a lack of erosion, which favors garlic mustard on the berm slopes), there is a single patch of reed-canary grass in shade on the plateau. This is a very aggressive wetland weed, but it is able to establish in upland areas where there is sufficient shade. The jury is still out as to whether reed-canary grass poses a significant threat to upland forests.

Wet forest. Between the floodplain and the berm is a strip of transitional wet forest that may harbor a few species unique to the site, including swamp buttercup (*Ranunculus hispidus* var. *nitidus*) and perhaps other floodplain forest species. It is very narrow, however, because the berm is so steep.

Reed-canary grass slough. Between the wet forest and the remainder of the floodplain is a 15-20 foot swath of reed-canary grass. This should be searched more carefully when the site is drier, as it contains patches of some species typically found in sedge meadows or wet prairies: angelica (*Angelica purpurea*), cow-parsnip (*Heracleum lanatum*, which also gets into the adjacent wet forest), and *Carex diandra* (most probably, though material was primarily vegetative with only a single perigynium remaining from prior year).

Wet meadow / marsh. Beyond the reed-canary grass slough is a wet area not yet inspected. It looks promising. Given the above findings, a variety of wetland species seem like plausible finds, including many of the more generalist denizens of sedge meadows (e.g. *Campanula aparinoides*, *Carex utriculata*, *C. lanuginosa* or *C. aquatilis*, *C. atherodes*, *Calamagrostis canadensis*, etc.) and lacustrine meadows (e.g. *C. cristatella*, *C. tribuloides*).

South flat. Between the berm and the railroad tracks to the south is a mesic wooded area with several species unique to the site: golden Alexander (*Zizia aurea*), wild strawberry (*Fragaria virgniana*), an orchid (cf. *Galearis spectabilis*), horsetail (*Equisetum arvense*), wild lily (*Lilium philadelphicum*) and wild leek (*Allium tricoccum*).

Summary of September 2001 field visit - final field work report

present of staff - Thomas Murn, Andrew Hipp and Jimmy Murn

Terrace. The open floodplain terrace was described in the last report as a possible site for sedge meadow or wet prairie species. The species found there on our October visit, however, are for the most part a mix of generalist wetland natives, with some exotic species as well. The most obvious exotic on the terrace is reed-canary grass (*Phalaris arundinacea*), which occupies about 25 to 50 percent of the ground surface. Most of the remainder of the area is a thicket of asters (most appearing to be *Aster lanceolatus* var. *simplex*), with scattered individuals of sneezeweed (*Helenium autumnale*), dogbane (*Apocynum cannabinum*), Jerusalem artichoke (*Helianthus tuberosus*), fox sedge (*Carex vulpinoidea*), umbrella sedge (*Cyperus odoratus*), bluejoint grass (*Calamagrostis canadensis*), and openings dominated by mostly unidentified grasses and sedges.

Between this open area and the river is a degraded woodland of mulberry (*Morus alba*) and box-elder (*Acer negundo*) with elderberry (*Sambucus canadensis*) and buckthorn (*Rhamnus cathartica*). Understory species include red-stem aster (*Aster puniceus*), northern water-horehound (*Lycopus uniflorus*), pinkweed (*Polygonum pensylvanicum*), groundnut (*Apios americana*), virgin□s bower (*Clematis virginiana*), smooth black-eyed Susan (*Rudbeckia laciniata*), and garlic mustard (*Alliaria petiolata*). The garlic mustard is a shade-tolerant and highly competitive Eurasian weed. The remainder of the herbaceous species mentioned are typical denizens of an upper midwest floodplain forest.

The following list of species was identified from the September visit to the terrace:

Acalypha rhomboidea Three-seeded-mercury
Acer negundo Box-elder
Alliaria petiolata Garlic mustard
Amaranthus arenicola Sand-hills amaranth
Angelica atropurpurea Great angelica
Apios americana Groundnut
Apocynum cannabinum Indian-hemp
Asclepias syriaca Common milkweed
Aster lanceolatus var. *simplex*
Aster lateriflorus Calico aster
Aster puniceus Red-stem aster
Barbarea vulgaris Yellow-rocket
Bidens cf. *frondosus* Common beggar-ticks
Boehmeria cylindrica False nettle
Calamagrostis canadensis Bluejoint grass
Calystegia sepium Hedge bindweed
Carex vulpinoidea Fox sedge
Cirsium sp. Thistle
Clematis virginiana Virgin's bower
Cyperus odoratus Umbrella sedge
Echinocystis lobata Wild cucumber
Elytrigia repens Quackgrass

Glechoma hederacea Creeping Charlie
Helenium autumnale Sneezeweed
Helianthus tuberosus Jerusalem-artichoke
Impatiens capensis Jewelweed
Laportea canadensis Wood nettle
Lycopus uniflorus Northern water-horehound
Mentha arvensis Field mint
Morus alba Mulberry
Oenothera biennis Evening primrose
Oxalis stricta Common wood-sorrel
Panicum dichotomiflorum var *dichotomiflorum* Fall panic grass
Parthenocissus quinquefolia Virginia creeper
Pilea fontana Clearweed
Polygonum pensylvanicum Pinkweed
Polygonum scandens Climbing false buckwheat
Rudbeckia laciniata Wild golden-glow
Rumex cf. *orbiculatus* Great water dock
Sambucus canadensis Elderberry
Scutellaria lateriflora Mad-dog skullcap
Setaria sp. Foxtail
Solanum carolinense Horse-nettle
Solanum dulcamara Nightshade
Stachys tenuifolia var. *tenuifolia* Smooth hedge-nettle
Stellaria aquatica Water chickweed
Ulmus sp. (seedlings) Elm
Urtica dioica Stinging nettle
Vitis riparia Wild grape
Xanthium spinosum Spiny cocklebur

Dry plateau. This community was characterized in the prior report. Upon revisit it was found to be a relatively species-rich, with the addition of the following species not noted at the last visit:

Amphicarpaea bracteata Hog-peanut
Carex blanda Sedge
Carex projecta Sedge
Celtis occidentalis Hackberry
Circaea lutetiana Broad-leaf enchanter's-nightshade
Galium triflorum Sweet-scented bedstraw
Juncus tenuis Path rush
Muhlenbergia schreberi Nimble-will muhly
Muhlenbergia sylvatica var. *sylvatica* Forest muhly
Ostrya virginiana Ironwood
Panicum implicatum Panic grass
Poa sp. Bluegrass
Polymnia canadensis Pale-flowered leaf-cup
Populus tremuloides Quaking aspen
Ribes missouriensis Missouri gooseberry

Rubus allegheniensis Blackberry
Smilax ecirrhata Upright carrion-flower
Staphylea trifoliata Bladdernut a thicket of ca. 50 square meters
Teucrium canadense var. *virginicum* Wood-sage

South flat. On the flat between the berm and the railroad tracks to the south, many additional species were found, including a *Botrychium* (rattlesnake fern) species not found during the prior visit. Given the degraded nature of this strip of land, the finding of an orchid (cf. *Galearis spectabilis*) last time and the *Botrychium* this time is somewhat surprising. Neither of these two species was collected because of rarity at the site; a visit should be made in midsummer to make specific identification. Additional species found:

Apios americana Groundnut
Asarum canadense Wild ginger
Aster lateriflorus Calico aster
Aster novae-angliae New England aster
Aster sagittifolius Arrow-leaved aster
Botrychium sp. Rattlesnake fern
Clematis virginiana Virgin's bower
Daucus carota Queen-Anne's lace
Eupatorium rugosum White snakeroot
Geum canadensis White avens
Lactuca sp. Wild lettuce
Panicum virgatum Switchgrass
Smilacina racemosa False Solomon's seal
Smilax hispida Bristly greenbriar
Solidago canadensis Canada goldenrod
Thalictrum dasycarpum Early meadow-rue
Thalictrum dioicum Meadow-rue

Results and discussion

As the vegetation survey lists demonstrate, the hills between the RR ROW and the floodplain contain examples of woodland communities of relatively high quality. The floodplain terrace itself has suffered from the channelization of the river and subsequent dewatering, although periodic floods have apparently retarded shrub invasion of the terrace.

Some management considerations include:

A. Garlic mustard

This weed is actively invading the majority of the wooded acreage and will outcompete most native groundlayer species. Garlic mustard is not as pervasive in the maple woodlands along the north and northwest sides of the bluff, perhaps because of the deeper shade, although there may be other ecological factors at work; studying the lack of major infestation there may uncover limiting factors which could be used in biological control of this serious threat.
A program for garlic mustard control should be a high priority for management.

B. flooding
Flood events are a double-edged sword; flood pulses may retard shrub invasion (very important for preventing secondary succession into shrub carr), but also may bring in the future serious threats such as purple loosestrife and reed grass. Backwash floods from the Mississippi valley cannot be controlled as easily as floods from up the watershed, which could be better controlled with changing land uses, buffer zones, retention areas, contour plowing, greenstrips, etc.

C. other weed problems
Some invasive shrubs may cause future problems on the bluff sides. Current weeds such as wood nettle in the very degraded low forest along the channelized creek do not currently cause problems, but may retard restoration efforts on the terrace.

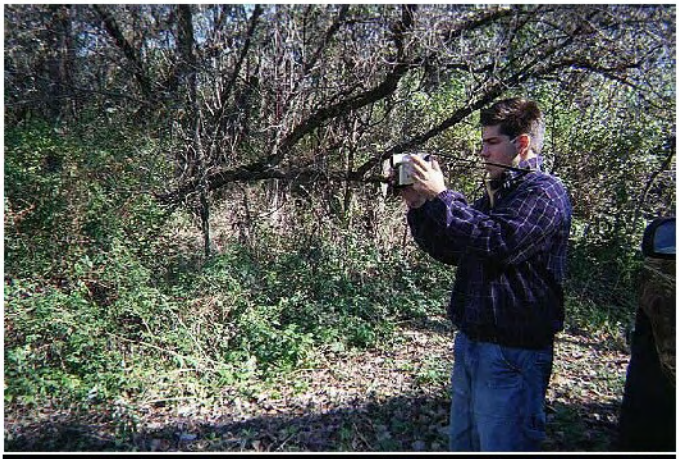
We had started this survey work with the intention of studying the possibilities for restoration of the floodplain area. Given the high floristic value of the wood bluff community and the severe threat posed by the garlic mustard, we propose that garlic mustard control should be the initial highest priority for land management at this location. The floodplain itself contains a community that is dominated in many areas by hardy natives such as swamp aster and sneezeweed; the lack of shrub invasion, presumably caused by flooding as well as the periodic mowing that had occurred in the past, means that there is no pressing need for management or restoration work at this time. We suggest that (1) the floodplain terrace be mowed throughout, perhaps every two years, to continue the beneficial effects of exposing some of the smaller natives (e.g. blue lobelia) to sunlight, and to keep shrubs down; and (2) the terrace should continue to be monitored for weed invasion and incidence and frequency of the hardy natives.

We propose that an on site meeting and inspection be held next spring, optimally in mid

May (to see the woodland spring ephemerals to best effect); members of the land trust Board could discuss these and other management options at that time. We would volunteer our interpretive ecological services at this meeting, and certainly other members of the Board would have much to offer in experience and perspective. Also, we would like to have at this meeting a local geologist or fluvial geomorphologist to discuss the history and evolution of the site, which would have some bearing on prioritization of future management and restoration activities in interpretation of and stability of soil types, etc.

Summary: The existing cover of the site provides many values, such as water filtration, flood storage, game and non-game habitat, and aesthetic and open space values, in proximity to the city of Galena. The site is inappropriate for most uses, and has its best use in providing the values listed above. Maintenance of the more rare of the vegetation communities is important because there is a pressing need for preservation of our natural heritage. Natural areas have become more and more fragmented and impacted with changing land uses, including development, commercial agricultural practices, and changes to recreational land. The Foundation in our opinion showed foresight in obtaining this parcel, and serves the area well in its preservation and in consideration of management options to best maintain and enhance functional values and natural diversity.

We will maintain records, including photographs, plant samples and videotape, of our site visits.

We appreciate the opportunity to serve the land trust in performance of this study.

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