F. Submesic Woods (varied disturbed transitions): mapped as code 07a/b/c/x
[JC Class 07-D/E; KHP no clear match, better woods aff. "deep soil mesophytic forest" and subxeric types; NVC, varied potential matches as noted below].
These diverse areas are mostly on rather gentle slopes, but often grade into more xeric or more mesic forest on steeper slopes. They generally have an "average mix" of tree species, in terms of ecological gradients from mesic to xeric, mesic to hydric, and mesic to disturbed. These areas have been largely cleared for farming in the past, and are now recovering in various mixtures, degrees of disturbance and stages of succession. Woods domimated by cedar or pine on more recently or intensively disturbed sites are treated here under G (JC Class 12), but various approaches to classification can be reasonable, depending on the application.

Core WKU Tracts [2008 plan]
"4d. Mixed hardwood forest" [~JC 07a]; "in general these are established within the last 40 years; *Fraxinus* and *Liriodendron* often occur with smaller oaks and maples."
"5b. Evergreen (cedar-pine) /oak-hickory chinquapin successional" [~JC 07b]; more or less similar to (b) under Bush/Goebel but also grading into 11b.
"5a. Pine/mixed hardwood successional" [~JC 07c]; "a mesic type recently established on upper alluvium and lower St. Genevieve limestone; *Pinus taeda* has [been] established on many of these sites; other dominant trees include *Liriodendron*."
"6. Hedgerow" [~JC 07a attenuated]—miscellaneous narrow strips of woods between fields; "early successional hardwoods between fields often including *Ulmus* spp., *Juniperus* and *Gleditsia*; shrubs often include *Symphoricarpos* and *Rosa multiflora*; vines are quite abundant, including *Lonicera japonica, Smilax* and *Rubus*; *Verbesina virginica* and *Microstegium vimineum*."

Bush/Goebel Tract (more or less continuous with 07a, b and c below).
The following notes provide only an introduction to the complexity of these woods. Some areas are transitional to subxeric oak forest (Class 11). Some areas with more red cedar are transitional to cedar-dominated woods, rocky xeric woods and glades (Class 12).

Variant 1 [JC 07a]. Old Bush cemetery: old 10-12 dm dbh *Acer saccharum* (dominant), *Juglans nigra* (common in smaller sizes); much *Symphoricarpus orbiculatus, Eupatorium rugosum* on ground; planted/escaped *Narcissus* cf. *pseudonarcissus*.

Variant 2 [JC 07a]. Lower uncleared (but probably grazed/thinned) woods (mostly to west of WKU): *Acer saccharum, Carya ovata, Quercus muehlenbergii, Q. shumardii, Fraxinus americana*; locally *Juniperus, Pinus*. Common species on the ground include *Carex* spp. (especially what may be *cumberlandensis*), and *Eupatorium rugosum*.

Variant 3 [JC 07b]. Upper uncleared (but probably grazed/thinned) woods: as above but more or less transitional to locally abundant *Q. alba, Q. velutina*, etc.

Variant 4 [JC 07c]. Upper seral woods with local poplar and pine as well as cedar; probably on more sandy soils: grading into locally abundant *Liriodendron* (especially more mesic) or *Pinus* (especially more xeric). *Cynoglossum virginianum* and *Desmodium* spp. are locally frequent on the ground.

Kinney & Durham Knob Tracts. Two variants are outlined here, but further variation remains. Canopy trees are mostly ca. 1-3 dm dbh, but there are also scattered relics of the former woods, up to 7-8 dm (bitternut) or even 10-15 dm (a dead tree, perhaps shumard oak).

Variant 1 [JC 07a; NVC aff. 4437]. On lower slopes, especially where disturbance has been less intensive, there are varied transitions between mesic forest, with locally abundant sugar maple, and cedar forest (12a). Hackberry is also frequent. Other scattered trees scattered cherry, black walnut, red elm, white ash and oaks (chinquapin and shumard). In lower strata, locally common species include *Lindera*, *Symphoricarpos* and the vining *Lonicera japonica*. Locally frequent herbs include *Dentaria* spp. (especially *laciniata*), *Eupatorium rugosum*, and *Ranunculus* spp. (*abortivus*, *micranthus*).

Variant 2 [JC 07b; NVC 4741]. Generally at moderate elevation, and mixed with subxeric woods dominated by red cedar (12b); typical oaks may include *rubra*, *muhlenbergii*, *velutina* and *alba* (old wolf tree 13 dm dbh); hickories are locally frequent (esp. *ovata*), with some large trees in a few places (ca. 7-8 dm dbh). These woods were mostly grazed by cattle until about 20-30 years ago (V.-J. Kinney, pers. comm.).

Variant 3 [JC 07c; NVC aff. 7709]. As in 07b but with more pine than cedar, probably on less calcareous soils. These areas are often mosaics with patches of hardwoods (including local *Liriodendron*), pine-hardwoods and pine, to be separated with more precise mapping.

Miller & Byler Tracts (Lawler Bend).

Variant 1 [JC 07a; NVC ~ 4411-5035]. This is on gentle lower NE-facing slopes with deep calcareous soils, and in sinkholes, grading into truly mesic woods on more protected sites. There has been repeated disturbance from browsing and logging (10-20 years ago in the Byler Tract), leading to a relatively brushy condition with frequent saplings and vines. Most canopy trees are 3-4(5) dm dbh. Dominant trees are bitternut (especially on the Byler Tract) or sugar

maple (at least in the understory); other species include black maple, chinquapin oak (frequent, one 12 dm), shumard oak, blue ash, white ashes (sensu lato), Ohio buckeye (to 5 dm), shellbark hickory (lower), hackberry, red elm (locally frequent in understory but a few trees 2-7 dm dbh), red mulberry (scattered) and coffeetree (rare); plus tulip and beech on low benches. The shrub layer has abundant *Asimina*; other locally common species include *Arundinaria* (riparian transitions), *Cercis, Hydrangea* (low bench), *Lindera* (esp. sinkholes) and *Rosa multiflora* (more disturbed). Ground vegetation includes locally abundant *Ageratina altissima* (areas more browsed in past), *Diplazium* (mesic transitions), *Jeffersonia* (drier transitions), *Lonicera japonica* (more disturbed areas), *Parthenocissus* (cutover areas), *Podophyllum* and *Toxicodendron* (edges). Other species include *Actaea pachypoda, Adiantum pedatum, Arisaema triphyllum, Asarum, Carex* spp. (esp. *jamesii*, also *communis* at upper levels; *amphibola, cumberlandensis, sparganioides*; *albursina* at lower levels), *Corydalis, Cystopteris protrusa, Dentaria laciniata, Festuca subverticillata, Glechoma, Hybanthus, Hydrophyllum appendiculatum* (often browsed), *Menispermum, Phlox divaricata, Pilea* (lower), *Poa sylvestris* (lower), *Polygonatum biflorum, Polystichum* (low benches and sinks), *Ranunculus abortivus* (lower), *R. micranthus* (upper), *Smilacina, Stellaria corei, Stylophorum, Symphyotrichum cordifolium, S. shortii, Tradescantia subaspera, Trillium sessile, Verbesina alternifolia* (more disturbed), *Viola pennsylvanica, V. sororia,* etc.

Variant 2 [JC 07b/c; NVC aff. 4741]. These woods are generally on higher ground and more disturbed (especially browsed). This vegetation varies much from drier upper slopes transitional to fields (probably with much past use by livestock) to damper lower slopes and toeslopes (with less history of livestock but probably much influence by deer). In addition to common dominants of more mature mesic or subxeric forest (sugar maple, beech, oaks,

hickories, ashes), the following trees are relatively frequent: tulip poplar, sassafras, winged elm (upper slopes), honey locust, Ohio buckeye, black walnut, mulberry, cherry and bitternut hickory (lower slopes). Common shrubs include *Symphoricarpos* (locally abun.), *Ostrya*, ?*Carpinus* (lower); other scattered species (especially at edges) include *Euonymus americanus*, *Frangula caroliniana*, *Rosa multiflora*, *Viburnum rufidulum*, etc. Vines are also common: *Bignonia, Lonicera japonica, Parthenocissus, Toxicodendron, Smilax bona-nox, Vitis* cf. *vulpina*, The ground is locally dominated by graminoids, including *Carex* spp. (esp. ?*cumberlandensis* on upper slopes and *jamesii* on lower), *Elymus* spp. (*hystrix, macgregorii*, *virginicus*), *Dichanthelium clandestinum*, *Leersia virginica* and *Microstegium*. However, dicots are also abundant in some areas, especially *Ageratina*, *Dentaria* spp. (*laciniata, multifida*), *Glechoma,* etc. Other characteristic species include *Antenoron*, *Myosotis macrosperma, Phacelia purshii* and *Trillium sessile*. Uncommon to rare species in transitions to riparian woods include *Monarda* sp. nov. ("*serotina*") and *Nabalus crepidineus* [= *Prenanthes crepidinea*].

There is a mosaic of submesic woods, subxeric woods and red cedar thickets on the extensive rolling uplands and sinks on high terrace deposits in the southern part of Lawler Bend. Common trees here include tulip (mostly 1-4 dm), walnut (to 5 dm) and sugar maple (to 7 dm), with more local chinquapin oak, white oak (to 10 dm), northern red oak (to 10 dm), shagbark (3-4 dm), sassafras (to 6 dm). Sinks can be classified as Variant 1, with patches of *Asimina* and *Lindera*.

Lawler Bend: submesic woods, gentle E-facing, frequent *Hydrophyllum appendiculatum*.

Lawler Bend: scenes in submesic woods on east-facing toeslope; left, more open area with *Ageratina, Glechoma, Iodanthus* and *Verbesina*; right, more shaded area with *Hydrophyllum*.

Lawler Bend: in submesic woods with *Trillium sessile*, *Sanguinaria*, *Viola papilionacea*, etc.

Lawler Bend: submesic woods with much twinleaf (*Jeffersonia*) on relatively dry rocky soil.

Lawler Bend: in transition from mesic-submesic to subxeric woods on relatively gentle slopes, probably with much past disturbance from livestock; patches of cane must reflect history.

Lawler Bend (Byler): somewhat disturbed submesic woods with abundant pawpaw and vines.

Lawler Bend: another aspect of submesic woods, probably much browsed by cattle in past, now relatively open understory with abundant white snakeroot (*Ageratina altissima*).

Lawler Bend: disturbed submesic woods transition to old field; much *Microstegium* (alien).

G. Red cedar/scrub pine woods, rocky xeric woods and glades: mapped as 12a/b/c [JC Class 12; KHP "xeric red cedar-oak forest/woodland" and "xeric Virginia pine forest/woodland" with some local "dry limestone cliff/outcrop" or remnants of "limestone slope glade"; NVC generally not matched.]
This class is broadly defined here to include relatively stable open woods and glades on xeric sites (JC 12b), plus young successional cedar/pine woods on more mesic sites (JC 12a).

Core WKU Tracts (2008 Plan)

"1b. Evergreen forest—cedar" [~ JC 12a]
"1a. Evergreen forest—pine" [~JC 12b]
"1c1. Evergreen forest—redcedar limestone glade" [~ JC 12c]; see notes under Bush/Goebel.
"1c2" is the flatrock variant: "found on Durham Knob [roadside], and on a middle elevation site of the north-side tract." Characteristic species include *Leavenworthia uniflora* and *Ophioglossum engelmanii*, as well as others noted above (under Goebel).

Bush/Goebel Tract.

Variant 1 [JC 12a]. Lower seral cedar woods (various ages but mostly on sites similar to b): *Juniperus* (dominant); *Ulmus alata* locally abundant; *Fraxinus americana* often common especially in seedling to sapling layer; also frequent *F. quadrangulata, Quercus muehlenbergii, Acer saccharum*, etc. Shrub layer includes locally frequent *Cercis canadensis* and *Symphoricarpos orbiculatus*. Common species on the ground include *Elymus villosus, Microstegium vimineum* (locally abundant), and *Salvia lyrata* (locally abundant in younger woods).

Variant 2 [JC 12b]. There are only small areas with distinctive diverse flora along roadsides and perhaps the ridge with utility right-of-way above the long river bluff, to be distingushed locally in future surveys. Typical woody species include *Juniperus, Rhus aromatica, Viburnum rufidulum*. In more shady sites—but not deeply shady, typical species on the ground include *Houstonia lanceolata*, (*Silphium trifoliatum*), *Solidago sphacelata, Thaspium chapmanii, Tragia cordata* (uncommon). In the open, typical species include *Agave virginica*, (*Allium cernuum*), *Arenaria patula*, *Croton monanthogynus*, (*Echinacea simulata*), (*Euphorbia corollata*), *Hypericum dolabriforme, Leavenworthia uniflora, Liatris squarrosa*, (*Ophioglossum engelmanii*), *Opuntia humifusa*, *Penstemon tenuiflorus*, (*Ratibida pinnata*), *Ruellia humilis*, (*Schizachyrium scoparium*), (*Sporobolus* spp.) and *Viola pedata*. Species in parentheses ( ) are rare or absent on the Goebel tract, but on the north side of the river there are south/west-facing bluffs have more extensive examples of such vegetation.

Kinney & Durham KnobTracts.

Variant 1 [JC 12a]. Submesic red cedar woods, generally at lower elevation. Cedar is generally dominant in these woods, but pine is also locally abundant (see 12c). Also common are chinquapin oak and, in the sapling/seedling classes, white ash. Other trees include oaks (with southern red and shingle), hickories (shagbark and bitternut), blue ash, winged elm, black walnut and stinking buckeye. Lower woody strata are generally thin, except near edges, with typical species including *Cercis* (locally frequent), *Hypericum prolificum*, *Prunus americana* (var. *lanata*), *Rhamnus caroliniana*, *Rosa setigera* and *Symphoricarpos*. Ground vegetation is generally thin, except for locally frequent *Dentaria laciniata*, *Podophyllum* and *Parthenocissus*. Graminoids are generally sparse (but see variant 3).

Variant 2 [JC 12b]. Thin xeric rocky woods and openings with slow succession. This vegetation is not well developed on the Kinney and Durham Knob tracts, but there are components of it along the roadside and adjacent burned woods on the adjacent WKU property. A few characteristic species extend along rocky roadbeds, or nearby, into the woodlands of these tracts: *Houstonia lanceolata, Hypericum dolabriforme*, and *Rudbeckia tenax*. Note that enclaves of red cedar also occur within Class 11 (see E-11b above), and more detailed mapping will be possible given high quality aerial photos.

Variant 3 [JC 12c]. More acid soils with local scrub pine, generally on eroded upper slopes with soils partly derived from acid shale and sandstone. As well as pine, these areas have local red maple, persimmon and other acidophilous species. Ground vegetation is thin except in transitions to drier old fields with much *Danthonia spicata* and *Andropogon virginicus*.

Miller & Byler Tracts (Lawler Bend).

Variant 1 [JC 12a]. Small diverse strips of vegetation could be classified here along clifftops, adjacent xeric slopes and nearby rocky roadsides or old field edges. However, these areas are only ca. 1-10 m wide and more or less mixed into subxeric woods for general mapping purposes. Red cedar is locally common, together with other species typical of subxeric calcareous woods: chinquapin oak (loc. abun.), post oak (up to 4 dm dbh), blue ash, white ash (sensu lato), southern shagbark hickory, northern red oak (and shumard expected); sugar maple is common on more mesic ledges below. Shrub layer is well-developed in places: aromatic sumac (*Rhus aromatica*) locally frequent; other inspiring species include redbud, hophornbeam, Carolina rose, Carolina cascara (*Frangula caroliniana*), chittimwood (*Sideroxylum lycioides*), occasional farkleberry (*Vaccinium arboreum*). Truly xeric patches of

vegetation on or near outcrops have *Agalinis tenuifolia*, *Asclepias verticillata*, *Bidens bipinnatifida, Carex* cf. *umbellata* (loc. abun.), *Euphorbia corollata*, *Galactia volubilis*, *Houstonia canadensis, H. cf. nigricans* ('*rupestris*' variant), *Helianthus hirsutus* (loc. abun.), *Lespedeza virginica*, *Liatris squarrosa* sensu lato (with cf. *hirsuta*), *Lithospermum canescens, Manfreda virginica, Minuartia patula, Monarda fistulosa, Opuntia cespitosa, Oxalis* cf. *macrantha, Phlox bifida, Penstemon hirsutus, Ruellia humilis, Schizachyrium scoparium* (not common), *Solidago sphacelata* (loc. abun.), *Symphyotrichum patens*, *Zizia aptera*, etc. Species that are more typical of adjacent or intermixed thin woods include *Antennaria plantaginifolia*, *Bignonia capreolata, Danthonia spicata, Dichanthelium boscii, Elymus hystrix, Eutrochium purpureum, Helianthus microcephalus*, *Iris cristata* (on unusually dry ground for this species), *Lespedeza frutescens* (loc. freq.), *Muhlenbergia sobolifera*, *Nothoscordium bivalve, Polymnia canadensis, Ruellia caroliniana, Scleria* cf. *triglomerata, Smilax bona-nox, Solidago* cf. *erecta, Symphyotrichum shortii*.

Similar ground vegetation is relatively well developed along the rocky roadsides on ridges (on Byler and Miller Tract), which might be considered transitional on deeper soils to "xeric limestone prairie" of Class H (see below). Characteristic species include *Agalinus tenuifolia*, *Asclepias viridiflora* (Byler), *Blephilia ciliata, Carex* spp. (*digitalis, umbellata*), *Croton monanthogynus*, *Danthonia spicata*, *Dichanthelium boscii, D. oligosanthes, Helianthus hirsutus* (esp. adjacent hay-field), *Houstonia canadensis, Hypericum dolabriforme, Lespedeza frutescens, L. procumbens, Pycnanthemum tenuifolium* (esp. adjacent hay-field), *Solidago nemoralis* (more disturbed), *S. sphacelata*, *Sporobolus clandestinus* (locally abun. of Byler), *Thalictrum revolutum* and *Tragia cordata*. Little bluestem (*Schizachyrium scoparium*) was

generally absent on Miller and Byler tracts, but it was present in a relatively diverse disturbed area just north of the Miller Tract; this is outlined under H below.

Variant 2 [JC 12b]. Areas of old fields and eroded areas that have abundant red cedar.

Variant 3 [JC 12c]. This has negligible presence. Scrub pine (*Pinus virginiana*) is uncommon at Lawler Bend except locally on some eroded areas of the high terraces. It is unlikely that this species occurred here regularly before settlement.

Lawler Bend: red cedar is the first invader of some drier old fields, starting along fencerows.

Lawler Bend (Byler): frequently disturbed edge of bluff, with red cedar and shingle oak.

Red cedars dominate much old farmland on calcareous soils. Here above the old Kinney place, erosional gullies are evident. The older open-grown cedar grew at the edge of the field.

Scrub pine (*Pinus virginiana*) mixes with red cedar (*Juniperus virginiana*) on some uplands. Most of these woods [JC 12a and 12c] are seral; drier sites [especially in 12b] are more stable.

Left: old cedars persist at some field margins and roadsides, often selected for aesthetics.
Right: yucca is probably not native to these rocky sites, but has often escaped from cultivation.

More xeric roadside “barrens” [adjacent to JC 12b] east of entrance to WKU property: bird’s-foot-violet (*Viola pedata*) and .much little bluestem (*Schizachyrium scoparium*).

Lawler Bend: old knarly post oaks, typical of xeric rocky woods, often with much red cedar.

Xeric woods [JC 12b] with much red cedar on south-facing hillside near boundary of Kinney and Dorozniak tracks. Several conservative grassland plants occurs on the adjacent roadside.

Lawler Bend: typical scence on xeric clifftops with red cedars and blue ash (central tree).

Lawler Bend: less xeric ledge with *Solidago sphacelata* and leaves of *Polymnia canadensis*.

Lawler Bend: xeric ledge; *Heuchera, Acalypha, Houstonia, Antennaria, Hypericum*, *Rhus*.

Lawler Bend: small xeric grass openings on clifftops, looking up with *Liatris squarrosa* in front (left), and looking down with *Agalinis tenuifolia* and *Silphium trifoliatum* (right)

Lawler Bend. Left: xeric site on rocks with *Opuntia*; *Polymnia canadensis* nearby on deeper soil. Right: near xeric openings, *Oxalis* cf. *macrantha*; *Houstonia canadensis* & *Iris* (below).

A few ledges on sandstone cliffs have graminoid patches in openings [~JC 12c]; here is false onion (*Nothoscordium bivalve*), bluets (*Houstonia caerulea*),orange dandelion (*Krigia d.*).

H. More disturbed habitats on deeper upland soils: mapped as 10a/b/c/d
[JC Classes 08 (more brushy) and 10 (more grassy); KHP remnants of "acidic" and calcareous xeric forest/woodland", perhaps also remnants of "limestone/dolomite prairie" or associated open types; NVC to be determined.]
These areas are on relatively deep soils; disturbance (formerly with fire) rather than xeric conditions maintains the openings. Remnants of somewhat conservative native grassland species do remain on or near the WKU tracts, especially along the access roads (field station access road and Davis-Williams road). These are mostly typical of subxeric to xeric sites (see notes under G and under "barrens" in Core WKU tracts). There are virtually no species that indicate remnants of more mesic grassland that may have existed where now are old-fields.

Core WKU Tracts [notes taken from the 2008 plan].
"7b. Bottomland old-field" [~ JC 10a]; "these former hay meadows have all been planted with bottomland hardwood seedlings."
"7a. General old-field" [~ JC 10b]; "on the north side, this former fescue field was abandoned and is now dominated by *Juniperus virginiana*; *Lonicera japonica* is encroaching... on the south side, this former fescue field was abandoned, but is now part of a barrens recreation."
A diverse mix of native species has been used, though not all native to this particular site; these species include some relatively conservative ones, e.g., *Echinacea purpurea*, *Silene regia* and *Tripsacum dactyloides*.
"7d. Upland old-field" [~ JC 10c].
"8. Barrens" [~ JC 10d]—roadside along somewhat xeric woodland edges (Davis-Williams Rd), which are now being restored with fire to open grassy woodland; species include *Coreopsis major*, *Helianthus hirsutus*, *Echinacea simulata**, *Eragrostis spectabilis*,

*Eryngium yuccifolium**, *Liatris squarrosa**, *Manfreda virginica*, *Monarda fistulosa*, *Ratibida pinnata**, *Rosa carolina*, *Schizachyrium scoparium*, *Silphium trifoliatum*, *Sorghastrum nutans* and *Yucca filamentosa* (probably alien). There are a few patches of *Andropogon gerardii* (at lower levels around the corner to the preserve entrance) and *Silphium pinnatifidum** (perhaps just one plant). Asterisks indicate more conservative species.

Bush/Goebel Tract. Locally abundant species in the large field are mostly aliens or planted, including *Daucus carota, Festuca arundinacea, Lespedeza cuneata, Poa pratensis* (or ssp. *angustifolia*), *Sorghastrum* (planted). Native species include *Apocynum cannabinum*, *Aster* spp., *Danthonia spicata, Desmodium* spp., *Dichanthelium* [*Panicum*] *oligosanthes*, *Monarda fistulosa* (local mostly along roads), *Panicum anceps*, *Ruellia* spp., *Solidago* spp., *Tridens flavus*. Lower slopes might be distinguished from upper (to be determined). Frequent tree species invading the field include *Juniperus, Diospyros, Fraxinus americana, Gleditsia, Prunus serotina, Platanus, Acer negundo*. Locally common shrubby species include *Arundinaria, Rhus copallina, Rosa multiflora, Rubus pensylvanicus, Sambucus, Symphoricarpos*. The vine *Lonicera japonica* is also locally abundant.

Kinney & Durham Knob Tracts.
JC 10a. Lower fields; much mapped on terraces of the river.
JC 10b. General fields; mapped on slopes.
JC 10c. Upper fields; small areas mapped on upper slopes and on the knob.
JC 10d. Barrens remnants; not mapped.

Miller & Byler Tracts (Lawler Bend).

Some upland fields might be included here, if they are regarded as remnants of open grassy woodland, but there is little current evidence to support that notion. See also notes above (section G) on adjacent rocky ground with some species that might be expected to persist in maintained openings on this ridge. The small hayfield at higher elevation at the northern side of the Miller Tract provides most interest here. There could be some interest in maintaining it as a quasi-natural, semi-native grassland system.

Just north of the Miller Tract, there is a curiously diverse open grassy or brushy area of an acre or so that may have been used for a log-landing (or similar use) within the past decade or two. Some of the ground appears to have been scraped and is quite rocky. Frequent species here include *Cirsium discolor, Daucus carota, Erigeron strigosus, Eupatorium altissimum, Euthamia graminifolia, Helianthus hirsutus* (locally abundant), *Hypericum dolabriforme* (loc. abun.), *Kummerowia striata, Lespedeza 'intermedia', L. procumbens* (loc. abun.), *Rudbeckia tenax, Ruellia humilis, Schizachyrium scoparium, Sporobolus compositus*. More brushy or shady transitions include *Bignonia capreolata, Helianthus microcephalus, Rhus copallina, R. glabra, Symphyotrichum undulatum*, etc. It would be interesting to investigate how close native grassland on the karst plain used to come before settlement. There is an apparent remnant patch of big bluestem along the road about a mile east of the north side of Lawler Bend, at junction of Logsdon Valley Road and the Cub Run Highway (Route 88).
A more mesic brushy phase of interest would be patches of dense cane (*Arundinaria gigantea*), but these have not yet spread much into adjacent old fields. In addition to edges along some lowland fields, there is a curious place on the road along Byler, with cane and

Helianthus tuberosus are locally abundant at the head of a wooded gullly. Lowland fields themselves also have some interest as potentially native systems (including weeds spread from warmer regions), but are rapidly invaded by trees despite much browsing by deer.

Lawler Bend: passion flower (maypops), southern native formerly grown with corn (maize).

Kinney Tract: mowed field on bottomland between submesic woods on toe-slope and riparian woods. Despite dominant fescue, native plants persist such as bluets on sandy soil (above).

Lawler Bend: long bottomland field at east side planted with Indian grass, big bluestem and little bluestem as part of the USDA-funded CREP program to revegetate the river corridor.

Lawler Bend: “native warm season grasses” like Indian grass (left) were probably absent on lowlands before settlement, but CREP plantings can become the basis for eventual growth of old- field forbs (like these self-sown goldenrods) and trees into young forest; organizing these fields into rows can allow important long term experiments on succession and reforestation.

Lawler Bend: common natives in low old fields: *Persicaria punctata*, *Solanum carolinense*.

Lawler Bend: brushy old field on lower terrace with honeylocust, coralberry, blackberry, etc.

Lawler Bend: blackberry patches tend to persist where mowed at intervals of a few years.

Lawler Bend: hayfield on private land at higher elevation, mostly on old terrace depositis.

Lawler Bend (Byler): cane, *Helianthus tuberosus*, *Impatiens capensis* at head of upland gully.

Old field on south side of WKU lands near public road; redbud is common in later succession.

Lawler Bend (Byler): grassland between road and bluff, with much *Danthonia spicata*, *Sporobolus clandestinus* and *Solidago nemoralis*; shingle oak often colonizing more open areas.

Lawler Bend: scraped area on ridge, with diverse mix of grasses, forbs and brush; *Rudbeckia tenax* here viewed towards road (left) and back into woods with *H. divaricatus* (right).

Lawler Bend (Byler): *Ruellia caroliniana*, often the most showy native to appear in old fields.

Less xeric, more acid roadside [type 10c/d] on hilltop approaching gate into WKU land from east: whitetop aster (*Sericarpus linifolius*) and woodland sunflower (*Helianthus divaricatus*).

Old field on knob of Kinney Tract, with Haney Limestone and sandstone remnants [JC 10d]. Pine is most common tree; broom-sedge (*Andropogon virginicus*) is dominant on ground.

I. Swampy woods and open wetlands: not mapped here
[JC Class 02; KHP aff. "shrub swamp" and "sinkhole/depression" marsh or pond; NVC to be determined—see notes for Mammoth Cave National Park].

Core WKU Tracts (2008 Plan)
"9. Cat-tail pond"; this is an artificial pond at one site.

Kinney & Durham Knob Tracts. None located.

Bush/Goebel Tract. None located.

Miller & Byler Tracts (Lawler Bend) [JC 06a; NVC ~ 2586]. A few small (1-2 acre) remnants of wetter woods occur along the lower edge of the eastern slope, along the large bottomland field. Green ash is locally common, together more typical species of submesic woods and riparian woods. There are also several locally abundant wetland graminoids: *Carex sangamonensis* (esp. near woods, probably a remnant of the original habitat), *Carex conjuncta*, *C. vulpinoidea*, *Phalaris arundinacea*, etc.

Margins of the artificial ponds have varied mixtures of common shoreline and wetland species, including *Carex* spp. (*frankii, vulpinoidea*), *Cyperus strigosus*, *Juncus* spp. (*acuminatus, effusus*), *Lindernia dubia, Penthorum sedoides, Persicaria* spp. (*lapathifolia, punctata*), *Sida spinosa*.

Lawler Bend: old artificial pond with brushy edges on terrace in southern part of project area.

Lawler Bend: shallow pond in field on terrace; *Cyperus, Lindernia, Penthorum, Persicaria* etc

Lawler Bend: marshy meadow at back of bottomland field, with much *Carex conjuncta*.
Next page: nearby area dominated by *Phalaris arundinacea*, possibly native to this region.