

# THE STABILIZATION OF A GULLY BY NATURAL FOREST SUCCESSION

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**ABSTRACT.**—In an abandoned pasture in Rockvale Township of Ogle County, Illinois, there is an old gully formed during a period of cultivation between 1835 and 1900. It is about 1300 feet long, varies in width from five to 100 feet and ranges to a depth of 15 feet. A photograph of 1904 shows a few scattered clumps of small trees in the gully. Today it is obscured by many mature trees and abundant undergrowth. A survey of gully trees in 1958 revealed box elder to be the most abundant, with black walnut, red elm, and American elm following. In 1969, red elm and black walnut shared dominance, with hackberry, black oak, box elder, black cherry and American elm next. Most of the older box elder were dead. The American elm had increased substantially in total number, but one-half were dead of Dutch elm disease. Most red elm were unaffected by the disease. The number of tree species increased from 13 to 21 during the years 1958 to 1969. Many new species of forest-related herbaceous plants had appeared. It is evident that in a period of about 70 years the gully has become stabilized and revegetated with numerous forest species and is developing rapidly into a mature deciduous forest condition.

Few ecological studies of secondary succession give any attention to the development of natural vegetation in gullies. Most are concerned with abandoned agricultural land. In some studies the recovery of a gully may be mentioned incidentally.

Oosting (1942) reported that, in the Piedmont, natural vegetation of gullies is very slow if head erosion continues. Eventually, the typical herbs and legumes of the old field appear. Marks (1942) also reported slow recovery of gullies in Wisconsin, with local weeds followed by perennial grasses and herbs. Early woody vegetation consisted of *Rubus*, *Ribes*, and *Prunus*

*virginiana* with elder (*Sambucus*) and black locust (*Robinia*) developing on the upper gully slopes. In a gully thicket in Michigan, Brewster et al. (1969) found black locust as dominant tree associated with various shrubs, vines, and herbs.

Since no detailed analysis of the vegetation of a stabilized gully has been found in the literature, the author will attempt to show what has happened in recent decades in a northern Illinois setting.

## DESCRIPTION OF STUDY AREA

A detailed account of the study site has previously been reported (Bullington, 1970). Only a brief description will be included here. The main features are shown in Figure 1.

An old pasture of approximately 30 acres is located on property known as The Stronghold, owned by the Presbyterian Camping Association of Northern Illinois. The field is in the center of section 33 of Rockvale Township (T 24 N. R 10 E.), Ogle County, Illinois. The site is on a hillside to the west of the Rock River Valley extending westward from Illinois Highway 2 north of the town of Oregon.

The gully is the dominant feature of the old pasture, extending from the center to the eastern edge, a distance of about 1300 feet, and dropping from an elevation of about 780 feet at the west end to 710 at the east. At the gully head it rapidly deepens to about 15 feet below the adjacent ground level and varies in width from a few to about 30 feet. As it progresses to less steep terrain, it becomes quite shallow and broadens to about 100 feet.

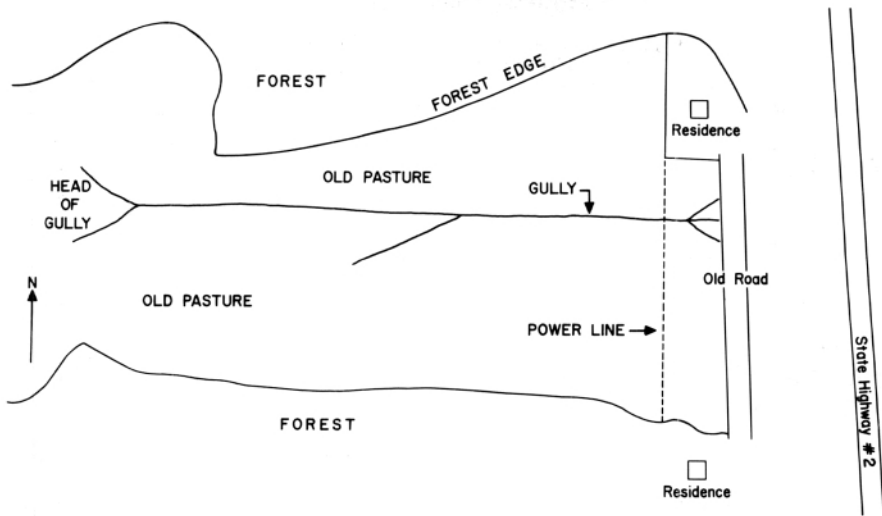


FIGURE 1. The study area at The Stronghold, Oregon, Illinois.

Portions of the upper part are cut down to bedrock of Platteville limestone, while the lower part has considerable areas of deposited silt and debris. At various places, the gully has been partially filled with old fence wire, farm machinery, and other debris. Little visible erosion has occurred in the past 20 years except for some shallow channels cut in the sediments of the lower part of the gully.

The hillside field was cleared of forest and cultivated by pioneers starting soon after 1835. Decades of cultivation resulted in extensive erosion of the field, with removal of all topsoil and the formation of the large central gully with a few small branches. Sometime before 1900, the field was seeded to bluegrass (and perhaps other grasses and legumes) and used for pasture until 1948. No domestic livestock has disturbed the field since. The entire field has undergone rapid secondary succession since 1948, with distinct competition between forest and prairie vegetation (Bullington, 1970).

A photo published in 1904 shows the gully quite clearly with a few clumps of small trees in limited areas. By the time of an aerial photo of 1939, there was a distinct cover of trees present over most of the gully.

#### PROCEDURE AND OBSERVATIONS

The author's first observation of the gully vegetation was in 1958 (Table 1). In all there were 551 trees counted, with box elder (*Acer negundo*) accounting for 295, or 53.5%. The likely seed source was box elders along the old roadway at the foot of the gully, a few of which were present in the 1904 photo. They are uncommon in the forest both to the north and the south of the field. Everywhere in the field, however, box elder is prominent in the new growth. Evidently the seeds can be dispersed a considerable distance, and the seedlings develop readily in an open area. The box elder is a common pioneer tree.

The 1958 survey showed that walnut (*Juglans nigra*) was next in

TABLE 1. Trees found in the gully of Strong field by reconnaissance survey in summer of 1958.

Species	Number	Percent of Total
<i>Acer negundo</i>	295	53.5
<i>Juglans nigra</i>	95	17.2
<i>Ulmus rubra</i>	35	6.4
<i>Ptelea trifoliata</i>	23	4.2
<i>Ulmus americana</i>	18	3.3
<i>Populus grandidentata</i>	17	3.1
<i>Malus ioensis</i>	16	2.9
<i>Carya ovata</i>	15	2.7
<i>Crataegus mollis</i>	11	2.0
<i>Prunus serotina</i>	10	1.8
<i>Quercus velutina</i>	9	1.6
<i>Celtis occidentalis</i>	6	1.1
<i>Prunus americana</i>	1	.2
Total	551	100.0

abundance with 95 trees, or 17.2%. Shagbark hickory (*Carya ovata*) and black oak (*Quercus velutina*) were represented by a small number of trees. Both could have been introduced from the mature forest about 200 feet to the north by the activity of squirrels.

Increment borer cores were taken of the larger trees in the gully in 1959 and 1963 (Table 2). Cores were collected and studied from walnut, box elder, American and red elms (*Ulmus americana* and *U. rubra*), black oak, large-toothed aspen (*Populus grandidentata*), and black cherry (*Prunus serotina*). The trees ranged in estimated age from 25 to 40 years. It was determined that they became established in the years between 1914 and 1933, a period when the field was used for pasturing and hay meadow. It is not known whether the trees present in the 1904 photo were still alive when the check on age was made.

Between 1958 and 1969, the gully was visited frequently at various seasons. The presence of new species of plants was often noted but no statistical information was gathered. During the eleven-year period the gully vegetation matured and took on a more forest-like aspect.

It was obvious that new forest species of herbs and woody plants were becoming established.

In October of 1969 a detailed survey of the trees of the gully was undertaken. Because there was no uniformity in distribution of species, a complete count of all trees was made. Starting at the upper west end, ten-foot wide strips were marked off with string. Not only were the trees of the gully included, but also those to a distance of ten feet on each side of the banks. This was roughly the point of division between the adjacent old-field vegetation and that of the eroded gully.

Trees were tallied by species and by size classes. Size was measured in inches of diameter at four and a half feet above the ground (dbh). Five size classes were arbitrarily selected (under 1 inch, 1-6 inches, 6-9 inches, 9-12 inches, and over 12 inches). Separate records were kept of the west one-half and the east one-half because of differences in both terrain and species.

Because of considerable mortality among a few species, dead trees were recorded. Numerous American elms were dead from the Dutch elm disease. This was not present in the earlier survey of 1958. Many

TABLE 2. Age estimates of gully trees by increment borer samples at 4-1/2 feet height.

Year Taken in October	Species	Estimated Age at 4-1/2 Feet	Estimated Date of Establishment
1959	<i>Juglans nigra</i>	40	1914
1959	<i>Ulmus americana</i>	30	1924
1959	<i>Acer negundo</i>	30	1924
1963	<i>Quercus velutina</i>	40	1918
1963	<i>Ulmus americana</i>	35	1923
1963	<i>Juglans nigra</i>	30-35	1923-28
1963	<i>Ulmus americana</i>	30	1928
1963	<i>Populus grandidentata</i>	30	1928
1963	<i>Quercus velutina</i>	30	1928
1963	<i>Acer negundo</i>	25-30	1928-33
1963	<i>Ulmus americana</i>	25-30	1928-33
1963	<i>Prunus serotina</i>	25	1933
1963	<i>Ulmus rubra</i>	25	1933

box elders were also dead, presumably from shading and age.

The results of the 1969 survey are given in Table 3. Thirty percent of the total were under one inch dbh. Over 53% were between one and six inches. New trees were much more abundant in the west half of the gully, where 17 species were in the smallest size category and 15 in the second group. In the east half, there were 11 and 10 species in the two smallest size groups. The west half of the gully has more of the appearance of a forest, with a well-developed crown and open understory. The east half, much broader and with more silt deposits, is quite open, with more scattered trees and a heavy ground cover of brambles and vines which are almost impenetrable in places. Seedling trees have a better chance of surviving in the west half.

The total number of species in 1969 was 21. Only 13 were recorded in 1958. All but one of the new species of 1969 were represented by young trees under 6 inches dbh. The exception was white oak (*Quercus alba*) with two trees between 6 and 12 inches. They were located along the margin where they were not counted in 1958.

Abundant new reproduction has occurred with red elm, black oak, hackberry (*Celtis occidentalis*), and the black cherry in the west end only. There are mature trees of these species for seed sources in the west end but not in the east end, except for one red elm. On the other hand, the black walnut is reproducing heavily in both areas. Mature trees are abundant throughout the gully, but there are more in the east end where walnut reproduction is the heaviest. It is likely that a portion of the lower east end of the gully will eventually develop into a dominant black walnut forest.

In order to compare reproduction in the gully with that in a mature forest on the north side of the old field, only a distance of 300 feet from the gully at the east end, and 100 feet at the west end, a count was made of the trees in a marginal 50-foot strip running parallel with the gully. The north forest strip is 1000 feet long and is the fence-row margin of an extensive mature upland oak forest, probably of the type that was cleared from the old-field area in the 1830's. The north strip was assumed to be close enough to have had significance as an early seed source for the gully.

TABLE 3. Number of trees in gully by size classes (Oct. 1969).

Size Classes*	-1		1-6		6-9		9-12		12+		Total	%
Location**	W	E	W	E	W	E	W	E	W	E		
Species												
<i>Acer negundo</i> (living)	7	9	27	27	2	2		3		2	79	7.3
<i>Acer negundo</i> (dead)			9	31	4	18	5	1		3	71	
<i>Acer saccharum</i>	1	1									2	.2
<i>Carya ovata</i>	12		48		6						66	6.1
<i>Catalpa speciosa</i>			1								1	.1
<i>Celtis occidentalis</i>	27	30	34	16	5		1				113	10.4
<i>Crataegus mollis</i>	3	1	1	1							6	.6
<i>Fraxinus americana</i>	1		3	1							5	.5
<i>Juglans nigra</i>	37	46	39	75	7	7	9	13	2	9	244	22.4
<i>Juniperus virginiana</i>	8		2								10	1.0
<i>Malus ioensis</i>	17		1	5							23	2.1
<i>Populus grandidentata</i>	2		22		1		5				30	2.8
<i>Prunus americana</i>	2										2	.2
<i>Prunus serotina</i>	19	3	32	10	9		3		1		77	7.1
<i>Prunus virginiana</i>	15	4									19	1.7
<i>Ptelea trifoliata</i>		2									2	.2
<i>Quercus alba</i>					1		1				2	.2
<i>Quercus macrocarpa</i>	1		1								2	.2
<i>Quercus velutina</i>	34	2	17	7	9		10		4		83	7.6
<i>Ulmus americana</i> (living)	3	7	15	26	2	6	3	1		1	64	5.9
<i>Ulmus americana</i> (dead)		1	21	11	21	1	3		2		60	
<i>Ulmus rubra</i> (living)	69	4	136	31	7	1	8		1		257	23.6
<i>Ulmus rubra</i> (dead)							1		1		2	
<i>Viburnum lentago</i>		1					1		1		1	.1
Sub-totals (Living)	258	110	379	199	49	16	40	17	8	12	1088	100.3
Totals by Size Class	368		578		65		57		20		1088	
Percent of All Trees (Living only)	33.8		53.1		6.0		5.3		1.8		100	

\*dbh in inches

\*\*W = west half of gully, on upper slope

E = east half of gully, on lower slope

Note: Dead trees of three species are not included in table totals. Numbers not totalled are italicized.

TABLE 4. Trees of gully in order of abundance in 1969 compared with 1958 and with rank in adjacent areas.

No. in Gully 1969	Species	Rank Gully 1969	Rank Gully 1958	Rank in Old Field		Rank in Forest 1969	Rank in Old Road 1970
				1959	1970		
257	<i>Ulmus rubra</i>	1	3	3	2	3	4
244	<i>Juglans nigra</i>	2	2	2	1	8	2
113	<i>Celtis occidentalis</i>	3	12			5	3
83	<i>Quercus velutina</i>	4	11	5	4	2	
79	<i>Acer negundo</i>	5	1	1	4	9	1
77	<i>Prunus serotina</i>	6	10	10	11	7	4
66	<i>Carya ovata</i>	7	8	9	10	1	8
64	<i>Ulmus americana</i>	8	5	7	9		4
30	<i>Populus grandidentata</i>	9	6	11	7	6	
23	<i>Malus ioensis</i>	10	7	6	3		9
19	<i>Prunus virginiana</i>	11					7
10	<i>Juniperus virginiana</i>	12					
6	<i>Crataegus mollis</i>	13	9	4	8		
5	<i>Fraxinus americana</i>	14					
2	<i>Acer saccharum</i>	15					
2	<i>Quercus macrocarpa</i>						
2	<i>Quercus alba</i>				12	4	
2	<i>Prunus americana</i>		13	7	6		
2	<i>Ptelea trifoliata</i>		4				
1	<i>Viburnum lentago</i>						
1	<i>Catalpa speciosa</i>	21					
1088	Total Species Present	21	13	11	12	9	9

The same size classes were used in the forest count as in the gully. The survey was also made in October of 1969. The details of this survey will be reported in another paper. Brief mention will be made here of pertinent information. Black oaks and the shagbark hickory were discovered to be the dominant trees of this forest. Most of the recent reproduction was hickory. There were few walnuts.

Table 4 compares the various areas studied in terms of rank order based on total numbers of each species. There were only nine species in the 50-foot strip at the edge of his forest. This pattern continues through the forest. Table 4 also compares the gully trees with those of the adjacent old field to the north recorded in two quadrat surveys in 1959 and 1970. This narrow strip of former pasture separates the gully from the forest. It varies from 100 to 300 feet in width, with the nar-

row end to the west. Its principal species were the black walnut and red elm. The strip had 11 species in 1959 and 12 in 1970.

Also compared with the gully is a 420-foot strip of abandoned road running at right angles to the east end of the gully. This old gravel road has been undisturbed since 1922 except for a mowed path down the center. Large trees now arch overhead. The old road right-of-way is approximately 60 feet wide. A count of the road trees in 1970 showed that box elder was the most abundant. Except for the absence of the black oak, the top five species of the roadway were the same group as the top six of the gully, although the rank order was different (see Table 4).

No detailed analysis of shrubs and vines has been made, although they are now a prominent part of the ground cover in portions of the

gully. The 14 species identified are listed in Appendix I.

As the forest of the gully matures, there is a steady invasion of herbaceous plants, particularly the spring ephemerals. The 50 species identified to date are listed in Appendix II.

Species common to disturbed areas, such as stinging nettle (*Urtica dioica*) and black snakeroot (*Sanicula gregaria*) have been common since the first observations were made. Species of rich woods, such as rattlesnake fern (*Botrychium virginianum*), purple trillium (*Trillium recurvatum*), may apple (*Podophyllum peltatum*), and Solomon's Seal (*Polygonatum biflorum*) have entered recently.

Of special interest are the two orchids found in the gully, each in the type of habitat described for it in Gray's *Manual of Botany* (Fernald, 1950). The broad-leaved twayblade (*Liparis lilifolia*) was found in 1970 in the more open, drier, upper part of the gully. It had been established nearby for several years in a young thicket of trees in the old field.

The showy orchis (*Orchis spectabilis*) was first reported about 1958 in a moist wooded area across the old roadway from the east end of the gully. By 1970 it was abundant in the more mature central portions of the gully. Fell (1955) reported the two orchids growing together in a woods in adjacent Winnebago County.

Most herbaceous species listed in Appendix II are in the type of habitat and associated with the typical tree species reported by Swink (1969) for northern Illinois counties.

#### DISCUSSION

The eleven-year period from 1958 to 1969 was a time of rapid change and development of the gully vegetation. The area had progressed

from an open gully in 1900, still subject to erosion, to a fairly stable deciduous forest situation in about seven decades.

Some distinct changes have occurred in the species of trees. A few were disappearing. The wafer ash (*Ptelea trifoliata*), number four in abundance in 1958, dwindled to two specimens in 1969. Heavy shading no doubt accounted for its demise. It is still common in the open parts of the old field.

Box elder, a common pioneer tree dominant in the old field and also in the gully in 1958, was rapidly dying. Most of the box elders over six inches dbh were dead. The smaller specimens recorded were mostly sprouts from the base of dead or dying trees.

The American elm is dying from the Dutch elm disease, with about one-half of the trees dead. It is decreasing in rank, going from 5th to 8th, but the actual percentage of American elm trees is increasing (3.3% to 5.9%). There is still active reproduction of this species.

Red elm is reproducing vigorously, especially in the west end of the gully. It has moved from third rank with 6.4% to first place in 1969 with 23.6% of the total of 1088 live trees in the gully. Only two large trees were found dead. Apparently at this midpoint in succession, red elm is an important species. So far, it does not seem very susceptible to the disease that is decimating the American elm.

Downy haw (*Crataegus mollis*) is not surviving well in the shade of the gully. The few remaining specimens are quite small. Wild crabapple (*Malus ioensis*), a common pioneer associated with the haw, is still a common understory tree in the gully. However, it ranked in tenth place there in 1969 compared to a third place rank in the adjacent field. It was absent from the adja

ent mature forest sample. As shading increases, the haw and crab apple will probably disappear from the gully.

The increase in some tree species is quite marked. Hackberry has moved from near the bottom of the 1958 list to third place in 1969, with 0.4% of the total trees. There is very heavy reproduction of the hackberry. However, the saplings are being damaged or killed at a rapid rate by winter girdling by rabbits.

Black oak has assumed a prominent place in recent years. It is co-dominant with hickory in the nearby forest and shows signs of assuming this same place in the gully, at least in the west half. Hickory is also increasing in prominence. There is active reproduction of both species.

Black walnut, actively reproducing and accounting for 22.4% of the total trees in 1969, is a rather surprising contender for future dominance of the gully forest. It is rather infrequent in the mature forest. However, it is known that mature trees have been selectively logged from the forest in the past. Black walnut is known to have an inhibiting effect upon other species. Perhaps it is the presence of walnut that is hastening the death of box elder. The two grow in the same habitat. Another species that is increasing in abundance is the black cherry. A few mature trees provide the abundant seeds for proliferation of this tree.

The improvement of the gully environment as a habitat for forest trees is indicated by the rapid increase in total species to 21. No other area sampled has more than a dozen species. Some of the recently invading species are probably random or accidental seedings of no significance. Catalpa (*Catalpa peciosa*) is not likely to multiply,

and the two specimens of burr oak (*Quercus macrocarpa*) may be the only ones that enter. Red cedar (*Juniperus virginiana*) has been spread from open-grown trees in the old field. It will not do well in the shade. The newly reported choke cherry (*Prunus virginiana*) may have been overlooked in 1958. It will not be more than an understory tree.

Two new species are of special interest, even though their numbers are small. Two sugar maple (*Acer saccharum*) saplings have appeared. This tree of the climax deciduous forest is abundant in a forest valley only a few hundred yards south of the gully. Also from the forest valley have come at least five young white ash (*Fraxinus americana*). Four specimens have passed the 1 inch dbh mark and show promise of future development.

It should be noted that nine of the ten most abundant trees in the gully are also among the most common invaders of the adjacent bluegrass old field. The exception is hackberry, which is absent from the field. Two species common as pioneers in the old field, downy haw and wild plum (*Prunus americana*) are rare in the gully. As noted before, shading is probably the limiting factor.

#### CONCLUSION

In six or seven decades, an open gully has become stabilized by natural vegetation and has progressed to a mid-successional stage of deciduous forest development. There is active reproduction of numerous tree species. Many herbaceous plants, typical of rich deciduous woods, have become established under the mature trees. There is evidence that the rate of development is increasing. A few more decades may result in a near-climax



deciduous forest in a stabilized condition.

The observations of this study have implications for gully management in deciduous forest areas. Planting an exotic species is a common practice in the management of waste areas such as gullies. It is suggested that such places be permitted to develop naturally through the processes of secondary succession, especially if good seed sources are in the vicinity.

Two circumstances that have existed in the Strong old-field situation are no doubt of considerable importance. The eroded field surrounding the gully was planted to grass, thus stabilizing the soil of the area and reducing runoff of water. At a later time, livestock were excluded from the area. With these aids in management, natural processes have succeeded.

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#### APPENDIX I. SHRUBS AND VINES OF GULLY

*Berberis Thunbergii* DC  
*Lonicera prolifera* (Kirchn.) Rehd.  
*Lonicera* sp.  
*Parthenocissus quinquefolia* Planch.  
*Rhamnus cathartica* L.  
*Rhus glabra* L.  
*Rhus radicans* L.  
*Ribes missouriense* Nutt.  
*Rubus allegheniensis* Porter  
*Rubus occidentalis* L.  
*Sambucus canadensis* L.  
*Smilax tamnoides* L. *hispida* (Muhl.) Fern.  
*Viburnum trilobum* Marsh.  
*Vitis riparia* Michx.

Japanese barberry  
 grape honeysuckle  
 honeysuckle (ornamental)  
 Virginia creeper  
 common buckthorn  
 smooth sumac  
 poison ivy  
 wild gooseberry  
 blackberry  
 black raspberry  
 common elderberry  
 bristly greenbrier  
 highbush cranberry  
 riverbank grape

## APPENDIX II. HERBACEOUS PLANTS OF GULLY

Note: The identification of the herbaceous plants of the gully is an on-going project. Some of the plants listed are tentatively identified and require examination at other times of the year than when seen, especially at flowering time. No attempt has been made to sort out the species of certain genera, as *Aster* and *Solidago*. On each visit to the gully, new species are discovered and no doubt there will be new ones found in the future. Some plants have undoubtedly been missed. As the environment changes, there will be new invaders for future discovery.

<i>Agrimonia gryposepala</i> Wallr.	tall agrimony
<i>Ambrosia artemisiifolia</i> L.	common ragweed
<i>Ambrosia trifida</i> L.	great ragweed
<i>Aquilegia canadensis</i> L.	wild columbine
<i>Atractium minus</i> (Hill) Bernh.	common burdock
<i>Arenaria laterifolia</i> L.	blunt-leaved sandwort
<i>Arisaema triphyllum</i> (L.) Schott	Jack-in-the-pulpit
<i>Aster</i> sp.	aster
<i>Asplenium</i> sp.	lady fern
<i>Barbarea vulgaris</i> R. Br.	yellow rocket
<i>Cheilanthes virginianum</i> (L.) Sw.	rattlesnake fern
<i>Brassica nigra</i> (L.) Koch	black mustard
<i>Cacalia atriplicifolia</i> L.	pale Indian-plantain
<i>Carex pennsylvanica</i> Lam.	sedge
<i>Desmodium glutinosum</i> (Muhl.) Wood (?)	tick-trefoil
<i>Dodecatheon meadia</i> L.	shooting-star
<i>Eupatorium perfoliatum</i> L. (?)	common boneset
<i>Eupatorium purpureum</i> L.	Joe-pye-weed
<i>Erigeron virginiana</i> Duchesne	wild strawberry
<i>Galium aparine</i> L.	bedstraw
<i>Galium circaeazans</i> Michx.	wild licorice
<i>Galium trifidum</i> L.	small bedstraw
<i>Galium canadense</i> Jacq.	white avens
<i>Geranium maculatum</i> L.	wild cranesbill
<i>Helianthus</i> sp.	sunflower
<i>Hydrophyllum virginianum</i> L.	Virginia waterleaf
<i>Impatiens</i> sp.	Jewelweed
<i>Liparis lilifolia</i> Richard	broad-leaved twayblade
<i>Mertensia virginica</i> (L.) Pers.	Virginia bluebells
<i>Monarda fistulosa</i> L.	wild bergamot
<i>Orchis spectabilis</i> L.	showy orchis
<i>Osmorhiza Claytoni</i> (Michx.) C. B. Clarke	hairy sweet cicely
<i>Pastinaca sativa</i> L.	parsnip
<i>Plantago major</i> L.	common plantain
<i>Podophyllum peltatum</i> L.	mayapple
<i>Polygonatum biflorum</i> (Walt) Ell.	Solomon's seal
<i>Ranunculus abortivus</i> L.	kidneyleaf buttercup
<i>Ranunculus hispidus</i> Michx. (?)	bristly buttercup
<i>Rudbeckia laciniata</i> L.	golden-glow
<i>Ranuncula gregaria</i> Bickn.	black snakeroot
<i>Scrophularia marilandica</i> L.	late figwort
<i>Senecio aureus</i> L. (?)	golden ragwort
<i>Silphium laciniatum</i> (L.) Desf.	false spikenard
<i>Silphium laciniatum</i> (L.) Desf.	starry false Solomon's seal
<i>Silphium lasioneura</i> Hook.	carrion flower
<i>Solidago</i> sp.	goldenrod
<i>Taraxacum officinale</i> Weber	common dandelion
<i>Thalictrum dasycarpum</i> Fisch. & Lall.	purple meadow-rue
<i>Trillium recurvatum</i> Beck	purple trillium
<i>Triosteum perfoliatum</i> L.	wild coffee
<i>Urtica dioica</i> L.	stinging nettle
<i>Viola pennsylvanica</i> Michx.	smooth yellow violet
<i>Viola papilionacea</i> Pursh	common blue violet