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# Wetlands in Teays-stage Valleys in Extreme Southeastern Ohio: Formation and Flora

David M. Spooner[1]

Ohio Department of Natural Resources
Fountain Square, Building F
Columbus, Ohio 43224

ABSTRACT. A vegetational survey was conducted of Ohio wetlands within an area drained by the preglacial Marietta River (the main tributary of the Teays River in southeastern Ohio) and along other tributaries of the Teays River to the east of the present-day Scioto River and south of the Marietta River drainage. These wetlands are underlain by a variety of poorly drained sediments, including pre-Illinoian lake silts, Wisconsin lake silts, Wisconsin glacial outwash, and recent alluvium. A number of rare Ohio species occur in these wetlands. They include *Potamogeton pulcher*, *Potamogeton tennesseensis*, *Sagittaria australis*, *Carex debilis* var. *debilis*, *Carex straminea*, *Wolffia papulifera*, *Platanthera peramoena*, *Hypericum tubulosum*, *Viola lanceolata*, *Viola primulifolia*, *Hottonia inflata*, *Gratiola virginiana*, *Gratiola viscidula* var *shortii* and *Utricularia gibba*. In Ohio, none of these wetlands exist in their natural state. They have become wetter in recent years due to beaver activity. This beaver activity is creating open habitats that may be favorable to the increase of many of the rare species. The wetlands are also subject to a variety of destructive influences, including filling, draining, and pollution from adjacent strip mines. All of the communities in these wetlands are secondary.

## INTRODUCTION

Wetlands are uncommon habitats in southeastern Ohio. The botanical diversity of these areas has long been recognized. Beatley (1959) includes a list of over 1,100 vascular plant species collected by Floyd Bartley in Jackson County, Ohio. The Ohio Department of Natural Resources, Division of Natural Areas and Preserves, documents this county as the third most diverse county in Ohio (out of 88) with regard to the number of endangered and threatened vascular plant species (Robert McCance pers. comm. 1982). This diverse county flora is due in part to the wetland habitats well represented in this county.

My work is based on a survey, in a selected portion of these wetlands, to verify old records of rare species, locate new records, and evaluate these wetland areas for possible inclusion in a state nature preserve system. The rare species list consulted is that of the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, 1982. This list varies significantly from an earlier 1980 list and reflects updated information compiled by this Division.

Wetlands were surveyed within an area formerly drained by the preglacial Marietta River (the main tributary of the preglacial Teays River in southeastern Ohio) and along other tributaries of the Teays River to the east of the present-day Scioto River and south of the Marietta River drainage (Fig. 1). Names and maps of these preglacial tributaries are from Stout, Ver Steeg, and Lamb (1943).

The term wetland in this study is defined as a naturally wet area that is generally covered by standing water throughout the spring, during nonflood conditions. This survey does not address artificial bodies of water. The maximum water depth in the study areas is rarely more that four feet. Many of the wetlands are quite small, ranging from a fraction of a hectare to almost 100 hectares. Nearly contiguous wetlands, however, may be connected by periodically moist soil that may harbor many of the characteristic species of the areas.

[1]Present address: Department of Botany
The Ohio State University
Columbus, Ohio 43210

## HISTORY OF DRAINAGE CHANGES AND FORMATION OF WETLANDS IN THE STUDY AREA

The present-day drainage in Ohio bears little resemblance to pre-Pleistocene drainage. Former drainage lines, mostly now abandoned, are evident throughout unglaciated Ohio. In many cases, these old valleys occur at levels higher than present-day streams. Perhaps the first account of such a valley is that of Hildreth (1836), who described an abandoned valley in Washington County, Ohio, that was at one time occupied by Barlow Creek, a headwater tributary of the Marietta River (Fig. 1). This valley had isolated deposits of sediments that Hildreth interpreted as having formed on the floor of an ancient lake.

Subsequent to Hildreth's report, other workers described similar abandoned valleys, with sediments in portions of the valleys. Campbell (1900) studied sediments along an abandoned valley in Cabell and Putnam counties, West Virginia. Tight (1903) provided the first comprehensive account of the drainage system these sediments are deposited in. He named this system the Teays River. Further details of this river were provided by Stout (1916, 1927), Rhodehamel and Carlston (1963), Stout and Lamb (1938), Stout, Ver Steeg and Lamb (1943), and Ver Steeg (1946).

The Teays River originated in the Piedmont of Virginia and North Carolina, flowed across West Virginia, and entered Ohio near Huntington, West Virginia. It followed essentially the route of the Ohio River Valley northwestward to near Wheelersburg in Scioto County, where it became diverted to northward along a now largely abandoned valley east of the present-day Scioto River, cut west to Waverly in Pike County, and flowed northward roughly along the present-day Scioto River Valley as far as Chillicothe (Fig. 1). It then turned northwest across Ohio, then went westward across Indiana and Illinois, and eventually joined the ancient Mississippi River (Ver Steeg 1946). The size of the Teays River was comparable to the Ohio River (Stout et al. 1943). The term "Teays System" is today used to refer to the Teays River and all of its tributaries. The Marietta River was its major tributary in southeastern Ohio (Stout et al. 1943).

The northwestward flow of the Teays River is believed to have been blocked and ponded by an early glacial advance, either the Kansan of pre-Kansan glacier (Stout and Schaff 1931), forming long narrow lakes throughout southeastern Ohio and West Virginia. Wolfe (1942) presents a theoretical extent of this lake, which is called Lake Tight. The sediments deposited on the bed of this lake have been named the Minford Silts (Stout and Schaff 1931). It is unlikely, however, that the extent of Lake Tight as reconstructed by Wolfe was ever present at any one time, but that the lake had different levels and extents at different times, reflecting different stages of glacial advance (Jane Forsyth pers. comm. 1981). The full extent of the lake is not known, but is may have covered extensive portions of southeastern Ohio and adjacent West Virginia and Kentucky. Meijer et al. (1981) mapped swamp forests on lacustrine sediments far south into Kentucky, and suggested that some of these sediments may have been deposited during this early ponding. This lake is believed to have existed for many thousands of years; estimates range from 6,500 to 25,000 years (Hoyer 1976).

The lake became clogged with silts, possibly from many origins. Stout and Schaff (1931) believed that the majority of the sediments originated from materials carried down the Teays River, as these silts are composed largely of micaceous minerals common in the schists of the Piedmont Plateau where the Teays River originated. Hoyer (1976), however, speculated that some of the material originated from glacial materials from the north, or locally from surrounding hills. Jane Forsyth (pers. comm. 1982) has examined these lacustrine deposits in many places throughout the study area. She has found them to be largely calcareous in nature and believes they are of glacial origin.

Eventually, Lake Tight is believed to have spilled westward over old stream divides, cutting new channels, and draining the lake (Stout and Schaff 1931). The new drainage system that resulted bore little resemblance to the Teays drainage. It was termed the Deep-Stage drainage (Stout and Lamb 1938), for in southern Ohio this new system cut channels much deeper than the Teays system. At Wheelersburg, Ohio, there is a 190-foot difference between the rock floor of the Teays River and the rock floor of the Ohio River. The Ohio River Valley in this area at Deep-Stage time was occupied by the Cincinnati River, the master stream of the area (Stout and Lamb 1938).

Deep-Stage drainage in southeastern Ohio occupied valleys very similar to those that exist today. Two subsequent glacial advances, the Illinoian and the Wisconsin, modified certain Deep-Stage valleys by aggradation of the channels by deposition of glacial outwash (Stout et al. 1943).

Many of the sediments deposited in valleys of the study area were subsequently eroded by glacial meltwaters or water from local streams, but lacustrine deposits as thick as 80 feet are known to occur in southeastern Ohio (Stout et al. 1943). The silts deposited in Lake Tight were originally named the Minford Silts by Stout and Schaff (1931), for deposits at the type locality at an exposure along a railroad cut near Minford, Scioto County, Ohio. Hoyer (1976) studied these deposits in detail in portions of Gallia, Jackson, Lawrence, Pike, and Scioto counties, and modified the terminology of earlier workers. Basal sands and gravels of the Teays River, with an average thickness of 20 feet in Hoyer's study area, underlie the silts. Hoyer named these deposits the Gallia Sand Member. Over this lies the "Minford Silts" of Stout

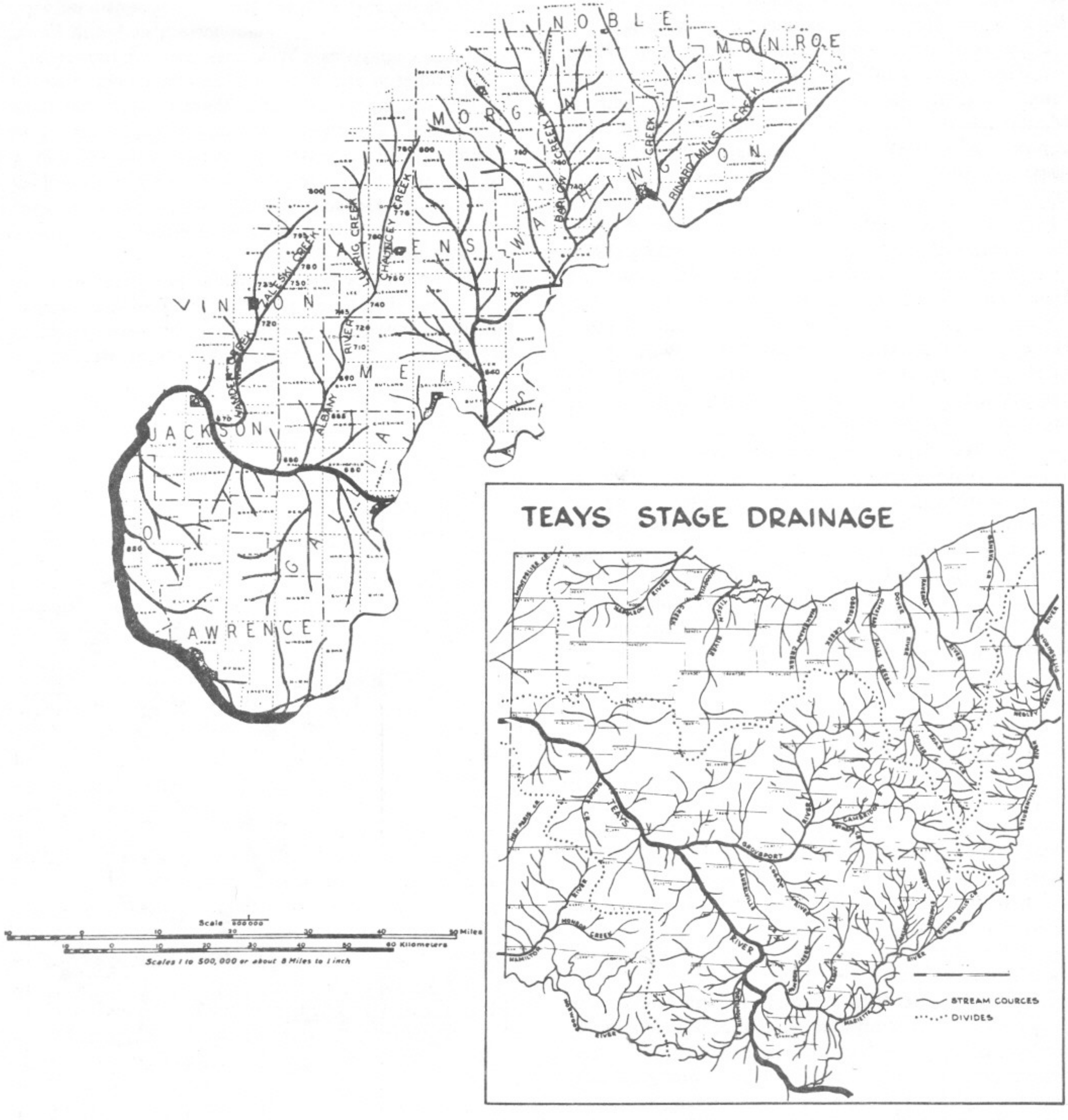


**Figure 1.** Map showing the preglacial Teays drainage in Ohio, from Forsyth (1965). (Modification of a map in Stout, Ver Steeg, and Lamb, 1943); and enlargement of study area (from Stout, Ver Steeg, and Lamb, 1943).

and Schaff (1931), which Hoyer renamed the Minford Clay Member. (He gave no average thickness for his study area.) This deposit is not all clay, however, as Hoyer's term may suggest. The deposit at Minford consists of grey, calcareous alternating silt and clay (Goldthwait et al. 1961). Over the silt and clay are a variety of loamy sediments with an average thickness of 8.3 feet in Hoyer's study area. This loamy sediment is a heterogeneous mixture of alluvium, colluvium, and loess (Hoyer 1976).

The "Minford Silts" are widely distributed and are found in areas near the headwaters of the preglacial Marietta River. Collins and Smith (1977) map these deposits in the vicinity of preglacial Barlow Creek in western Washington County, and report that they are at least five feet thick in places. Barlow Creek is the area where Hildreth (1838) reported the occurrence of lacustrine sediments. Sturgeon (1958) and Bossong (1975) map these deposits in Athens County, and Stout and Schaff (1931) mention that these deposits are found in Adams, Scioto, Pike, Lawrence, Jackson, Vinton, Hocking, Gallia, Meigs, Athens, Perry, Washington, Noble, and parts of several other counties. Beatley (1959) mapped areas where these deposits probably occur in Jackson and Vinton counties.

The Hocking, Muskingum, and Scioto rivers served as channels for glacial meltwaters. A series of Illinoian and Wisconsin outwash terraces are present along the Hocking River, and Wisconsin and Illinoian lake silts are present along Sunday and Monday creeks and other tributaries of the Hocking River (Birkheimer 1971, Goldthwait et al. 1961, Hall 1951, Kempton 1956, Kempton and Goldthwait 1959, Merrill 1953, Stonestreet 1965, and Sturgeon 1958). Lakes were formed as backwater areas in tributaries became dammed by Illinoian and Wisconsin glacial outwash in the main streams (Stonestreet, 1965). Laminated clays, silts, and sands accumulated in these valleys in the slackwater conditions of these lakes. Most of these deposits were eroded away during interglacial times, but some remain in places along the sides of these tributaries (Stonestreet, 1965). Wisconsin and Illinoian outwash terraces are also present along the Ohio and Scioto rivers (Bossong 1975, Goldthwait et al. 1961, Hubbard 1954, Kempton and Goldthwait 1954).

In summary, the wetlands in the study area are underlain by a variety of sediments. The most extensive sediment type under these wetlands, present probably in every county in the study area but best represented in the southern portion, are the Minford Silts (Minford Clay member of Hoyer 1976). Other wetlands along Sunday and Monday creeks, tributaries of the Hocking River, are underlain by Wisconsin slackwater lake sediments (Merrill 1953, Stonestreet 1965). A few wetlands occur on recent alluvium along portions of Raccoon Creek and Little Raccoon Creek. Wetlands along these streams occur in areas outside of the postulated areas of the occurrence of the Minford Silts as mapped by Beatley (1959). In addition, some soil types found along Little Raccoon Creek are those that characteristically form on recent alluvium (Alexander Ritchie pers. comm. 1982). A few wetlands occur on cut terraces along the Ohio River near Haverhill in Scioto County, and near Burlington and Proctorville in Lawrence County. Hubbard (1954) interprets the Haverhill terrace as a Wisconsin outwash terrace. He interprets a similar terrace at South Point, Lawrence County, as a Wisconsin outwash terrace also. The Burlington and Proctorville wetlands occur on cut terraces not mentioned in Hubbard's paper, but these terraces occur slightly upstream on levels accordant to the South Point terrace and are probably also on a Wisconsin outwash terrace. Figure 2 shows the location of all of the wetlands in Jackson County, Ohio, showing their relationship in most cases to present or preglacial drainage lines.

Soils developed on these wetlands vary according to the geological materials present. The list of soils below is far from complete but was all of the information of recent soils data available at the time of this writing. Recent soils

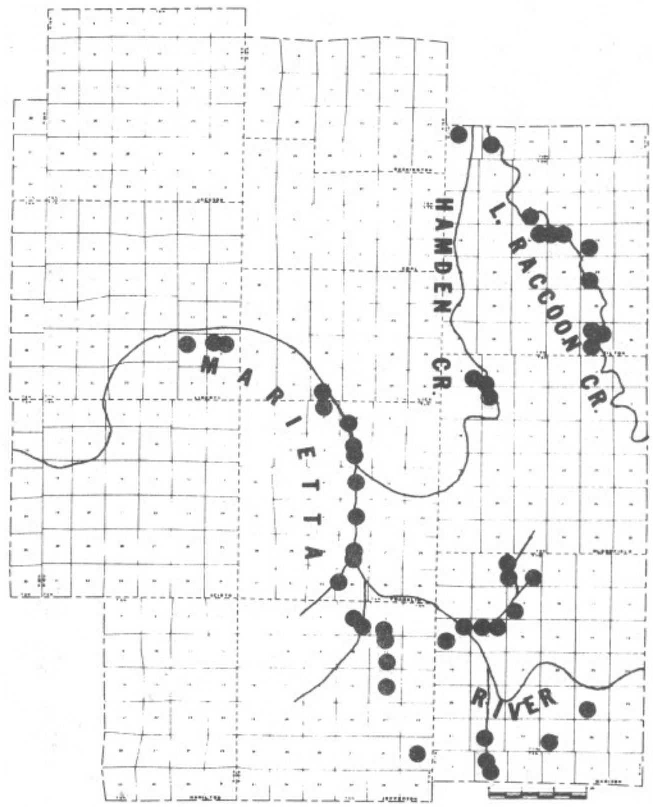


**Figure 2.** The location of wetlands in Jackson County, Ohio. The squares on the map are township sections, approximately one square mile in area. The Marietta River and some of its tributaries, including Hamden Creek, are pre-glacial drainages. Little Raccoon Creek is a modern stream.

data are not yet complete for all of the counties in the study area. A recent soil survey does exist, however, for Washington County (Lessig et al. 1977) and surveys are in press for Athens and Jackson counties. Surveys are also in progress for Gallia, Scioto, and Pike counties. Information presented below is drawn from examination of completed or nearly completed soil surveys or from information provided (1982) by Alexander Ritchie, soil scientist with the Ohio Department of Natural Resources, Division of Lands and Soils.

Soils along some wetlands along Sunday and Monday creeks in Athens County are mapped as Fitchville Silt Loam. These wetlands occur along preglacial headwater tributary valleys of the Marietta River, and are underlain by Wisconsin Lake Silts (Sturgeon 1958). Soil on a wetland along Margaret Creek in Athens County in the valley of the preglacial Albany River, formed on recent alluvium (Sturgeon 1958), is mapped as Nolan Silt Loam. Soil of a wet field along preglacial Barlow Creek, a headwater tributary of the Marietta River, underlain by Minford Silts (Collins and Smith 1977), is mapped as Taggart Silt Loam. Soil in a wetland along the Ohio River in Scioto County, underlain by Wisconsin glacial outwash (Hubbard 1954), is mapped as Weinbach Silt Loam and Peoga Silt Loam. Soils of wetlands along the lower courses of the preglacial Marietta River drainage are mapped as Doles Silt Loam and Piopolis Silt Loam. The Piopolis Silt Loam is the most common soil type in the southern portion of the study area. All of the above soils, except the Nolan Silt Loam, are characterized by an aquic moisture regime (U.S. Dept. Agr. 1975). They have poor internal drainage and may be wet during parts of the year. On the other hand, according to Beatley (1959), many of the wetland soils in Jackson and Vinton counties can become quite droughty later in the growing season. This droughtiness was evident throughout my study. Many areas that were covered by standing water in the spring had very dry soil with surface cracks later in the season.

## VEGETATION OF THE WETLANDS

### Methods

Wetlands in the study area were located by noting marsh, swamp, depression, or natural open-water symbols on 7.5 minute topographic maps. In addition, many valleys near such areas were also examined. Teays River tributaries were all examined on 7.5 minute topographic maps as possible locations of wetlands. The map in Stout et al. (1943) was used, but the maps in Beatley (1959), Collins and Smith (1977), Sturgeon (1958), and Tight (1903) were more useful due to their greater detail.

Location data for rare species previously collected from these areas were obtained from the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, data base of rare elements of diversity in the state. Specimens collected during my study are deposited in herbaria at Kent State University, Miami University, and The Ohio State University. Data sheets are deposited at the Ohio Department of Natural Resources, Division of Natural Areas and Preserves.

### Results and Discussion

Previous botanical studies have been conducted in these wetlands. Beatley (1959) discussed the wetlands in Jackson and Vinton counties and described: a pin oak-red maple association on tight clays underlain by a clay pan in depressions and flats; an elm-sycamore-river birch-red maple association on alluvial bottoms or various mixtures of sands, silts and clays; an elm-white ash-red maple association in areas with better drainage and aeration conditions, and a cattail to sedge meadow to alder, buttonbush, swamp rose succession in the wettest areas. Rypma (1961) discussed various swamp-forest types along the Ohio, Muskingum, and Hocking river valleys in Athens and Washington counties. He described a willow-sycamore-soft maple association in poorly drained areas away from river banks, a pin oak-bur oak association along Sunday Creek Valley, and a cattail-sedge meadow to alder-buttonbush-willow to willow-elm-soft maple succession in the wettest areas. Cusick and Silberhorn (1977) discussed swamp forests and wetlands of the unglaciated Allegheny Plateau of Ohio, and state that swamp white oak and black willow are dominants on the wettest sites, and that American elm, sycamore, silver maple, Ohio buckeye, and in extreme southern Ohio, sweet gum, are dominants on the less wet areas. The results of my research are largely in agreement with those of these previous studies. Beatley's (1959) classic analysis is especially complete and descriptive. Pin oak-red maple is a well-defined type on areas underlain by Minford Clays, and in some swamps along Sunday and Monday creeks underlain by Wisconsin Lake Silts (Sturgeon 1958, Stonestreet 1965). Pin oak was apparently overlooked in these sites by Rypma (1961), who reported it missing. Swamp white oak, white ash, green ash, red elm, and American elm are present in lesser amounts.

All of the vegetation in the study sites is secondary, and almost all communities are very young and disturbed. In these successional communities occur many different combinations of red maple, silver maple, river birch, red elm, American elm, and black willow. By far the most common of the above is red maple. River birch commonly occurs in depressions away from flowing water as well as along water courses. Sycamore can be found in better-drained swamps on recent alluvium. Sweet gum is locally common in swamps along the Ohio River and in more southern portions of the study area.

Individual species found in these communities are listed in Table 1. The statewide rarity of these plants, according to the Ohio Department of Natural Resources,

**Table 1.** Species found in southeastern Ohio Teays Valley wetlands.

Standing water in open sunny areas:

ZOSTERACEAE
*Potamogeton diversifolius* Raf.
*Potamogeton foliosus* Raf.
*Potamogeton pulcher* Tuckerm., (E) I
*Potamogeton tennesseensis* Fern., (E) I

NAJADACEAE
*Najas minor* All., C

LEMNACEAE
*Lemna minor* L., C
*Spirodela polyrhiza* (L.) Schleid.
*Wolffia columbiana* Karst.
*Wolffia papulifera* C. H. Thompson, (T) I

CERATOPHYLLACEAE
*Ceratophyllum demersum* L.

NYMPHAEACEAE
*Brasenia schreberi* Gmel., I
*Nelumbo lutea* (Willd.) Pers., I
*Nuphar advena* (Ait.) Ait. f.
*Nymphaea tuberosa* Paine

PRIMULACEAE
*Hottonia inflata* Ell., (E) I

LENTIBULARIACEAE
*Utricularia gibba* L., (P) I

RUBIACEAE
*Cephalanthus occidentalis* L., C

Water margins or moist areas adjacent to open water in open sunny areas:

TYPHACEAE
*Typha latifolia* L., C

SPARGANIACEAE
*Sparganium americanum* Nutt., C

GRAMINEAE
*Leersia oryzoides* (L.) Sw.

CYPERACEAE
*Scirpus cyperinus* (L.) Kunth, C
*Scirpus atrovirens* Willd., C

ARACEAE
*Acorus calamus* L.

CORYLACEAE
*Alnus serrulata* (Ait.) Willd., C

POLYGONACEAE
*Polygonum hydropiperoides* Michx., C

ANACARDIACEAE
*Rhus radicans* L.

ROSACEAE
*Rosa palustris* Marsh., C
*Spiraea tomentosa* L.

CORNACEAE
*Cornus amomum* Mill., C

CAPRIFOLIACEAE
*Sambucus canadensis* L.

Open or partially shaded areas with moist soil throughout the wetlands:

POLYPODIACEAE
*Onoclea sensibilis* L.

SPARGANIACEAE
*Sparganium americanum* Nutt.
*Sparganium eurycarpum* Engelm., I

ALISMATACEAE
*Alisma subcordatum* Raf.
*Sagittaria australis* (J. G. Smith) Small, (P) I
*Sagittaria brevirostra* Mackenz. & Bush
*Sagittaria latifolia* Willd.

GRAMINEAE
*Cinna arundiacea* L.
*Echinocloa crusgalli* (L.) Beauv.
*Eragrostis hypnoides* (Lam.) BSP.
*Glyceria septentrionalis* Hitchc., C
*Panicum microcarpon* Muhl.
*Panicum stipatum* Nash.
*Phalaris arundinacea* L.

CYPERACEAE
*Carex annectens* Bickn.
*Carex bromoides* Schkuhr
*Carex comosa* Boott
*Carex debilis* Michx. var *debilis*, (E) I
*Carex frankii* Kunth
*Carex incomperta* Bickn., I
*Carex intumescens* Rudge, C
*Carex lacustris* Willd.
*Carex lupuliformis* Sartwell, (P) I
*Carex lupulina* Muhl, C
*Carex lurida* Wahlenb., C
*Carex scoparia* Schkuhr
*Carex squarrosa* L.
*Carex straminea* Willd., (E) I
*Carex tribuloides* Wahlenb.
*Carex tuckermanii* Boott, I
*Carex vulpinoidea* Michx.
*Cyperus esculentus* L.
*Cyperus strigosus* L., C
*Eleocharis acicularis* (L.) R. & S.
*Eleocharis obtusa* (Willd.) Schultes
*Scirpus pendulus* Muhl.
*Scirpus validus* Vahl.

JUNCACEAE
*Juncus biflorus Ell.*
*Juncus effusus* L., C
*Juncus tenuis* Willd.

ORCHIDACEAE
*Platanthera peramoena* Gray., (P) I

URTICACEAE
*Boehmeria cylindrica* (L.) Sw.
*Pilea pumila* (L.) Gray

POLYGONACEAE
*Polygonum arifolium* L.
*Polygonum coccineum* Muhl.
*Polygonum convolvulus* L.
*Polygonum pensylvanicum* L.
*Polygonum punctatum* Ell., C
*Polygonum sagittatum* L., C

CALLITRICHACEAE
*Callitriche heterophylla* Pursh

**Table 1** Continued.

| | |
|---|---|
| UMBELLIFERAE | BALSAMINACEAE |
| *Cicuta maculata* L. | *Impatiens capensis* Meerb., C |
| PRIMULACEAE | MALVACEAE |
| *Decodon verticillatus* (L.) Ell. | *Hibiscus militaris* Cav., I |
| *Lysimachia nummularia* L. | *Hibiscus moscheutos* L. |
| *Samolus parviflorus* Raf., I | *Hibiscus palustris* L. |
| ASCLEPIADACEAE | HYPERICACEAE |
| *Asclepias incarnata* L. | *Hypericum mutilum* L. |
| CONVOVULACEAE | *Hypericum tubulosum* Walt., (T) I |
| *Cuscuta gronovii* Willd. | VIOLACEAE |
| VERBENACEAE | *Viola lanceolata* L., (E) I |
| *Verbena hastata* L. | *Viola primulifolia* L., (E) I |
| LABIATAE | RANUNCULACEAE |
| *Lycopus americanus* Muhl. | *Ranunculus septentrionalis* Poir. |
| *Lycopus virginicus* L. | *Thalictrum polygamum* Muhl. |
| *Mimulus alatus* Ait. | CRUCIFERAE |
| *Mimulus ringens* L. | *Cardamine pensylvanica* Muhl. |
| *Scutellaria lateriflora* L. | *Rorippa palustris* (L.) Bess. |
| SCROPHULARIACEAE | CRASSULACEAE |
| *Chelone glabra* L. | *Penthorum sedoides* L. |
| *Lindernia dubia* (L.) Pennell | ROSACEAE |
| *Gratiola virginiana* L., (T) I | *Agrimonia parviflora* Ait., C |
| *Gratiola viscidula* Pennell var *shortii* (Pennell) Gleason, (T) I | LEGUMINOSAE |
| RUBIACEAE | *Apios americana* Medic. |
| *Diodia virginiana* L., (T) I | MELASTOMATACEAE |
| *Galium tinctorium* Michx., C | *Rhexia virginica* L., (P) I |
| CAMPANULACEAE | ONAGRACEAE |
| *Lobelia cardinalis* L. | *Ludwigia alternifolia* L. |
| COMPOSITAE | *Ludwigia palustris* (L.) Ell., C |
| *Bidens tripartita* L., C | *Ludwigia polycarpa* Short & Peter |
| *Eclipta alba* (L.) Hassk. | *Oenothera pilosella* Raf., I |
| *Erechtites hieracifolia* (L.) Raf. | HALORAGACEAE |
| *Eupatorium fistulosum* Barratt | *Proserpinaca palustris* L. |
| *Eupatorium perfoliatum* L. | |

Division of Natural Areas and Preserves (1982) is given in parenthesis after the names of the rare species. These symbols are: (P) = potentially threatened, (T) = threatened, and (E) = endangered. In addition, common species occurring in these wetland areas are designated by C, and infrequently encountered species are designated by I. Species lacking such designations occur with intermediate frequencies, but may be common in some areas.

These wetlands harbor many species rare to Ohio. Post-1950 occurrences of certain of these species are mapped in Figures 3 and 4. They are discussed below.

*Gratiola viscidula* var. *shortii* is apparently a rare endemic in southeastern Ohio and adjacent West Virginia and Kentucky. *Gratiola viscidula* var. *shortii* was originally described as *G. viscidula* subsp. *shortii* by Pennell (1935), but was subsequently given varietal status by Gleason (1952). It differs from *Gratiola viscidula* var. *viscidula* by its larger sepals, leaves, and petals. Pennell (1935) had a Floyd Bartley specimen of this variety from Jackson County, Ohio, and a C. W. Short specimen of this variety from an unspecified site in Kentucky. It was subsequently collected in Gallia and Scioto counties, Ohio, in Putnam County, West Virginia (Cooperrider 1976), and in Mason County, West Virginia (Brumfield et al. 1981). In 1980, the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, classified it as an endangered species. It is now documented from a number of sites in wetlands in the study area, including Pike County. No extant Kentucky sites are known, but it should be sought in wetlands underlain by lacustrine sediments in the Teays-stage valleys.

*Platanthera peramoena* is widely scattered throughout these wetlands, with most of its Ohio localities occurring in these areas. It is also known from wet acidic soils on the Illinoian Till Plain of Ohio. It was formerly considered for listing as a federally threatened species, but has subsequently been withdrawn from consideration for federal listing. Its distribution is discussed at length elsewhere (Spooner and Shelly, Rhodora, in press).

Lowland species existing during Teays time are postulated by Wolfe (1942) to have been eliminated in the

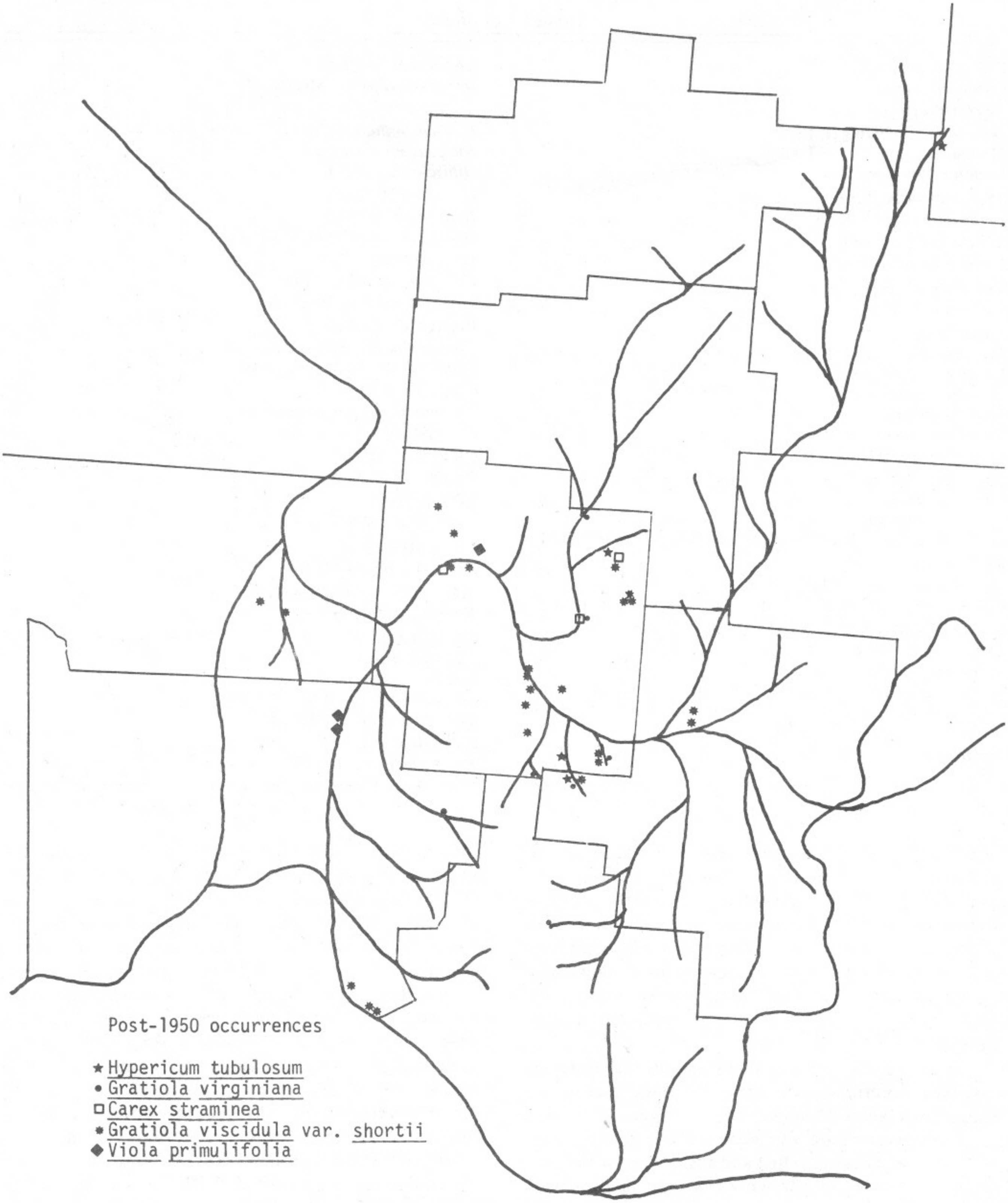


**Figure 3.** Post-1950 occurrences of some rare species in southeastern Ohio superimposed over a map of the Teays Drainage System.

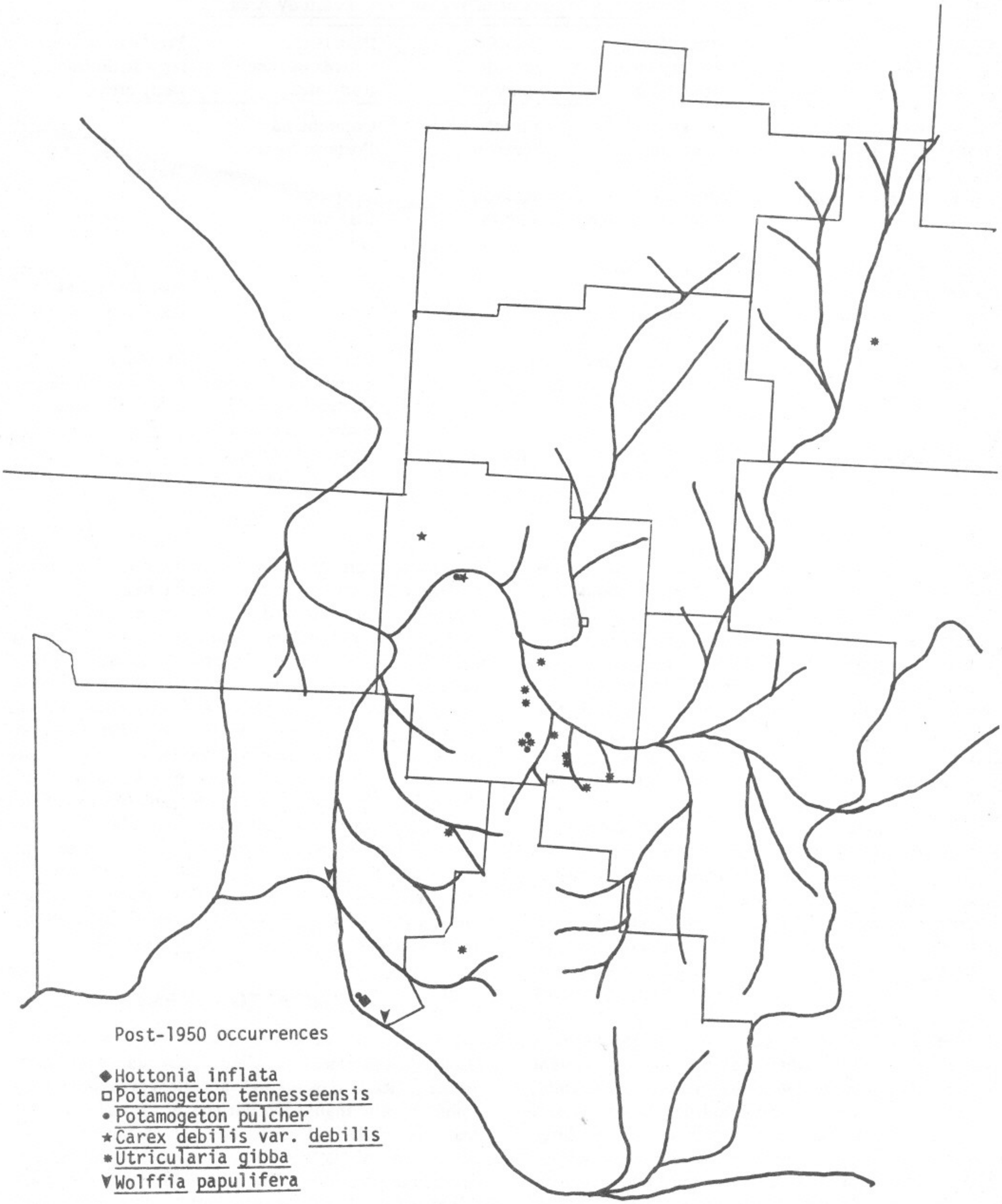


**Figure 4.** Post-1950 occurrences of some rare species in southeastern Ohio superimposed over a map of the Teays Drainage System.

**Table 2.** Some Rare Ohio Species in Wetlands of the Study Area.

| Species | Post-1950 county records in study area | Pre-1950 records in study area | Post-1950 records outside study area | Pre-1950 records outside study area |
|---|---|---|---|---|
| *Potamogeton tennesseensis* | Jackson | Vinton | Columbiana | |
| *Potamogeton pulcher* | Jackson, Scioto | Jackson | Portage, Summit | |
| *Carex straminea* | Jackson | | | Wayne |
| *Carex debilis* var. *debilis* | Jackson | Jackson | | |
| *Hypericum tubulosum* | Jackson, Morgan | Vinton | Columbiana, Guernsey | |
| *Viola primulifolia* | Jackson, Scioto | | | Portage |
| *Hottonia inflata* | Scioto | | | Ashtabula, Lake |
| *Gratiola virginiana* | Gallia, Jackson, Lawrence, Scioto | | | Clermont, Erie |
| *Utricularia gibba* | Athens, Gallia, Jackson, Lawrence, Scioto | | Champaign, Cuyahoga, Holmes, Portage, Stark, Summit, Trumbull | Defiance, Erie, Fairfield, Franklin, Geauga, Wayne |
| *Wolffia papulifera* | Scioto | Jackson | Greene, Lorain, Portage, Warren | |

inundated valleys covered by Lake Tight. However, it is possible that many of these wetland species could have survived such an inundation. Small pockets of wetland habitats have been formed about Lake Katharine, a relatively undisturbed artificial lake in Jackson County. These wetland habitats contain many of the characteristic species of the wetlands of the study area. Lake Katharine was formed in the late 1930s by the damming of Rock Run. The waters rose about 20 feet in a year or two, probably much faster than the rising waters of Lake Tight.

Wetlands in the study area have become much wetter and more open in recent years, due to beaver activity. The beaver was extirpated from Ohio about 1800 and was not recorded again in the state until 1936. The first statewide beaver survey, made in 1947, revealed 25 active colonies containing 100 to 124 animals in 11 counties. By 1980, 12,390 beavers in 43 counties were recorded in Ohio. The majority of these were in northeastern Ohio, but many occurred in southeastern Ohio (Bednarik 1981). Many of the wetlands have dead standing trees indicating a formerly wooded habitat. Beaver activity is evident throughout the area. One large marsh in Jackson County, "Baker Swamp," was formerly wooded with large trees. A longtime resident of the area mentioned that the large trees in the swamp were cut for timber a number of years ago, and beaver came in soon afterward and raised the water level and leveled all remaining trees. The more open condition throughout these wetlands has provided increased habitat for many of the rare species.

These wetlands are subject to a variety of destructive influences, many of which are apparently not favorable for an increase in rare plant species. As some of the larger Teays valleys are natural transportation corridors, roads and railroads now traverse many of the areas. The natural drainage has been affected in some cases both by artificial drainage and by ponding. Many of the wetlands have been drained or filled in for agricultural uses. All have been logged. Perhaps the most destructive influence, however, has been acid runoff and sedimentation from abandoned coal mines. Evidence of pollution from nearby mines was evident in many places in this study area. Many of these wetlands occupy low, flat positions that make them natural basins in which this runoff can accumulate. Mining is still active in southeastern Ohio and will therefore pose a continuing threat to these areas.

Wetlands are uncommon habitats in this area of Ohio. They harbor rare Ohio species and are a significant factor to the natural diversity of the area. It is hoped that some will be preserved for future generations.

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