

Biological Assessment
of the
Lowell Trace Property

by

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June 15, 1988

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I. Introduction

In the winter of 1988, development of the Lowell Trace property on Avery Road began. A portion of the park land given to the City of Dublin, associated with the development, is designated to be a natural area preserve. Development of the site has been reduced 50% from initial plans allowing more land to come under Parks and Recreation supervision with the provision of being included in a natural area preserve. The park will provide passive recreation opportunities for the community. The proposed bikeway will traverse sections of the park. The proposed park includes woodland, riparian, and meadow habitats. In order to develop management strategies for the park, the Dublin Parks and Recreation Department ordered an inventory of the area to assess wildlife and plant resources. This report documents the occurrence of wildlife, particularly bird, and plant species on the site and presents management considerations of these resources.

II. Study Area and Methods

A. Property Description

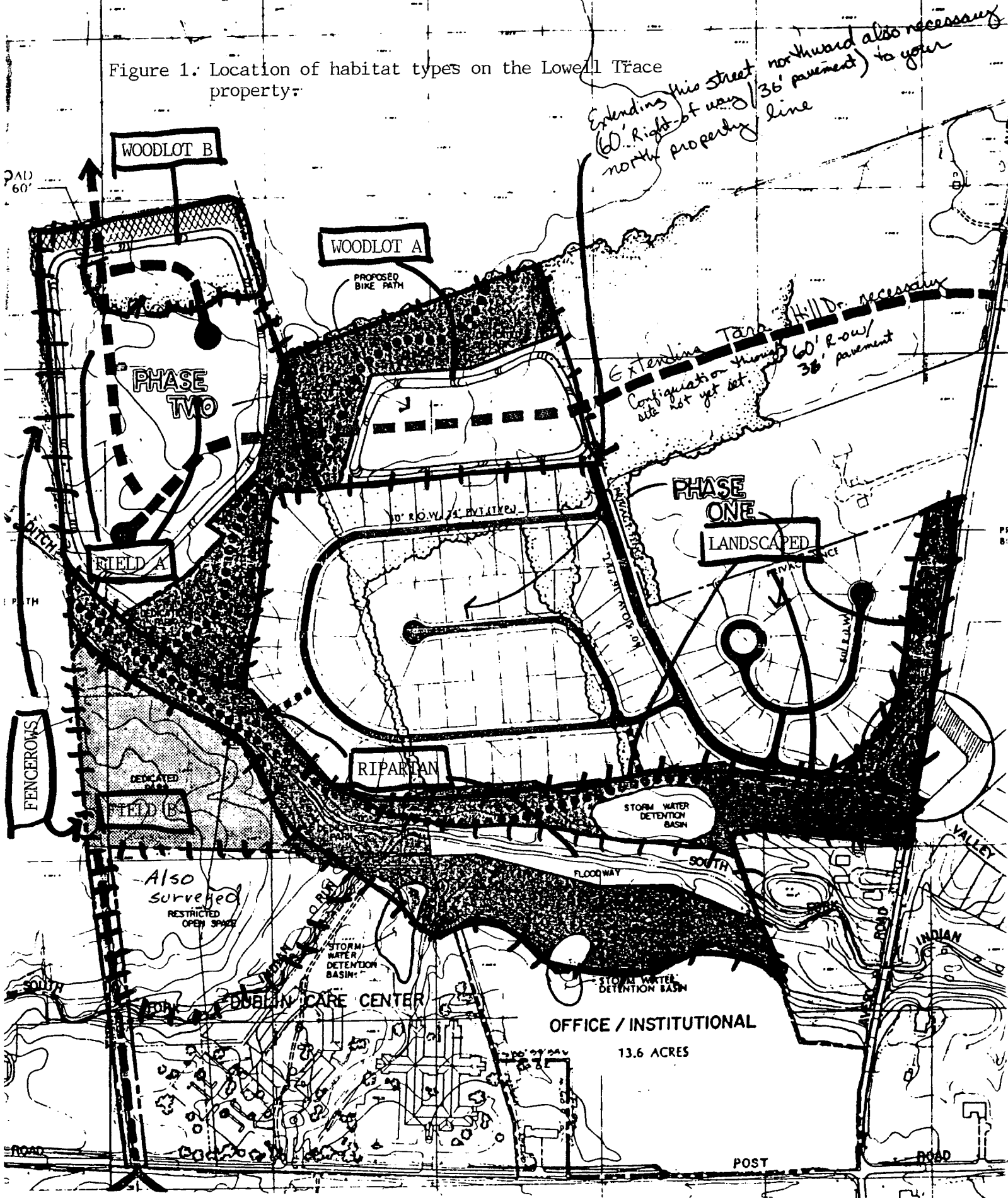
The Lowell Trace property encompasses approximately 90 acres along Avery Road within the City of Dublin, Ohio. Proposed park land totals 56 acres. Of the total park acreage, 39% (22 acres) is old field, 23% (13 acres) is woodlot, 14% (8 acres) is riparian, and 23% (13 acres) will be landscaped (Figure 1). An additional 6 acre field was surveyed adjacent to field B. Old fields consist of abandoned farm fields that have been colonized

by composites and other wildflowers. Riparian habitats are composed of trees and shrubs lining the small stream (Indian Run) that bisects the property. Woodlots are defined as forested areas where the trees form a complete canopy. Several vegetated fencerows bound the perimeter of the park. A small retention pond lies on park property and several other planned ponds will be partially included on park property.

B. Survey Methods

Three surveys were conducted from May 11 to June 1. Surveys were conducted between 6:30 a.m. and 10:30 a.m. One additional orientation visit was made in late afternoon on April 29. A walking route was chosen that bisected all areas of the proposed park land. The same route was followed on each additional visit. During a survey, all bird species that were heard or seen were recorded. Locations of birds were noted as: woodlot, stream, riparian, fencerow, or field. Birds seen on peripheral areas to the park, including nearby residences, were also noted. Behaviors that indicated that birds might be breeding in the vicinity were recorded. Casual observations of mammals were recorded during surveys. During one survey (5/19), I was accompanied by the Dublin Parks and Recreation Department Horticulturist, Sarah McClellan, who greatly aided in plant identification. Most of the information on woody plants was collected during this survey. Notes on flowering plants were made during the entire survey period.

Figure 1. Location of habitat types on the Lowell Trace property.



C. Breeding Bird Status Determination

To determine breeding status of birds observed on the site, Breeding Bird Atlas criteria were used (Palmer-Ball and Evans 1985). The following three breeding status codes were assigned to birds found at Lowell Trace:

- PO - possible breeder, bird is known to breed central Ohio but was observed too few times or did not exhibit breeding behavior when observed at Lowell Trace;
- PR - probable breeder, pairs were observed or males were found consistently singing from the same spot;
- CO - confirmed breeder, adults seen on nest, building nest, entering nest cavity, or carrying food to the young.

III. Results

A. Migrant Birds

Seventy-four species of birds were recorded during 12 hours of surveys. Migrant species (those not breeding in this part of Ohio) contributed to 38% (28) of the bird species found. Most of these species are found in Ohio during brief periods in spring and fall. Fifteen of these migratory species were wood warblers and were most frequently found in the two woodlots. One wood warbler, the golden-winged warbler, is considered a fairly rare spring migrant in the state (Peterjohn et al. 1987). Migrant bird species observed, habitat, and dates of occurrence are given in Table 1. Common names follow the A.O.U. (1983).

Table 1. Habitat and occurrence of migrant bird species observed on the Lowell Trace property.

Species	Habitat	4/29	5/11	5/19	6/1
Canada Goose	Aerial				X
Turkey Vulture	Aerial	X	X		
American Woodcock	Stream	X			
Spotted Sandpiper	Stream	X			
Solitary Sandpiper	Stream	X	X		
Ruby-throated Hummingbird	Riparian			X	
Acadian Flycatcher	Woodlot			X	
Least Flycatcher	Woodlot		X	X	
Warbling Vireo	Riparian			X	
Golden-winged Warbler	Woodlot		X		
Tennessee Warbler	Woodlot		X	X	
Chestnut-sided Warbler	Woodlot		X	X	
Magnolia Warbler	Woodlot			X	
Cape May Warbler	Woodlot			X	
Black-throated Blue Warbler	Woodlot		X		
Yellow-rumped Warbler	Woodlot		X		
Black-throated Green Warbler	Woodlot		X	X	
Blackburnian Warbler	Woodlot		X		
Bay-breasted Warbler	Woodlot			X	
Blackpoll Warbler	Woodlot		X	X	
Black-and-White Warbler	Woodlot		X	X	
American Redstart	Woodlot		X	X	
Ovenbird	Woodlot			X	

Table 1 (cont.)
Species

Species	Habitat	4/29	5/11	5/19	6/1
Wilson's Warbler	Riparian			X	
Vesper Sparrow	Field		X	X	
White-crowned Sparrow	Fencerow		X	X	
White-throated Sparrow	Woodlot	X			
Swamp Sparrow	Stream	X			

B. Breeding Birds

Breeding birds represented 62% (46) of the species observed. Of the 46 species suspected of breeding on the site, 8 (17%) were possible breeders, 23 (50%) were probable breeders, 9 (20%) were confirmed breeders, and 6 (13%) bred in peripheral areas to the park. Breeding status, abundance, and habitat are given for all breeding species in Table 2. Abundance reflects the maximum number of pairs or singing males observed during a single survey or in the case of possible breeders, the number of surveys that it was observed. Field sparrows were by far the most abundant breeding species found at Lowell Trace. Field sparrow density of 1.08 birds/acre exceeds that for any of six fields I studied at Batelle-Darby Creek Metro Park last year (Andres 1988). Song sparrows were the second most abundant species (0.65 birds/acre) and also exceeded Batelle-Darby Creek densities.

Table 2. Status, Habitat, and abundance of breeding bird species observed on the Lowell Trace property (* = peripheral breeders)

Species	Status	Abundance	Habitat
Green-backed Heron	Possible	+	Stream
Mallard	Probable	1	Stream
Red-tailed Hawk	Probable*	1	Riparian
Killdeer	Possible	++	Field
Yellow-billed Cuckoo	Probable	1	Woodlot
Mourning Dove	Probable	2	Fencerow
Great Horned Owl	Possible	+	Riparian
Chimney Swift	Possible*	+++	Aerial
Red-bellied Woodpecker	Confirmed	2	Woodlot
Downy Woodpecker	Probable	1	Woodlot
Hairy Woodpecker	Probable	1	Woodlot
Northern Flicker	Confirmed	2	Woodlot, Riparian
Eastern Wood-Pewee	Probable	2	Woodlot
Willow Flycatcher	Probable	2	Fencerow
Great-crested Flycatcher	Probable	1	Woodlot
Barn Swallow	Possible*	+++	Aerial
Blue Jay	Probable	2	Woodlot
American Crow	Possible	+++	All
Carolina Chickadee	Probable	1	Woodlot
Tufted Titmouse	Probable	2	Woodlot
White-breasted Nuthatch	Probable	1	Woodlot
House Wren	Probable	5	Fencerow, Woodlot

Table 2 (cont.)
Species

Species	Status	Abundance	Habitat
Eastern Bluebird	Probable	1	Riparian
Wood Thrush	Probable	2	Woodlot
American Robin	Confirmed	6	Woodlot, Riparian
Gray Catbird	Probable	3	Fencerow, Woodlot
Brown Thrasher	Possible	++	Fencerow
European Starling	Confirmed	3	Riparian, Woodlot
Red-eyed Vireo	Probable	3	Woodlot
Yellow Warbler	Probable	1	Riparian
Common Yellowthroat	Probable	3	Fencerow, Woodlot
Scarlet Tanager	Possible	1	Woodlot
Northern Cardinal	Confirmed	4	Woodlot, Fencerow
Indigo Bunting	Probable	7	Riparian, Woodlot Fencerow
Rufous-sided Towhee	Confirmed	2	Woodlot
Chipping Sparrow	Probable*	1	Residential
Field Sparrow	Confirmed	15	Field, Fencerow
Song Sparrow	Confirmed	9	Field, Fencerow
Red-winged Blackbird	Probable	2	Fencerow, Field
Eastern Meadowlark	Probable*	1	Field
Common Grackle	Possible	+++	All
Brown-headed Cowbird	Probable	5	Fencerow, Woodlot
Northern Oriole	Confirmed	2	Woodlot, Riparian
House Finch	Probable	2	Riparian, Fencerow
American Goldfinch	Probable	7	Field, Riparian
House Sparrow	Probable*	2	Residential

Table 3 presents ecological categories of breeding bird species and their abundances. Only species of probable and confirmed breeding status are included in Table 3. Peripheral breeding species are also excluded. Edge category includes species that nest in fencerows or along riparian corridors and use open areas for feeding or other activities. This contrasts to woodlot species that confine their feeding and nesting activities to the interior of the woodlot. Field species nest and feed in open areas but may use fencerows for singing perches. From this analysis, edge habitats appear to support the greatest numbers of species and individuals. This is generally thought to be due to the greater vertical vegetation diversity that is created along the interface of field and woodlands. This directly relates to greater space available for birds to nest and feed. Woodlots are similar to edge habitats in diversity but have one-half the numbers of breeding individuals. The number of edge species found at Lowell Trace is what could be expected in central Ohio. Woodlot species however, are underrepresented. Fields are the lowest in diversity but contain the two most abundant species found on the property. The lack of complexity the vertical stratification of field habitats leads to a low avian diversity. These results indicate that distinct avian assemblages occur within park lands and disturbance to any habitat would likely reduce overall bird diversity within the park. A list of all bird species observed in Dublin parks during the past two years is given in Table 6 at the end of the text.

Table 3. Ecological categorization and abundance of breeding bird species of Lowell Trace.

Habitat	Species	Abundance
Woodlots	13 species	20 pairs
	Yellow-billed Cuckoo	1
	Red-bellied Woodpecker	2
	Downy Woodpecker	1
	Hairy Woodpecker	1
	Northern Flicker	1
	Eastern Wood-Pewee	2
	Great-crested Flycatcher	1
	Bluejay	2
	Carolina Chickadee	1
	Tufted Titmouse	2
	White-breasted Nuthatch	1
	Red-eyed Vireo	3
	Rufous-sided Towhee	2
Edge	16 species	48 pairs
	Mourning Dove	2
	Northern Flicker	1
	Willow Flycatcher	2
	House Wren	5
	Eastern Bluebird	1
	American Robin	6
	Gray Catbird	3
	European Starling	3
	Yellow Warbler	1
	Common Yellowthroat	2
	Northern Cardinal	4
	Indigo Bunting	7
	Brown-headed Cowbird	5
	Northern Oriole	2
	House Finch	2
Fields	5 species	34 pairs
	Field Sparrow	15
	Song Sparrow	9
	Red-winged Blackbird	2
	American Goldfinch	7
	Common Yellowthroat	1

C. Mammals

Nine species of mammals were detected on the site by direct observation or track observation and are presented in Table 4. Common and scientific names follow Jones et al. (1982). These observations are quite preliminary and would be greatly expanded by a more thorough survey directed at mammal species. A live-trap sampling program would likely turn up several species of shrews, mice, and moles.

Table 4. Species of mammals detected on the Lowell Trace property.

Virginia Opossum (<u>Didelphis virginiana</u>)
Eastern Cottontail (<u>Sylvilagus floridanus</u>)
Woodchuck (<u>Marmota monax</u>)
Gray Squirrel (<u>Sciurus carolinensis</u>)
Fox Squirrel (<u>Sciurus niger</u>)
Red Fox (<u>Vulpes vulpes</u>)
Raccoon (<u>Procyon lotor</u>)
Long-tailed Weasel (<u>Mustela frenata</u>)
White-tailed Deer (<u>Odocoileus virginianus</u>)

D. Vegetation

A list of all plant species found on the site is presented in Table 5. Common and scientific names are taken from Newcomb (1977) and Wharton and Barbour (1971,1973). Species are grouped by herbaceous and woody categories. This list represents a cursory survey of the flora of Lowell Trace. I am certain the list would be expanded and refined with further work. Woodlots on the Lowell Trace property differ from those found at Avery Park. At Avery, American beech is a dominant component of the canopy. Lowell Trace woodlots are dominated by maples, ashes, basswood, and elms. Cottonwoods are scattered throughout the woodlots and black haw is a conspicuous component of the understory. Ground-level vegetation is dominated by bedstraw, trillium, waterleaf, and Solomon's plume. Prominence of these species is due to the moist conditions found in the woodlots of Lowell Trace. It appears that the woodlots, particularly the larger one (A), are periodically inundated. This is evidenced by the buttressing (enlarged area of trunk near the ground found in wetland trees) of trees, the presence of cottonwoods, and the profusion of trillium in the woodlots. In central Ohio, trillium is often found growing on the moist slopes of creek gorges. The population of large-flowered trillium and nodding trillium in the two woodlots probably exceeds 3000 individuals. Overall species composition is similar to that found in the moist woods of Inniswood Metro park.

Fencerows are dominated by wild black cherry and poison ivy. Occasional mulberries and hackberries are present. Riparian vegetation consists of cottonwoods, willows, box elder, and hackberries. Plants range from shrubby willows and honeysuckles to several large cottonwoods growing along Indian Run. Field plants are typical old field successional species. Remains of agricultural crops indicate that the fields were formerly used for corn production. Pioneer perennial species have since invaded the fields and have become well established. Young woody species, particularly cottonwood, have also begun to invade the fallow fields. Dominant perennial vegetation consists of goldenrod, asters, yellow goatsbeard, and other composites. Indian hemp and common mullein are also present. Because these species are well established, thistle abundance is low. Since most of these perennials bloom in mid-summer, species identification was somewhat limited. To refine the plant list of these old fields, a follow up visit by Sarah McClellan is planned for mid-July.

Table 5. List of plants found on the Lowell Trace property.

A. Herbaceous Plants

Grape-fern (Botrychium sp.)
Sensitive Fern (Onoclea sensibilis)
New York Fern (Thelypteris noveboracensis)
Horsetail (Equisetum sp.)
Bellwort (Uvularia perfoliata)
Yellow Trout-lily (Erythronium americanum)
Solomon's Plume (Smilacina racemosa)
Star-flowered Solomon's Seal (Smilacina stellata)
Solomon's Seal (Polygonatum biflorum)
Wild Hyacinth (Camassia scilloides)
Jack-in-the-pulpit (Arisaema atrorubens)
Green Dragon (Arisaema dracontium)
Large-flowered Trillium (Trillium grandiflorum)
Nodding Trillium (Trillium flexipes)
Moonseed (Menispermum canadense)
Umbrella Sedge (Cyperus sp.)
Yellow Nut-sedge (Cyperus sp.)
Swamp Buttercup (Ranunculus septentrionalis)
Evening Primrose (Oenothera biennis)
Rue Anemone (Anemonella thalictroides)
Thimbleweed (Anemone virginiana)
Teasel (Dipsacus sylvestris)
May-apple (Podophyllum peltatum)
Bloodroot (Sanguinaria canadensis)

A. Herbaceous Plants (cont.)

Cut-leaf Toothwort (Dentaria laciniata)
Virginia Waterleaf (Hydrophyllum virginianum)
Broad-leaved Waterleaf (Hydrophyllum canadense)
Yellow Wood Sorrel (Oxalis europaea)
Wild Blue Phlox (Phylox divaricata)
Wild Geranium (Geranium maculatum)
Common Milkweed (Asclepias syrica)
Spring Beauty (Claytonia virginica)
Spring Cress (Cardamine bubosa)
Shepard's Purse (Capsella bursa-pastoris)
Greek Valerian (Polemonium reptans)
Wild Parsnip (Pastinaca sativa)
Sweey Cicely (Osmorhiza longistylis)
Wild Carrot (Daucus carota)
Bedstraw (Galium sp.)
Pigweed (Amaranthus sp.)
Indian Hemp (Apocynum cannabinum)
Red Clover (Trifolium pratense)
Ground Ivy (Glechoma hederacea)
Spotted Jewelweed (Impatiens capensis)
Common Mullein (Verbascum thapsus)
Dutchman's Breeches (Dicentra cucullaria)
White Violet (Viola striata)
Common Blue Violet (Viola papilionacea)
Lady's Thumb (Polygonum persicaria)

A. Herbaceous Plants (cont.)

Thistle (Cirsium sp.)

Dandelion (Taraxacum officinale)

Rough Hawkweed (Hieracium scabrum)

Yellow Goatsbeard (Tragopogon pratensis)

Great Ragweed (Ambrosia trifida)

Goldenrod (Solidago sp.)

Yarrow (Achillea millefolium)

Philadelphia Fleabane (Erigeron philadelphicus)

Aster (Aster sp.)

Wild Ginger (Asarum canadense)

B. Woody Plants

Red Cedar (Juniperus virginiana)

Greenbrier (Smilax sp.)

Poison Ivy (Rhus radicans)

Virginia Creeper (Parthenocissus quinquefolia)

Moonseed (Menispermum canadense)

Wild Grape (Vitis sp.)

Elderberry (Sambucus canadensis)

Black Haw (Viburnum prunifolium)

Barberry (Berberis sp.)

Multiflora Rose (Rosa multiflora)

Raspberry (Rubus sp.)

Spicebush (Lindera benzoin)

Olive (Elaeagnus sp.)

Tatarian Honeysuckle (Lonicera tatarica)

B. Woody Plants (cont.)

Pawpaw (Asimina triloba)
Black Willow (Salix nigra)
Cottonwood (Populus deltoides)
Wild Black Currant (Ribes americanum)
White Ash (Fraxinus americana)
Blue Ash (F. quadrangulata)
Green Ash (F. pennsylvanica)
Box Elder (Acer negundo)
Sugar Maple (A. saccharum)
Silver Maple (A. saccharinum)
Red Maple (A. rubrum)
Black Walnut (Juglans nigra)
Mockernut (Carya tomentosa)
Shellbark Hickory (C. lacinisa)
Hackberry (Celtis occidentalis)
Red Mulberry (Morus rubra)
Basswood (Tilia americana)
Wild Black Cherry (Prunus serotina)
Hawthorn (Crataegus sp.)
Slippery Elm (Ulmus rubra)
American Hornbeam (Carpinus caroliniana)
American Beech (Fagus grandifolia)
Chinquapin Oak (Quercus muehlenbergii)
Swamp White oak (Q. bicolor)
Bur Oak (Q. macrocarpa)

B. Woody Plants (cont.)

Pin Oak (Q. palustris)

Black Oak (Q. velutina)

IV. Management Considerations

A. Current Thought

If the Lowell Trace park is to be maintained as a natural area preserve, one goal would be to maintain as much biological diversity as possible. Since diversity is biologically defined as a function of the number of species and the abundance of each species in an area, management decisions should likewise address these two aspects. Traditionally, management of an area often included a plan to increase habitat types. Increasing habitats types was thought to increase the numbers of species inhabiting the area. Indeed, any birder knows forays into fields as well as forest will increase the daily species list. However, unless the created habitat patches are fairly large (which is dependent on the species in question) species may be present in numbers too low to sustain a population. Recent biological research has focused on these questions of minimum refuge size and minimum viable population size. These concepts have applications from managing the tropical forests of Brazil to the breeding of endangered species in captivity. Following these lines, arguments have recently surfaced against the concept of edge. Creating an "edge-effect" has been a method to create more habitats and thus increase animal diversity. Investigators have recently found

that the edge of a woodlot often allows predators access to interior-breeding species. Woodlots with a low area to high perimeter ratio will experience higher predation than a woodlot with a high area to low perimeter ratio (Brittingham and Temple 1983). With birds, the predator is in the form of a nest parasite; the brown-headed cowbird. The cowbird lays its eggs in the nest of other species and subsequent young are raised by the host. Parasitism affects the host by the larger cowbird young outcompeting the host's young for food provided by the adults. To manage for forest songbirds, large wooded tracts are deemed optimal. With these ideas in mind, the following discussion suggests management strategies for each habitat described at Lowell Trace.

B. Woodlots

I believe that both woodlots should remain intact. The trillium displays in early May certainly warrant such action. In order to minimize disturbance in these areas I suggest routing the bikeway near the northern boundary of the larger woodlot (Figure 2 - A). A second use for the bikeway in the woodlots would be as an interpretive trail. In developing the bikeway, bear in mind the wetness of woodlot A. Routing the bikeway along the northern edge should put it on somewhat higher ground. Public education on the uniqueness of the plants in these areas would strengthen support for preserving these areas. A long term goal might be to increase the acreage of woodlot by allowing natural succession to

connect the two woodlots (Figure 2). This would increase breeding bird diversity in the woodlots. Populations of trillium, Solomon's plume, and wild hyacinth would also benefit from such action. Natural regeneration can be easily accomplished by a hands off policy of reduced mowing and other manipulation. Public education of this management decision and its ultimate goal should capture community support. Of all natural habitats the public is exposed to, forests are by far the most desirable. Expansion of Tara Hill Drive into these areas would likely cause the demise of almost all woodland bird species by fragmenting the woodlot and disrupting breeding activities. Herbaceous plant species diversity would also be greatly reduced by physical disturbance and allowing greater access to the interior of the woodlot.

C. Riparian

An effort should be made to curtail any removal of vegetation that lines Indian Run. Vegetation helps to filter run-off and slow run-off velocity. Providing a vegetation buffer, protected from bulldozing, will help to insure high water quality. Muddy, stagnant water resulting from inadvertent filling is assuredly not a desirable public place feature. In routing the bikeway, I suggest that no streamside vegetation be removed for its construction. Areas adjacent to the riparian tree corridor seem suitable for such construction. Old, large trees lining the stream provide nest sites for cavity-nesting species such as the

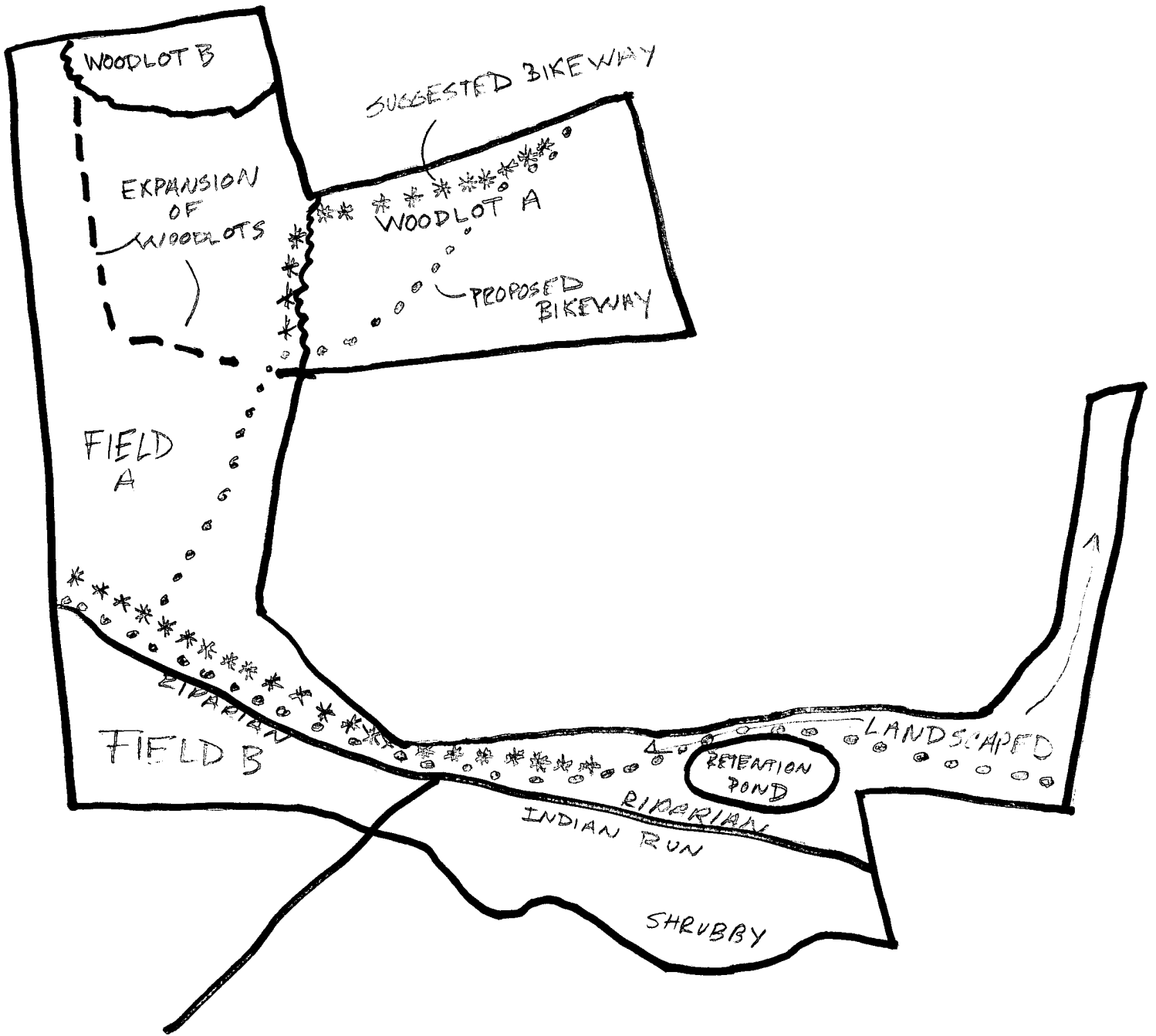
eastern bluebird and northern flicker. They also provide perch and nest sites for owls and hawks. Since riparian vegetation has already been removed in some areas, a native planting project would speed recovery. Supplemental nest boxes might also replace the loss of natural cavities. Community service organizations could be involved in both of these processes. I would like to stress the importance of having the actions of such groups be authorized by the Parks and Recreation Department.

C. Fields

I suggest that fields be maintained as wildflower meadows. Because wildflowers are established in these fields, thistle control should be easily achieved through spot spraying or manual removal. Invasion of woody plants can be discouraged by periodically mowing every 2-3 years. Fall mowings are thought to be best in reducing perennial cover. Wildflowers could be overseeded after fall mowing. Tilling should be avoided because it brings noxious weed seeds to the surface. Since these weeds are adapted for living in disturbed areas, they readily outcompete desirable wildflowers. If a spring mowing program was pursued, mowing should be completed by early April since field-nesting species are initiating nests by the third week of April. Several nearby wildflower meadow programs (Columbus, ODOT, Montgomery and Franklin County Metro Parks) have met with great success and have received wide community support. Another reason for maintaining a large meadow is the upcoming Ameriflora '92.

Providing an opportunity for international visitors to view such an unique suburban management program would certainly place Dublin far above other suburban Columbus communities vying for Ameriflora visitors. The Ameriflora gives good reason to pursue such non-traditional strategies. With a non-mowing program, public education is the key of its success. Unlocking the public's attitudes is necessary if urban wildlife management concepts are to share a place in parks and recreation department's management decisions.

Figure 2. Management alternations of the Lowell Trace habitats.



V. Literature Cited

- American Ornithologist's Union. 1983. Checklist of North American Birds, 6th edition. Allen Press Inc. Lawrence, Kansas. 877 pp.
- Andres, B. 1988. Bird use of successional fields at Batelle-Darby Creek Metro Park. Unpublished Report. Metropolitan Park District of Columbus and Franklin County. Columbus, Ohio 19 pp.
- Brittingham, M.C. and S.A. Temple. 1983. Have cowbirds caused forest songbirds to decline? *BioScience* 33:31-35.
- Jones, J.K., D.C. Carter, H.H. Genoways, R.S. Hoffman, and D.W. Rice. 1982. Revised checklist of North American mammals north of Mexico, 1982. Occasional Papers, The Museum of Texas Tech University. 80:1-22.
- Newcomb, L. 1977. *Newcomb's Wildflower Guide*. Little, Brown, and Co. Boston, MA. 490 pp.
- Palmer-Ball, B. Jr. and S.A. Evans. 1985. Kentucky Breeding Bird Atlas Instruction Manual. Kentucky Nature Preserves Commission. Frankfort, KY. 35 pp.
- Peterjohn, B.G., R.L. Hannikman, J.M. Hoffman, and E.J. Tramer. 1987. Abundance and distribution of the birds of Ohio. *Ohio Biol. Surv. Biol. Notes* No. 19iv + 52 pp.
- Wharton, M.E. and R.W. Barbour. 1971. *The Wildflowers and Ferns of Kentucky*. University of Kentucky Press. Lexington, KY 344 pp.
- Wharton, M.E. and R.W. Barbour. 1973. *Trees and Shrubs of Kentucky*. University of Kentucky Press. Lexington, KY 582 pp.

Table 6. List of bird species observed in Dublin Parks:
Fall 1986 - Spring 1988.

Great Blue Heron	Gray-cheeked Thrush
Green-backed Heron	Hermit Thrush
Black-crowned Night-Heron	Wood Thrush
Canada Goose	American Robin
Wood Duck	Gray Catbird
Mallard	Northern Mockingbird
Turkey Vulture	Brown Thrasher
Cooper's Hawk	Cedar Waxwing
Northern Harrier	European Starling
Red-tailed Hawk	White-eyed Vireo
American Kestrel	Warbling Vireo
Ring-necked Pheasant	Red-eyed Vireo
Killdeer	Golden-winged Warbler
Solitary Sandpiper	Tennessee Warbler
Spotted Sandpiper	Yellow Warbler
American Woodcock	Chestnut-sided Warbler
Ring-billed Gull	Magnolia Warbler
Rock Dove	Cape May Warbler
Mourning Dove	Black-throated Blue Warbler
Yellow-billed Cuckoo	Yellow-rumped Warbler
Great Horned Owl	Black-throated Green Warbler
Common Nighthawk	Blackburnian Warbler
Chimney Swift	Palm Warbler
Ruby-throated Hummingbird	Bay-breasted Warbler
Belted Kingfisher	Blackpoll Warbler
Red-bellied Woodpecker	Black-and-white Warbler
Downy Woodpecker	American Restart
Hairy Woodpecker	Ovenbird
Northern Flicker	Common Yellowthroat
Eastern Wood-Pewee	Wilson's Warbler
Acadian Flycatcher	Yellow-breasted Chat
Willow Flycatcher	Scarlet Tanager
Least Flycatcher	Northern Cardinal
Eastern Phoebe	Indigo Bunting
Great-crested Flycatcher	Rufous-sided Towhee
Horned Lark	Chipping Sparrow
Tree Swallow	Field Sparrow
Northern Rough-winged Swallow	Vesper Sparrow
Barn Swallow	Song Sparrow
Blue Jay	Swamp Sparrow
American Crow	White-throated Sparrow
Carolina Chickadee	White-crowned Sparrow
Tufted Titmouse	Dark-eyed Junco
White-breasted Nuthatch	Red-winged Blackbird
House Wren	Eastern Meadowlark
Ruby-crowned Kinglet	Common Grackle
Blue-gray Gnatcatcher	Brown-headed Cowbird
Eastern Bluebird	Orchard Oriole
Swainson's Thrush	Northern Oriole

Table 6 (cont.)

House Finch
American Goldfinch
House Sparrow