

# Appendix L: Plant Communities of Hemlock-Canadice Watershed

The following are scanned copies of The Nature Conservancy/Natural Heritage 1998 inventory and report on the watersheds of Hemlock and Canadice lakes.

1998

## PLANT COMMUNITIES OF THE HEMLOCK-CANADICE WATERSHED

Inventory and report prepared by

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## EXECUTIVE SUMMARY

Standard New York Natural Heritage Program methodology was used to document plants and plant communities in the Hemlock-Canadice watershed. Plant communities were identified by ground-truthing and/or by stereoscopic analysis of aerial photos. They were delineated on mylar overlays of the photos, digitized by personnel at the Ontario County Planning Department and named according to Ecological Communities of New York State by Carol Reschke.

Twenty-four plant communities were surveyed and mapped; lakes and ponds were mapped but not surveyed. Eight wetland communities comprise 2.5% of the watershed and include four communities which are rare in New York State. Abandoned farmland in the form of successional old field and successional shrubland covers over 20% of the watershed. Almost 55% of the watershed is vegetated in one of seven forest communities including one which is rare in New York State. Over 11% is being actively farmed and only 4% has been developed.

Plants are named according to Revised Checklist of New York State Plants by Richard S. Mitchell and Gordon C. Tucker. Plant lists are provided for seven palustrine and six terrestrial communities. One New York State rare plant was found: Kentucky coffee tree, *Gymnocladus dioica*.

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Many steps and several people were involved in transcribing data from the aerial photos into the computer that generated the multi-colored community map. We have done our best to catch mistakes, but with such a complex mosaic of communities to deal with, it is possible that inadvertant errors have crept into the final product. Please direct omissions, corrections and comments to:

City of Rochester  
Hemlock Water Treatment Plant  
7412 Rix Hill Road  
Hemlock, New York 14466

Support from the City of Rochester and from the Rochester Area Community Foundation is gratefully acknowledged.

**PLEASE RESPECT PROPERTY RIGHTS**

Many of the plant communities described in this report are on private property. **Their descriptions in this report do not constitute permission to visit.**

The City of Rochester welcomes visitors to its property on the watershed. Please obtain a visitor permit at the kiosk at the north end of Hemlock Lake on Rix Hill Road. When on city property, please obey the conditions listed on the permit and do not trespass on private property.

## TABLE OF CONTENTS

Executive Summary	i
Acknowledgements	ii
Please Respect Property Rights	iii
Table of Contents	iv
Introduction	1
Methods	2-3
Results	4-39
Conclusion	40
Bibliography	41

## LIST OF TABLES

Table IA: Cover Types and Plant Communities in Acres	5
Table IB: Cover Types and Plant Communities as Percent of Watershed	6
Table IIA: Cover Types and Plant Communities by Township (in acres)	7
Table IIB: Cover Types and Plant Communities by Township (as percent of watershed)	8
Table III: Birds of Open Fields	19
Table IV: Hemlock-Canadice Watershed Rare Plant Communities	28

## LIST OF PLANT LISTS

Shallow emergent marsh	12
Shrub swamp	13
Sedge meadow	14
Successional old field	16-17
Successional shrubland	18
Appalachian oak-hickory forest	21
Hemlock-northern hardwood forest	23-24
Successional northern hardwoods	25-26
Silver maple-ash swamp at Canadice Inlet	30
Silver maple-ash swamp at Canadice Outlet	31-32
Rich hemlock-hardwood peat swamp in Wayland Township	35
Inland poor fen on Canadice Hill Road	36
Highbush blueberry bog thicket on Bald Hill	37
Maple-basswood rich mesic forest in Springwater Township	38
Maple-basswood rich mesic forest at Mission Road Gullies	39

## INTRODUCTION

The Hemlock-Canadice Watershed is a 38,995 acre mosaic of forests, wetlands, fields, shrublands, farms and lawns that includes portions of the townships of Canadice, Conesus, Livonia, Richmond, Springwater and Wayland. Unique among the Finger Lakes, Hemlock and Canadice are renowned for their wild, undeveloped shorelines and wooded hillsides, the home of nesting bald eagles for the past century. The dramatic and unspoiled setting of Hemlock and Canadice sets them apart from all the other Finger Lakes.

The Finger Lakes Land Trust, The Nature Conservancy and the Ontario County Planning Department are working with the City of Rochester and other landowners within the watershed in a cooperative conservation effort. This report, which is part of that cooperative effort, is designed to provide information about the plants, animals and plant communities of the watershed itself.

## METHODS

### INTRODUCTION

Standard New York Natural Heritage Program methodology was used to document vegetation in the watershed. The New York Natural Heritage Program is a joint effort of the NYS Department of Environmental Conservation and The Nature Conservancy. It seeks to preserve biological diversity by identifying the locations of rare plants and animals and significant ecological communities, by providing this information to a broad audience, by providing scientific advice on conserving and managing these resources and by supporting an international network of scientists evaluating North America's natural diversity. Heritage maintains New York's most comprehensive database on the status and location of rare species and ecological communities, assembled from historical records and collections maintained by scientific institutions along with on-the-ground field inventories.

### PLANT COMMUNITY IDENTIFICATION AND MAPPING

Plant communities were delineated using names and descriptions established by Carol Reschke in her book Ecological Communities of New York State, with exceptions described within the Results section. Their identities were established by actual visits ("ground truthing") and/or by stereoscopic analysis of existing air photos which, for Ontario County were flown in 1995 and for Livingston County in 1994. Field visits took place from July 1996 to October 1996 and from April 1997 to October 1997. Forty-five visits were made totalling 215 hours. Most of the stereoscopic analysis was done during the winter of 1996-1997 with corrections ongoing throughout the 1997 field season.

Stereoscopic analysis of aerial photos involves looking at pairs of photos through a stereoscope, which renders a three dimensional image. Plant communities were delineated in pencil on mylar (translucent plastic) overlays of the photos. These overlays were then digitized by personnel at the Ontario County Planning Department to produce the final multi-colored cover type maps. The plant communities that are mapped are limited to the palustrine and terrestrial types, i.e. those that could be walked with either wet (palustrine) or dry (terrestrial) feet. Riverine communities (e.g. streams) and lacustrine communities (e.g. the farm ponds and the two lakes) were mapped but not surveyed.

Ground truthing the entire 40,000 acres of the Hemlock-Canadice Watershed was clearly not possible for one field worker in one and one half field seasons. Therefore, strategies were devised to maximize field time productivity. These strategies are discussed below.

First, the New York Natural Heritage Program Biological and Conservation Data System (BCD) was consulted to determine what, if any, rare plant communities were known from the watershed. If any had been reported, an effort could be made to rediscover them and document them more thoroughly. The data base search did not reveal any rare plant communities already known.

Second, a list of sites to visit was prepared by the City of Rochester Watershed Conservationist (Don Root) in consultation with one of the foresters (Bruce Robinson) who has spent considerable time on the watershed. The list follows.

- A. The wetland loop trail south of Canadice Lake
- B. Springwater Flats
- C. The east and west branches of Springwater Creek to their headwaters
- D. Reynolds Gull to its headwaters
- E. Mission Gull to its headwaters
- F. Canadice Outlet Creek upstream of the curved dam
- G. A representative delta on Canadice Lake
- H. The "peat bog" near Webster Crossing

- I. The old growth oaks west of Hemlock Outlet Creek
- J. Other appropriate places

These sites were chosen for the following reasons. First, it was deemed appropriate to visit all the wetlands and uplands with immediate hydrological connection to Hemlock and Canadice Lakes. Wetlands, because of their relative inaccessibility, tend to be less disturbed (by humans) than nearby upland sites and so somewhat more likely to yield rare plants and intact plant communities. Also, silver-maple ash swamp, a plant community that is rare in New York State but not so in the Finger Lakes region, was likely to be found bordering one or both of the watershed lakes. This explains the inclusion of sites A through G. The wetland near Webster Crossing is actually part of the Conesus Lake watershed except during high water, when some drainage into Hemlock Lake can occur. It was deemed appropriate to visit because of its hydrological connection and because it is known locally as a "peat bog." Peatlands can harbor rare plants and are often themselves rare plant communities. Site I is actually not on the watershed, but the old growth oaks on it meant that the site was minimally disturbed so there was some interest in studying it further.

Aerial photos and topographic maps were used to help determine what other places would be visited. They were used to identify such features as wetlands, extensive forested areas, wooded north and east facing steep slopes and wooded south and west facing steep slopes. Again, the overall goal was to identify the least disturbed areas, and steep slopes were less likely to have been logged, farmed or pastured in the past because of their steepness. Also, north and east facing slopes, which are relatively cool and moist, tend to harbor different plant communities and different plants than south and west facing slopes, which tend to be warmer and dryer.

Landowners were encouraged to participate by giving permission for fieldwork to be done on their properties. They were recruited at a public lecture given in October 1996, part of the Talks and Treks series organized by the Finger Lakes Land Trust. The lecture outlined the scope of this project and shared results to date. About a dozen property owners were contacted this way and word of mouth added several more. Other property owners were contacted as sites looked interesting during aerial photo analysis and/or during drives on the watershed.

#### PLANT IDENTIFICATION

Plants were named according to the Revised Checklist of New York State Plants by Richard S. Mitchell and Gordon C. Tucker. They were identified using Newcomb's Wildflower Guide by Lawrence Newcomb and/or by more technical works, such as Britton and Brown. See the bibliography for sources used.

A search for rare plants on the 40,000 acre watershed was narrowed considerably by using the following strategies.

The New York Natural Heritage Program's Biological and Conservation Data System (BCD) was consulted to determine which, if any, rare plants had already been discovered on the watershed. If any had been discovered, an effort could be made to re-discover them. A data base search revealed a record for a single rare plant, namely Northern Wild Comfrey (*Cynoglossum virginianum* var. *boreale*), that had been seen in the village of Springwater. There was no known observation date. This plant population was not re-located.

The Heritage Program also makes available rare plant lists that can be printed out by county of occurrence. These county lists provide plant phenology data, i.e., information on when the plant is in flower and in fruit. With this information and information about the preferred habitat of the plant, decisions were made as to what habitats to visit and when to visit them.

## RESULTS

### OVERVIEW

Tables IA and IB list the plant communities that were found on the watershed as a whole and on the Hemlock and Canadice sub-watersheds. Tables IIA and IIB list the same plant communities with their percent cover broken down by township. The statistics in Tables IA through IIB were compiled from digital information within the Geographic Information System. Fifty-five % of the watershed is forested in one of seven forest communities. Eight wetland communities constitute 2.6% of the watershed. Old fields, shrubland and a mosaic of the two make up 20%, whereas 11% is actively agricultural land in either cropland, pasture or vineyard. Only 4% is developed into mowed lawns or commercial use. Remarkably, there are 271 ponds on the watershed, mostly farm ponds. Assuming no more than one pond per tax parcel, this represents almost 14% of the tax parcels.

The maps illustrate the locations of the plant communities on the watershed, all shown in color except for mowed roadside/pathway and unpaved road/path. The paved roads are in white on the community maps and are readily apparent; the unpaved roads are not included because they were too narrow to map at the scale used.

Dominant features on the community map include the presence of large, unbroken tracts of forest along the lake shores, numerous conifer plantations and their remnants (mapped as a mosaic of successional northern hardwoods and conifer plantation), abandoned farmland represented by old field and shrubland, vast tracts of agricultural land, mostly in the southeast corner of the watershed, and mowed lawns which hug the roadsides.

T/ IA  
COVER TYPES AND PLANT COMMUNITIES IN ACRES

PLANT COMMUNITY OR COVER TYPE	TOTAL WATERSHED	CANADICE WATERSHED	HEMLOCK WATERSHED
<b>OPEN WATER</b>	<b>2818.09</b>	<b>712.46</b>	<b>2105.63</b>
Lakes	2678.22	670.22	2008
Ponds	139.87	42.24	97.63
<b>TOTAL WETLAND COVER TYPES</b>	<b>999.32</b>	<b>120.91</b>	<b>878.41</b>
Shallow emergent marsh	68.61	4.12	64.49
Shrub swamp	321.05	71.91	249.14
Sedge meadow	39.63	0	39.63
Shallow emergent marsh/shrub swamp/sedge meadow	332.28	0	332.28
Inland poor fen	7.61	0	7.61
Highbush blueberry bog thicket	0.44	0.31	0.13
Silver maple-ash swamp	221.53	44.57	176.96
Rich hemlock-hardwood peat swamp	8.17	0	8.17
<b>TOTAL SUCCESSIONAL COVER TYPES</b>	<b>7889</b>	<b>1154.2</b>	<b>6714.8</b>
Successional old field	4321.02	785.48	3535.54
Successional shrubland	3224.59	282.66	2941.93
Successional old field/successional shrubland	323.39	86.06	237.33
<b>TOTAL FOREST COVER TYPES</b>	<b>21313.35</b>	<b>5211.85</b>	<b>16101.5</b>
Appalachian oak-hickory forest	119.51	103.57	15.94
Maple-basswood rich mesic forest	43.71	0	43.71
Hemlock-northern hardwood forest	1687.35	224.37	1442.98
Successional northern hardwoods	13422.7	3196.69	10226.01
Successional shrubland/successional northern hardwoods	1048.3	532.26	516.04
Successional northern hardwoods/conifer plantation	2509.43	547.91	1961.52
Conifer Plantation	2502.35	607.05	1895.3
<b>TOTAL AGRICULTURAL COVER TYPES</b>	<b>4391.04</b>	<b>180.43</b>	<b>4210.6</b>
Cropland	4102.96	175.45	3927.51
Pasture	281.29	4.98	276.3
Vineyard	6.79	0	6.79
<b>TOTAL DEVELOPED COVER TYPES</b>	<b>1599.45</b>	<b>345.27</b>	<b>1259.06</b>
Mowed lawn	1455.33	345.27	1114.94
Residential/commercial	131.72	0	131.72
Gravel mine	12.4	0	12.4
<b>TOTAL ACRES</b>	<b>38995.12</b>	<b>7725.12</b>	<b>31270</b>

5

T/ IB  
COVER TYPES AND PLANT COMMUNITIES AS PERCENT OF WATERSHED

PLANT COMMUNITY OR COVER TYPE	TOTAL WATERSHED	CANADICE WATERSHED	HEMLOCK WATERSHED
<b>OPEN WATER</b>	<b>7.22</b>	<b>9.22</b>	<b>6.73</b>
Lakes	6.87	8.68	6.42
Ponds	0.36	0.55	0.31
<b>TOTAL WETLAND COVER TYPES</b>	<b>2.56</b>	<b>1.57</b>	<b>2.82</b>
Shallow emergent marsh	0.18	0.05	0.21
Shrub swamp	0.82	0.93	0.8
Sedge meadow	0.1	0	0.13
Shallow emergent marsh/shrub swamp/sedge meadow	0.85	0	1.06
Inland poor fen	0.02	0	0.02
Highbush blueberry bog thicket	<0.01	<0.01	<0.01
Silver maple-ash swamp	0.57	0.58	0.57
Rich hemlock-hardwood peat swamp	0.02	0	0.03
<b>TOTAL SUCCESSIONAL COVER TYPES</b>	<b>20.18</b>	<b>14.94</b>	<b>21.48</b>
Successional old field	11.08	10.17	11.31
Successional shrubland	8.27	3.66	9.41
Successional old field/successional shrubland	0.83	1.11	0.76
<b>TOTAL FOREST COVER TYPES</b>	<b>54.67</b>	<b>67.46</b>	<b>51.49</b>
Appalachian oak-hickory forest	0.31	1.34	0.05
Maple-basswood rich mesic forest	0.11	0	0.14
Hemlock-northern hardwood forest	4.3	2.9	4.62
Successional northern hardwoods	34.4	41.38	32.7
Successional shrubland/successional northern hardwoods	2.69	6.89	1.65
Successional northern hardwoods/conifer plantation	6.44	7.09	6.27
Conifer Plantation	6.42	7.86	6.06
<b>TOTAL AGRICULTURAL COVER TYPES</b>	<b>11.26</b>	<b>2.33</b>	<b>13.47</b>
Cropland	10.52	2.27	12.56
Pasture	0.72	0.06	0.88
Vineyard	0.02	0	0.02
<b>TOTAL DEVELOPED COVER TYPES</b>	<b>4.1</b>	<b>4.47</b>	<b>4.03</b>
Mowed lawn	3.73	4.47	3.57
Residential/commercial	0.34	0	0.42
Gravel mine	0.03	0	0.04

6

**TA IIA  
COVER TYPES AND PLANT COMMUNITIES BY TOWNSHIP (IN ACRES)**

PLANT COMMUNITY OR COVER TYPE	RICHMOND	CANADICE	LIVONIA	CONESUS	SPRINGWATER	WAYLAND
<b>OPEN WATER</b>	<b>6.63</b>	<b>795.1</b>	<b>288.89</b>	<b>385.49</b>	<b>76.12</b>	<b>3.07</b>
Lakes	0	733.82	287	372.6	22	0
Ponds	6.63	61.28	1.89	12.89	54.12	3.07
<b>TOTAL WETLAND COVER TYPES</b>	<b>0.02</b>	<b>311.32</b>	<b>0</b>	<b>0</b>	<b>665.85</b>	<b>22.14</b>
Shallow emergent marsh	0	4.12	0	0	64.49	0
Shrub swamp	0	77.83	0	0	229.45	13.97
Sedge meadow	0	0	0	0	39.63	0
Shallow emergent marsh/shrub swamp/sedge meadow	0	0	0	0	332.28	0
Inland poor fen	0	7.61	0	0	0	0
Highbush blueberry bog thicket	0	0.44	0	0	0	0
Silver maple-ash swamp	0.02	221.52	0	0	0	0
Rich hemlock-hardwood peat swamp	0	0	0	0	0	8.17
<b>TOTAL SUCCESSIONAL COVER TYPES</b>	<b>365.21</b>	<b>2486.1</b>	<b>305.27</b>	<b>931.07</b>	<b>3678.67</b>	<b>47.73</b>
Successional old field	217.27	1155	165.9	592.32	2190.26	0.28
Successional shrubland	147.94	1181.87	139.37	338.75	1369.22	47.45
Successional old field/successional shrubland	0	149.23	0	54.99	119.19	0
<b>TOTAL FOREST COVER TYPES</b>	<b>439.19</b>	<b>9069.68</b>	<b>1091.76</b>	<b>3215.84</b>	<b>7412.58</b>	<b>91.24</b>
Appalachian oak hickory forest	0	119.51	0	0	0	0
Maple-basswood rich mesic forest	0	0	0	22.15	21.56	0
Hemlock-northern hardwood forest	2.81	388.17	123.51	659.86	463.77	29.24
Successional Northern hardwoods	340.59	5426.78	672.6	1954.89	4972.58	62
Successional shrubland/successional northern hardwoods	0	540.81	62.75	165.56	279.2	0
Successional northern hardwoods/conifer plantation	47.96	1395.27	119.3	178.58	768.49	0
Conifer plantation	47.83	1199.14	113.6	234.8	906.98	0
<b>TOTAL AGRICULTURAL COVER TYPES</b>	<b>57.32</b>	<b>296.47</b>	<b>304.45</b>	<b>250.61</b>	<b>3288.9</b>	<b>193.28</b>
Cropland	57.32	278.8	304.45	203.23	3065.88	193.28
Pasture	0	17.67	0	40.59	223.02	0
Vineyard	0	0	0	6.79	0	0
<b>TOTAL DEVELOPED COVER TYPES</b>	<b>49.98</b>	<b>582.69</b>	<b>78.52</b>	<b>127.5</b>	<b>3743.34</b>	<b>56.41</b>
Mowed lawn	49.98	582.69	78.52	127.5	566.64	55.02
Residential/commercial	0	0	0	0	3164.3	1.39
Gravel mine	0	0	0	0	12.4	0
<b>TOTAL ACRES</b>	<b>918.35</b>	<b>13541</b>	<b>2088.72</b>	<b>4964.7</b>	<b>18865.46</b>	<b>414.57</b>

1.3%      5.7%      1.5%      1.2%      26.7%      1%

**TA IIB  
COVER TYPES AND PLANT COMMUNITIES BY TOWNSHIP (AS PERCENT OF WATERSHED)**

PLANT COMMUNITY OR COVER TYPE	RICHMOND	CANADICE	LIVONIA	CONESUS	SPRINGWATER	WAYLAND
<b>OPEN WATER</b>	<b>0.72</b>	<b>5.87</b>	<b>13.96</b>	<b>7.76</b>	<b>0.41</b>	<b>0.74</b>
Lakes	0	5.42	13.87	7.5	0.12	0
Ponds	0.72	0.45	0.09	0.26	0.29	0.74
<b>TOTAL WETLAND COVER TYPES</b>	<b>0</b>	<b>2.3</b>	<b>0</b>	<b>0</b>	<b>3.53</b>	<b>5.34</b>
Shallow emergent marsh	0	0.03	0	0	0.34	0
Shrub swamp	0	0.57	0	0	1.22	3.37
Sedge meadow	0	0	0	0	0.21	0
Shallow emergent marsh/shrub swamp/sedge meadow	0	0	0	0	1.76	0
Inland poor fen	0	0.06	0	0	0	0
Highbush blueberry bog thicket	0	0	0	0	0	0
Silver maple-ash swamp	0	1.64	0	0	0	0
Rich hemlock-hardwood peat swamp	0	0	0	0	0	1.97
<b>TOTAL SUCCESSIONAL COVER TYPES</b>	<b>39.77</b>	<b>18.36</b>	<b>11.05</b>	<b>19.86</b>	<b>19.5</b>	<b>11.52</b>
Successional old field	23.66	8.53	8.02	11.93	11.61	0.07
Successional shrubland	16.11	8.73	3.03	6.82	7.26	11.45
Successional old field/successional shrubland	0	1.1	0	1.11	0.63	0
<b>TOTAL FOREST COVER TYPES</b>	<b>47.83</b>	<b>66.97</b>	<b>52.76</b>	<b>64.76</b>	<b>39.29</b>	<b>22.01</b>
Appalachian oak hickory forest	0	0.88	0	0	0	0
Maple-basswood rich mesic forest	0	0	0	0.45	0.11	0
Hemlock-northern hardwood forest	0.31	2.87	5.97	13.29	2.46	7.05
Successional Northern hardwoods	37.09	40.07	32.51	39.36	26.36	14.96
Successional shrubland/successional northern hardwoods	0	3.99	3.03	3.33	1.48	0
Successional northern hardwoods/conifer plantation	5.22	10.3	5.76	3.6	4.07	0
Conifer plantation	5.21	8.86	5.49	4.73	4.81	0
<b>TOTAL AGRICULTURAL COVER TYPES</b>	<b>6.24</b>	<b>2.19</b>	<b>14.72</b>	<b>5.05</b>	<b>17.43</b>	<b>46.62</b>
Cropland	6.24	2.06	14.72	4.09	16.25	46.62
Pasture	0	0.13	0	0.82	1.18	0
Vineyard	0	0	0	0.14	0	0
<b>TOTAL DEVELOPED COVER TYPES</b>	<b>5.44</b>	<b>4.3</b>	<b>3.8</b>	<b>2.57</b>	<b>19.84</b>	<b>13.61</b>
Mowed lawn	5.44	4.3	3.8	2.57	3	13.27
Residential/commercial	0	0	0	0	16.77	0.34
Gravel mine	0	0	0	0	0.07	0

## SOURCES OF ERROR

While every attempt was made to accurately identify and map the plant communities within the watershed, errors may still appear on the map. Sources of error can be related to aerial photo scale, distortion present in the photos, changes in land use, ease of community identification from photos and errors in digitizing.

Livingston County plant community delineations are likely to contain more errors than Ontario County delineations because the aerial photos used to map them are at a scale of 1 inch:3000 feet whereas the Ontario County photos are at 1 inch:1000 feet.

If a community's shape or place in the landscape looks not quite correct it is often because of the distortion present in the aerial photos themselves. The photos that were used were not orthographically corrected. Simply put, a photo is a two-dimensional representation of a three-dimensional landscape. The more three-dimensional (i.e. hilly) that landscape is, the more distortion exists on the photo. Road intersections help, but not all photos had road intersections on them, especially where they were needed the most, such as on the west side of Hemlock Lake.

Livingston County photos date from 1994 whereas Ontario County photos date from 1995. Any changes in the landscape that happened between these dates and the 1996 and 1997 field seasons might not have been recorded, especially if these changes happened far from a road. Fields that are fallow one year and cropland the next are likely places where these sorts of "errors" can be made. Indeed, cropland and successional old fields can be difficult to tell apart on aerial photos, presumably because the photos are taken early in the growing season.

Certain forested communities are easier to tell apart than others on aerial photos. On leaf-off photos, conifer plantations stand out prominently, as do hemlock-northern hardwood forests, especially when the photos are used in conjunction with topographic maps. But distinguishing, say, Appalachian oak-hickory forest from successional northern hardwoods can be difficult, especially when the latter community, as it exists on the watershed, happens to have a high concentration of oaks in the canopy. A conservative approach was taken to this mapping dilemma; when in doubt, forested leafless patches on the aerial photos were mapped as successional northern hardwoods because that was the community type most often encountered in the field.

When the first multi-colored drafts of the community maps were produced with tax parcel lines added, it was evident that tax parcel boundaries often coincided closely with but not exactly with plant community boundaries. It was tempting to make them fit exactly by altering the community data fed to the computer but we refrained. For one thing, doing so makes the assumption that the current land surveys are more accurate than the community analysis. Although this is probably the case (the width of the pencil line on the air photos represents about 60 feet on the ground), it could also be true that current land use reflects a neighborly agreement along growing community boundaries rather than strict adherence to survey lines.

Transferring information from the aerial photos to a computer through digitizing can introduce errors in shape, size and identification of the plant community.

## INTRODUCTION TO THE PLANT COMMUNITY DESCRIPTIONS

Descriptions of and plant lists for most of the common communities are given below: three wetland, two successional and four forest cover types are included here as well as the four mosaic communities and the farm ponds. Descriptions of the five rare plant communities follow these. Plant lists for the common communities are a composite of all the occurrences of that particular community type that were visited on the watershed. The rare plant community lists are not composites, so there are separate lists for each of the rare plant community occurrences on the watershed. The plant lists that are provided with each community are not intended to represent a complete inventory of all the plants that occur. Rather they are a list of what this author saw during her two field seasons on the watershed.

For the purposes of this report and to simplify interpretation of cover types, several standard community names as defined by Reschke are lumped. Cropland/row crops and cropland/field crops are mapped as one community, called cropland. Mowed lawn with trees and mowed lawn are mapped as one community, called mowed lawn. A new community is added, called residential/commercial. This is to distinguish the intense development in the village of Springwater from the lower density residential development elsewhere on the watershed. Finally, pine plantation is lumped with spruce plantation and called conifer plantation.

Although plant communities were, with the exceptions described above, named according to Reschke, it is not to be assumed that the communities as they occur on the watershed exactly match the descriptions as given in Reschke. Plant community classification is, at best, an inexact science and plant composition can vary somewhat from one community occurrence to another. The reader with access to Reschke's book is free to come to his or her own conclusions about the appropriateness of this author's designations.

## FARM PONDS

Although ponds were not surveyed for either plants or animals, the sheer number of them on the watershed (271) has prompted this short discussion.

Most of the ponds visible on the aerial photos seem too small to sustain breeding populations of ducks, geese and game fish. However, they are quick to get colonized by aquatic plants such as cat tails, sedges and rushes. The ponds also attract animals that require water for at least part of their life cycles, like frogs, toads, salamanders, dragonflies, damselflies, caddisflies and snails as well as the smaller plants and animals that these feed on. If managed properly, these ponds can function as miniature ecosystems for years and certainly add to the diversity present on the watershed.

## SHALLOW EMERGENT MARSH, SHRUB SWAMP AND SEDGE MEADOW

The three common wetland communities on the watershed are discussed together because they often occur together. Indeed, they occur as a large mosaic in Springwater Flats, south of the south end of Hemlock Lake and north of Kellogg Road.

**Shallow emergent marsh** occurs on the watershed as described above and farther upstream along the headwaters of Springwater Creek. It is a community whose soils are always saturated and which may be seasonally flooded. It is a herbaceous community with occasional emergent shrubs that may include speckled alder and arrowwood. Characteristic herbaceous species include swamp milkweed, bur marigold, water hemlock, three-way sedge, Joe Pye weed, whorled loostrife, ostrich fern, sensitive fern, reed canary grass, skunk cabbage and wide leaf cat tail.

Purple loosestrife (*Lythrum salicaria*) is an invasive alien species that has become a significant problem in the northeast by crowding out native species in shallow emergent marshes. So far, it is absent from the watershed except for a small population at the south end of Hemlock Lake.

The dominant layer in a **shrub swamp**, not surprisingly, consists of shrubs. On the watershed, these are most often gray, silky and red osier dogwoods as well as speckled alder, arrowwood, multiflora rose and shrubby willows including pussy willow. There are generally a few trees emergent over these shrubs such as swamp white and bur oaks. Herbs are rather scarce because the shrubs are often dense enough that light levels below them are low. Jewelweed, sensitive fern and skunk cabbage are commonly present.

**Sedge meadows** are herbaceous wetland communities that resemble shallow emergent marshes. Differences between them are subtle and include differences in soil composition not apparent to the casual observer. Shallow emergent marshes occur on mineral soils while sedge meadows develop on organic muck or fibrous peat. As their name implies, they are dominated by sedges, most of which don't have common names, such as *Carex aquatilis*, *Carex crinita* and *Carex lacustris*. Other species include those which might also be found in a shallow emergent marsh such as Joe Pye weed, boneset, skunk cabbage, marsh fern and wide leaf cat tail.

Birds that one might expect to see within these wetlands include Canada Goose, Mallard, Wood Duck, Great Blue Heron, House Wren, Marsh Wren, Least Flycatcher, Gray Catbird, Blue-winged Warbler, Yellow Warbler, Chestnut-sided Warbler, Common Yellowthroat, Red-winged Blackbird, Swamp Sparrow and Song Sparrow.

The area known locally as a "peat bog" near Webster Crossing turned out to be a mosaic of shrub swamp and sedge meadow. The author did not see any peat.

### SHALLOW EMERGENT MARSH

Common Name	Species name	Dominant	Tree	Shrub/Vine	Herb
ARROWWOOD	<i>Viburnum dentatum</i> var. <i>lucidum</i>			X	
MEADOWSWEET	<i>Spirea</i> sp.			X	
SPECKLED ALDER	<i>Alnus incana</i> ssp. <i>rugosa</i>			X	
WILD CUCUMBER	<i>Echinocystis lobata</i>			X	
ARROW-LEAVED TEARTHUMB	<i>Polygonum sagittatum</i>				X
BULRUSH	<i>Scirpus atrovirens</i>				X
BUR MARIGOLD	<i>Bidens cernua</i>				X
BUR REED	<i>Sparganium</i> sp.				X
CANADA GOLDENROD	<i>Solidago canadensis</i>				X
CLEAR WEED	<i>Pilea pumila</i>				X
CRESTED FERN	<i>Dryopteris</i> cf. <i>cristata</i>				X
FIELD HORSETAIL	<i>Equisetum arvense</i>				X
JEWELWEED	<i>Impatiens capensis</i>				X
JOE PYE WEED	<i>Eupatorium maculatum</i>				X
MONEYWORT	<i>Lysimachia nummularia</i>				X
NEW ENGLAND ASTER	<i>Aster novae-angliae</i>				X
OSTRICH FERN	<i>Matteuccia struthiopteris</i>				X
PANICLED ASTER	<i>Aster lanceolatus</i>				X
PURPLE LOOSESTRIFE	<i>Lythrum salicaria</i>				X
PURPLE STEMMED ASTER	<i>Aster puniceus</i>				X
REED CANARY GRASS	<i>Phalaris arundinacea</i>				X
REED GRASS	<i>Phragmites australis</i>				X
ROUGH LEAVED GOLDENROD	<i>Solidago patula</i>				X
SEDGE	<i>Carex crinita</i>				X
SEDGE	<i>Carex cristatella</i>				X
SEDGE	<i>Carex hystericina</i>				X
SEDGE	<i>Carex</i> cf. <i>interior</i>				X
SEDGE	<i>Carex intumescens</i>				X
SEDGE	<i>Carex lacustris</i>				X
SEDGE	<i>Carex lupulina</i>				X
SEDGE	<i>Carex lurida</i>				X
SEDGE	<i>Carex scoparia</i>				X
SEDGE	<i>Carex vulpinoidea</i>				X
SENSITIVE FERN	<i>Onoclea sensibilis</i>				X
SKUNK CABBAGE	<i>Symplocarpus foetidus</i>				X
SOFT RUSH	<i>Juncus effusus</i>				X
SOFT STEM BULRUSH	<i>Scirpus tabernaemontanii</i>				X
SPIKEBRUSH	<i>Eleocharis obtusifolia</i>				X
SWAMP MILKWEED	<i>Asclepias incarnata</i>				X
THREE-WAY SEDGE	<i>Dulichium arundinaceum</i>				X
WATER HEMLOCK	<i>Cicuta maculata</i>				X
WHORLED LOOSESTRIFE	<i>Lysimachia quadrifolia</i>				X
WIDE LEAF CAT TAIL	<i>Typha latifolia</i>				X
WOOLGRASS	<i>Scirpus cyperinus</i>				X

SHRUB SWAMP

Common Name	Species Name	Dominant	Tree	Shrub/Vine	Herb
BLACK WALNUT	<i>Juglans nigra</i>		X		
BUR OAK	<i>Quercus macrocarpa</i>		X		
ELM SP.	<i>Ulmus sp.</i>		X		
SWAMP WHITE OAK	<i>Quercus bicolor</i>		X		
ARROWWOOD	<i>Viburnum dentatum var. lucidum</i>			X	
BOX ELDER	<i>Acer negundo</i>			X	
FALSE SPIREA	<i>Sorbaria sorbifolia</i>			X	
GRAY DOGWOOD	<i>Cornus foemina</i>			X	
HAWTHORNE	<i>Crataegus sp.</i>			X	
MULTIFLORA ROSE	<i>Rosa multiflora</i>			X	
PUSSY WILLOW	<i>Salix discolor</i>			X	
RED OSIER DOGWOOD	<i>Cornus sericea</i>			X	
SILKY DOGWOOD	<i>Cornus amomum</i>			X	
SPECKLED ALDER	<i>Alnus incana ssp. rugosa</i>			X	
ARROW-LEAVED TEARTHUMB	<i>Polygonum sagittatum</i>				X
FLAT SEDGE	<i>Cyperus sp.</i>				X
GOLDENROD	<i>Solidago sp.</i>				X
JEWELWEED	<i>Impatiens capensis</i>				X
JOE PYE WEED	<i>Eupatorium maculatum</i>				X
MONEYWORT	<i>Lysimachia nummularia</i>				X
SEDGE	<i>Carex bromoides</i>				X
SENSITIVE FERN	<i>Onoclea sensibilis</i>				X
SKUNK CABBAGE	<i>Symplocarpus foetidus</i>				X
SPIKERUSH	<i>Eleocharis obtusa</i>				X

### SEDGE MEADOW

Common Name	Species Name	Dominant	Tree	Shrub/Vine	Herb
QUAKING ASPEN	<i>Populus tremuloides</i>		X		
ARROWWOOD	<i>Viburnum dentatum var. lucidum</i>			X	
GRAY DOGWOOD	<i>Cornus foemina ssp. racemosa</i>			X	
HONEYSUCKLE	<i>Lonicera sp.</i>			X	
RED OSIER DOGWOOD	<i>Carex sericea</i>			X	
RED RASPBERRY	<i>Rubus idaeus</i>			X	
WILLOW	<i>Salix sp.</i>			X	
WINTERBERRY	<i>Ilex verticillata</i>			X	
BUTTERCUP	<i>Ranunculus hispidus var. caricetorum</i>				X
BLUE FLAG	<i>Iris versicolor</i>				X
BONESET	<i>Eupatorium perfoliatum</i>				X
BULRUSH	<i>Scirpus atrovirens</i>				X
FIELD HORSETAIL	<i>Equisetum arvense</i>				X
GREAT ANGELICA	<i>Angelica atropurpurea</i>				X
JOE PYE WEED	<i>Eupatorium maculatum</i>				X
LATE GOLDENROD	<i>Solidago gigantea</i>				X
MARSH FERN	<i>Thelypteris palustris</i>				X
MARSH SPEEDWELL	<i>Veronica scutellata</i>				X
SEDGE	<i>Carex aquatilis</i>				X
SEDGE	<i>Carex crinita</i>				X
SEDGE	<i>Carex diandra</i>				X
SEDGE	<i>Carex hystericina</i>				X
SEDGE	<i>Carex lacustris</i>				X
SEDGE	<i>Carex livida</i>				X
SEDGE	<i>Carex scoparia</i>				X
SEDGE	<i>Carex stipata</i>				X
SEDGE	<i>Carex vulpinoidea</i>				X
SENSITIVE FERN	<i>Onoclea sensibilis</i>				X
SKUNK CABBAGE	<i>Symplocarpus foetidus</i>				X
SMALL PURPLE FRINGED ORCHID	<i>Platanthera psycodes</i>				X
SOFT RUSH	<i>Juncus effusus</i>				X
WIDE LEAF CAT TAIL	<i>Typha latifolia</i>				X
WILD PARSNIP	<i>Pastinaca sativa</i>				X
WILLOW HERB	<i>Epilobium sp.</i>				X
WOOLGRASS	<i>Scirpus cyperinus</i>				X

## SUCCESSIONAL OLD FIELD AND SUCCESSIONAL SHRUBLAND

There is much abandoned farmland on the watershed. If left untouched, abandoned cropland and pasture will eventually return to forest through a fairly well-defined process whereby they are first invaded by herbaceous plants to become successional old fields and thence by woody shrubs and vines to become successional shrublands.

Successional old fields are at their best in late summer and early fall because it is at this time of year that native asters and goldenrods are blooming. Look for calico, New England, frost, purple-stemmed and arrow-leaved asters and grass-leaved, Canada, early, late and rough-stemmed goldenrods. Native species that bloom earlier in the season include common milkweed and blue-eyed grass. Except for the asters and goldenrods, most species that one can enjoy in old fields are aliens. These include most hawkweeds, St. John's wort, oxeye daisy, black-eyed susan, brown and spotted knapweeds, chickory, Queen Anne's lace and elecampane.

Successional old fields are great places to see birds that don't reside elsewhere and which indeed require non-forested communities in which to nest. Species to look for include Northern Harrier, Eastern Meadowlark, Bobolink and Vesper, Grasshopper, Savannah, Field and Henslow's Sparrows. See Table III for birds of open fields.

For those wishing to search for birds of open fields, the following tips are offered. For Harriers and Upland Sandpipers (the latter not seen but to be expected), bigger is better. They seem to require huge fields within an entire landscape of huge fields. Vesper, Henslow's and Grasshopper Sparrows seem to like old fields in an early state of succession, before they are dominated by asters and goldenrods. The birders call these "sparse grassy weed fields." Bobolinks, Eastern Meadowlarks and Savannah Sparrows, on the other hand, prefer fields that are still in cultivation; wheat and alfalfa seem to be favorites. If a landowner wishes to maintain grassland breeding birds, fields containing these species should be mowed no earlier than mid-July to allow young to fledge.

Successional shrublands are, of course, dominated by shrubs. Native gray dogwood, staghorn sumac, blackberries and raspberries are often dominant. If trails are cut through these they can be great places to visit in July with a basket and an empty stomach! Unfortunately, invasive shrubs such as autumn olive, honeysuckle and multiflora rose can sometimes choke these communities and make them difficult to walk through. Herbs are generally the same as one might find in a successional old field but in lesser amounts and fewer species because they are shaded by the shrubs.

Successional shrublands are good places to look for Blue-winged and Golden-winged Warblers and their hybrids, Lawrence's and Brewster's Warblers.

### SUCCESSIONAL OLD FIELD

Common Name	Species Name	Dominant	Tree	Shrub/Vine	Herb
COTTONWOOD	<i>Populus deltoides</i>		X		
QUAKING ASPEN	<i>Populus tremuloides</i>		X		
WHITE ASH	<i>Fraxinus americana</i>		X		
AUTUMN OLIVE	<i>Elaeagnus umbellata</i>			X	
BLACK RASPBERRY	<i>Rubus occidentalis</i>			X	
BLACKBERRY	<i>Rubus allegheniensis</i>			X	
GRAY DOGWOOD	<i>Cornus foemina ssp. racemosa</i>			X	
HEDGE BINDWEED	<i>Calystegia sepium</i>			X	
POISON IVY	<i>Toxicodendron radicans</i>			X	
RED RASPBERRY	<i>Rubus idaeus</i>			X	
STAGHORN SUMAC	<i>Rhus hirta</i>			X	
ARROW-LEAVED ASTER	<i>Aster sagittifolius</i>				X
BIRD'S FOOT TREFOIL	<i>Lotus corniculatus</i>				X
BLACK EYED SUSAN	<i>Rudbeckia hirta var. pulcherrima</i>				X
BLACK MEDICK	<i>Medicago lupulina</i>				X
BLUE-EYED GRASS	<i>Sisyrinchium montanum</i>				X
BONESET	<i>Eupatorium perfoliatum</i>				X
BRACKEN	<i>Pteridium aquilinum</i>				X
BROWN KNAPWEED	<i>Centaurea jacea</i>				X
BULL THISTLE	<i>Cirsium vulgare</i>				X
BUTTERCUP	<i>Ranunculus hispidus</i>				X
CALICO ASTER	<i>Aster lateriflorus</i>				X
CANADA GOLDENROD	<i>Solidago canadensis</i>				X
CANADA THISTLE	<i>Cirsium arvense</i>				X
CHICKORY	<i>Cichorium intybus</i>				X
COLTS FOOT	<i>Tussilago farfara</i>				X
COMMON BLUE VIOLET	<i>Viola sororia</i>				X
COMMON CINQUEFOIL	<i>Potentilla simplex</i>				X
COMMON MILKWEED	<i>Asclepias syriaca</i>				X
COMMON MULLEIN	<i>Verbascum thapsus</i>				X
CREeping BELLFLOWER	<i>Campanula rapunculoides</i>				X
CURLY DOCK	<i>Rumex crispus</i>				X
DAISY FLEABANE	<i>Erigeron annuus</i>				X
DOG VIOLET	<i>Viola conspersa</i>				X
EARLY GOLDENROD	<i>Solidago juncea</i>				X
ELECAMPANE	<i>Inula helenium</i>				X
FIELD SORREL	<i>Rumex acetosella</i>				X
FROST ASTER	<i>Aster pilosus</i>				X
GARDEN VALERIAN	<i>Valeriana officinalis</i>				X
GRASS LEAVED GOLDENROD	<i>Euthamia graminifolia</i>				X
HAWKWEED	<i>Hieracium aurantiacum</i>				X
HAY SCENTED FERN	<i>Dennstaedia punctilobula</i>				X
HEAL-ALL	<i>Prunella vulgaris</i>				X
HEMP NETTLE	<i>Galeopsis tetrahit</i>				X
LADY FERN	<i>Athyrium filix-femina</i>				X
LATE GOLDENROD	<i>Solidago gigantea</i>				X
MONEYWORT	<i>Lysimachia nummularia</i>				X
NEW ENGLAND ASTER	<i>Aster novae-angliae</i>				X
ORCHARD GRASS	<i>Dactylis glomerata</i>				X
OX EYE DAISY	<i>Leucanthemum vulgare</i>				X
OX-TONGUE	<i>Picris hieracoides</i>				X
PATH RUSH	<i>Juncus tenuis</i>				X
PLANTAIN	<i>Plantago sp.</i>				X

## SUCCESSIONAL OLD FIELD

Common Name	Species Name	Dominant	Tree	Shrub/Vine	Herb
PURPLE STEMMED ASTER	<i>Aster puniceus</i>				X
QUEEN ANNE'S LACE	<i>Daucus carota</i>				X
RAGWEED	<i>Ambrosia artemisiifolia</i>				X
RED CLOVER	<i>Trifolium pratense</i>				X
ROUGH-STEMMED GOLDENROD	<i>Solidago rugosa</i>				X
SEDGE	<i>Carex scoparia</i>				X
SEDGE	<i>C. stipata</i>				X
SEDGE	<i>C. vulpinoidea</i>				X
SENSITIVE FERN	<i>Onoclea sensibilis</i>				X
SLENDER VETCH	<i>Vicia tetrasperma</i>				X
SPOTTED KNAPWEED	<i>Centaurea maculosa</i>				X
ST. JOHN'S WORT	<i>Hypericum perforatum</i>				X
STRAWBERRY	<i>Fragaria virginiana</i>				X
SULFUR CINQUEFOIL	<i>Potentilla recta</i>				X
SWEET VERNAL GRASS	<i>Anthoxanthum odoratum</i>				X
TEASEL	<i>Dipsacus sylvestris</i>				X
TIMOTHY	<i>Phleum pratense</i>				X
WHITE SWEET CLOVER	<i>Melilotus alba</i>				X
WILD BERGAMOT	<i>Monarda fistulosa</i>				X
WILD MADDER	<i>Gallium mollugo</i>				X
WINTERCRESS	<i>Barbarea vulgaris</i>				X
YARROW	<i>Achillea millifolia</i>				X
YELLOW HOP CLOVER	<i>Trifolium aureum</i>				X

### SUCCESSIONAL SHRUBLAND

Common Name	Species	Dominant	Tree	Shrub/Vine	Herb
BLACK LOCUST	<i>Robinia pseudo-acacia</i>		X		
COTTONWOOD	<i>Populus deltoides</i>		X		
QUAKING ASPEN	<i>Populus tremuloides</i>		X		
RED MAPLE	<i>Acer rubrum</i>		X		
RED OAK	<i>Quercus rubra</i>		X		
RED PINE	<i>Pinus resinosa</i>		X		
SCOTCH PINE	<i>Pinus sylvestris</i>		X		
SHAGBARK HICKORY	<i>Carya ovata</i>		X		
SWEET CHERRY	<i>Prunus avium</i>		X		
WHITE ASH	<i>Fraxinus americana</i>		X		
WHITE PINE	<i>Pinus strobus</i>		X		
WILLOW	<i>Salix sp.</i>		X		
AUTUMN OLIVE	<i>Elaeagnus umbellata</i>			X	
BAYBERRY	<i>Myrica pensylvanica</i>			X	
BITTERSWEET NIGHTSHADE	<i>Solanum dulcamara</i>			X	
BLACK RASPBERRY	<i>Rubus occidentalis</i>			X	
GRAY DOGWOOD	<i>Comus foemina ssp. racemosa</i>			X	
HAWTHORNE	<i>Crataegus sp.</i>			X	
HONEYSUCKLE	<i>Lonicera sp.</i>			X	
MULTIFLORA ROSE	<i>Rosa multiflora</i>			X	
POISON IVY	<i>Toxicodendron radicans</i>			X	
PURPLE FLOWERING RASPBERRY	<i>Rubus odoratus</i>			X	
RIVERBANK GRAPE	<i>Vitis riparia</i>			X	
SMOOTH SUMAC	<i>Rhus glabra</i>			X	
STAGHORN SUMAC	<i>Rhus hirta</i>			X	
WILD RAISIN	<i>Viburnum lentago</i>			X	
BLACK MUSTARD	<i>Brassica nigra</i>				X
BONESET	<i>Eupatorium rugosum</i>				X
BURDOCK	<i>Arctium vulgare</i>				X
CANADA GOLDENROD	<i>Solidago canadensis</i>				X
CHRISTMAS FERN	<i>Polystichum acrostichoides</i>		/		X
COLTS FOOT	<i>Tussilago farfara</i>				X
COMMON PLANTAIN	<i>Plantago major</i>				X
FLAT-TOPPED ASTER	<i>Aster umbellatus</i>				X
GARLIC MUSTARD	<i>Alliaria petiolata</i>				X
GRASS LEAVED GOLDENROD	<i>Euthamia graminifolia</i>				X
MARGINAL SHIELD FERN	<i>Dryopteris marginalis</i>				X
NEW ENGLAND ASTER	<i>Aster novae-angliae</i>				X
REED CANARY GRASS	<i>Phalaris arundinacea</i>				X
ROUGH STEMMED GOLDENROD	<i>Solidago rugosa</i>				X
SEDGE	<i>Carex cristatella</i>				X
SOLOMON'S SEAL	<i>Polygonatum pubescens</i>				X

**TABLE III  
BIRDS OF OPEN FIELDS**

<b>DATE</b>	<b>LOCATION</b>	<b>SPECIES</b>	<b>OBSERVER</b>
6/8/97	Holmes Hill Rd.	Grasshopper Sparrow	Patricia Martin
6/28/97	Quantz Rd.	Northern Harrier Bobolink Eastern Meadowlark Grasshopper Sparrow Vesper Sparrow	Ann Clarridge
7/2/97	Quantz Rd.	Grasshopper Sparrow Vesper Sparrow	Ann Clarridge Carolyn Cass Dick Mather
7/2/97	Harper's Ferry Rd.	Savannah Sparrow Henslow's Sparrow Chipping Sparrow Field Sparrow	Ann Clarridge Carolyn Cass Dick Mather
7/2/97	Grouse Rd.	Bobolink Eastern Meadowlark Savannah Sparrow Chipping Sparrow Field Sparrow	Ann Clarridge Carolyn Cass Dick Mather
7/2/97	Strutt Street	Bobolink Eastern Meadowlark Savannah Sparrow Chipping Sparrow	Ann Clarridge Carolyn Cass Dick Mather