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A Taxonomic and Distributional Study of the Aquatic Vascular Plants of Northeastern North Dakota

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A TAXONOMIC AND DISTRIBUTIONAL STUDY OF THE AQUATIC VASCULAR PLANTS OF NORTHEASTERN NORTH DAKOTA

by
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This Thesis submitted by Leighton Kaloupek in partial fulfillment of the requirements for the Degree of Master of Science from the University of North Dakota is hereby approved by the Faculty Advisory Committee under whom the work has been done.

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Date May 2, 1972

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ABSTRACT

Aquatic vascular plants were collected in Walsh, Grand Forks, and Traill Counties, North Dakota, a tier of counties that lie in two physiographic areas; the Red River Valley and Drift Prairie. Collection sites were selected on a geographical basis to include all types of aquatic habitats. A total of 470 collections encompassing 141 species was made during one field season. A sum of 204 species was recorded by the inclusion of records from North Dakota and Minnesota herbaria. Analyses of the 470 collections revealed two species not previously recorded for North Dakota: Carex lenticularis and Ranunculus longirostris, and an extension of range for the following species: Sparganium chlorocarpum, Zannichellia palustris, Sagittaria latifolia, Vallisneria americana, Glyceria borealis, Alopecurus pratensis, Cyperus erythrorhizos, Eleocharis acicularis, Carex sartwelli, Carex atherodes, Juncus torreyi, Rumex maritimus, Ceratophyllum demersum, Ranunculus aquatilis, Ranunculus gmelini, Armoracia rusticana, Callitriche verna, Myriophyllum verticillatum, Hippuris vulgaris, Lysimachia hybrida, Lysimachia thyrsiflora, Asclepias incarnata, Gerardia tenuifolia, Utricularia vulgaris, Lobelia kalmii, Aster junciformis, and Cirsium muticum.

INTRODUCTION

Manuals available for identification of aquatic vascular plants invariably differ in their criteria for delimiting a vascular aquatic from a terrestrial plant. True hydrophytes, i.e., submerged, emergent and floating aquatics are not in question, but those on the periphery of a body of water or in other wet soil areas, including bogs, may or may not be included. In this investigation all plants of wet soil also were included after adherence to the definition of Smith (1966): "without standing water during growing season; waterlogged to within a few inches of surface."

The vascular plants of North Dakota have been studied on a statewide basis (Stevens, 1963), however the work on aquatic vascular plants has been limited to a small geographical range and has centered on areas of standing water. The need for a thorough study of the aquatics was conceived after surveying the plant collections at the University of North Dakota. This led to the realization that a sustained study of the aquatics within a circumscribed area of the Red River drainage system might yield worthwhile results.

MATERIALS AND METHODS

There are a number of species included in this study that were seen infrequently or not observed in the field by the author. It was necessary that their status as an aquatic be contingent on the determination of their habitat according to Stevens (1963), Gleason and Cronquist (1963), Fassett (1969), Fernald (1950), Löve and Löve (1954) and a list of aquatic plants prepared by the aquatic plants class of the University of North Dakota in 1964 under the direction of Dr. Vera Facey. The four former references were used in addition to Pohl's work on grasses (1968) as the basis for the description of taxa, while the nomenclature follows that of Gleason and Cronquist (1963). The abundance of each species, according to the system of Oosting (1956), is included as a part of the description of taxa.

The species distribution section includes records of specimens obtained during visits to the University of Minnesota herbarium in March, 1971 and North Dakota State University herbarium in April and May, 1971 in addition to those at the University of North Dakota (including my voucher specimens from the 1970 field season).

Plants were collected in Grand Forks County during the entire 1970 field season while plants were collected in Traill and Walsh Counties beginning in August. Collection sites were chosen to approximate equal geographical coverage and include the different habitats of aquatic

vascular plants. Random collection of a few specimens was made when interesting plants were noted while traveling from one collection site to another. The period between collections at each site ranged from one to two weeks.

The procedure used in this thesis for recording each specimen collected includes the locality, date, and collector. For example, a collection of Ranunculus cymbalaria is listed as 149-50-3; 6-15-70; Kaloupek 67. The 149-50-3 indicates Township 149 North, Range 50 West, and section 3. The 6-15-70 indicates the collection was made on June 15, 1970. Kaloupek 67 indicates the collector and his collection number. A locality cited as 3 N of Hendrum indicates 3 miles north of Hendrum.

Three abbreviations are used for frequently listed localities in Grand Forks County. F.R.B.S. denotes the Forest River Biology Station located at 154-55-14; O.P., Oakville Prairie located at 151-52-16; and T.R. St. Park, Turtle River State Park located at 152-54-36.

Species distribution maps are in Appendix A. Symbols according to the legend on each map indicate the locality where a collection was made. The symbols are a figurative representation of the localities listed in the species distribution section.

HISTORY OF BOTANICAL COLLECTING IN NORTH DAKOTA

The early 1800's marked the first time explorers entered North Dakota for the purpose of surveying the land and, incidentally, its plants and animals. Five expeditions passed through North Dakota from 1804 to 1839 according to McKelvey (1955). The first was the Lewis and Clark expedition, which passed through North Dakota in 1804 and 1806. This was followed by those of John Bradbury in 1811, Stephen Long in 1823, Maximilian Philipp in 1833-4, and by the Joseph Nicollet expedition in 1839. The collection of plants was the one goal all of these expeditions had in common.

The main purpose of the Lewis and Clark expedition was to survey the land west of the Mississippi River. They were also instructed to make collections of plants. No trained scientist was with the group; however, Lewis proved to be very adept at collecting and making notes of his observations. Their first collections from North Dakota were made in the late summer and early fall of 1804 during their trip up the Missouri River from St. Louis. On this expedition however, the majority of plants were collected in 1806 during their return trip, which once again followed the Missouri River. These were the first botanical collections made in the Dakotas.

The Bradbury and Maximilian expeditions followed the Missouri River as had Lewis and Clark. Their main objective was to obtain plant

specimens. The Bradbury expedition was accompanied by Thomas Nuttall, a botanist. They made their way up the Missouri River, reaching North Dakota in late spring. From a point just a few miles south of the North Dakota border, Bradbury took an overland route and Nuttall continued by boat, both reaching Fort Mandan in June, 1811. They returned to St. Louis that same summer. A number of new species were described and published by Nuttall from his collections, whereas those collected by Bradbury were similarly studied by Frederick Pursh. About 250 specimens of Bradbury's Dakota collection are located at the Botanic Garden at Liverpool, England.

Maximilian left St. Louis on April 10, 1833. He overwintered at Fort McKenzie, Montana, and returned to St. Louis the following spring. He collected about 200 species in the Dakotas and Montana, including one new species from the western part of North Dakota.

The Long and Nicollet expeditions were primarily for surveying, the collecting of plants being of secondary importance. Both expeditions included an exploration of the eastern part of North Dakota. Probably the botanical importance of these trips was substantial, but unfortunately the majority of plants from both parties were lost in shipment.

The Stephen Long party was instructed to follow the Red River north to the 49th parallel and then east to the Great Lakes. Thomas Say was hired as botanist for the trip. The party traveled up the Minnesota River, reaching the headwaters of the Red River of the North on July 27. Say collected in North Dakota from that date until August 5, when the

group reached Pembina. Lewis D. von Schweinitz identified the plants Say had collected and in a publication described 130 species, including 2 new species found in the environs of the Red River. Apparently his descriptions were poor, as few of them have been related to extant species.

The Nicollet expedition was organized for the purpose of charting the region drained by the Red River. As no botanist was hired to accompany the party, Nicollet engaged the services of Charles Geyer at his own expense. The men explored the valley of the James River as far north as Bone Hill, near Dickey, North Dakota. From there the group proceeded northeast to the valley of the Sheyenne River. They followed the valley north to southernmost Nelson County, where they then turned northwest until they reached Devil's Lake. The party spent six days examining the shores of Devil's Lake, subsequently traveling east to about 97° 30' where they turned south, eventually crossing the sources of the Wild Rice River before entering South Dakota.

During the summer of 1873, Elliott Coues and George Dawson collected plants along the 49th parallel in North Dakota. The majority of plants were collected near Pembina and in the valley of the Souris River. These records were later published in conjunction with the records of a collection from Montana. A total of 692 species were listed, but unfortunately these were not separated into Montana and North Dakota collections (Chickering, 1878).

Bolley and Waldron (1900) published the first list of plants solely

from North Dakota. It contained 775 species and varieties of vascular plants. Waldron (1904) later added 124 species.

Lunell published numerous articles from 1910 to 1918 concerning new varieties and species for North Dakota, including a list of North Dakota plants from his own collections. He spent less than 30 years in North Dakota and yet he collected more than 40,000 plants. Most of his collections are now located in the University of Minnesota herbarium, with a considerable number in the University of North Dakota herbarium. He is among the better known botanists of North Dakota due to the large collection of specimens in his private herbarium and the number of his publications. He was also controversial because his articles and descriptions of 74 new species and 104 new varieties relied almost solely on his own collections, and lacked confirmation from other sources. Many of the plants which he described as new species are considered by botanists to be similar to previously named species or varieties. He also added confusion to the nomenclature by not adhering to rules of priority that had been emphasized in the articles of Dr. J. A. Nieuwland. In spite of these detractions he remained an authority on the ecology and taxonomy of the Great Plains flora (Lunell, 1910-1918).

Bergman (1913) published the first Flora of North Dakota. In addition to plant descriptions, the publication contained an initial key to families plus keys within each family and genus where needed. A history of the area, geology, physiography, drainage, vegetation, and distribution were also included.

Nine years later Stevens, of the North Dakota Agricultural College, published a supplement to Bergman's flora. He added 52 new species to the North Dakota flora and included valuable information for known species (Stevens, 1922).

Numerous plants were discovered after 1922 but they were not mentioned in the literature until 1950 when Stevens published a Handbook of North Dakota Plants. The format of this work was similar to that used by Bergman in the original flora (Stevens, 1950). He supplemented his flora in 1963 by adding 60 species to the 1950 edition (Stevens, 1963), an addendum previously published in Rhodora (Stevens, 1961).

The earliest exclusive work on the aquatics of North Dakota was done by Metcalf and Mabbott in 1917. They passed through 33 counties gathering information on the food plants of migratory waterfowl in the State. Mabbott spent eight days in Grand Forks and Walsh Counties (Metcalf, 1931).

In the last decade several studies have included work on aquatics, but only one of them has been principally taxonomic. Dix and Smeins (1967) included a number of marshes in Nelson County in an ecological study of the vegetation of the area. Of the 268 species studied, 86 were aquatic. Burgess and Disrud (1969), in an ecological study on the pothole and small lake vegetation of the Turtle Mountains, reported 41 families and 144 species. In 1970 Stewart published a taxonomic list of 9 species representing new records for North Dakota and an additional list of 131 species as range extensions. This was the result of 10 years of

collecting in various parts of the state by Stewart and associates. These plants are located at the Northern Prairie Wildlife Research Center at Jamestown, North Dakota (Stewart, 1970). The most recent work to be published is that of Stewart and Kantrud (1972). It is an ecological investigation of the prairie pothole vegetation of North Dakota.

GEOGRAPHY OF STUDY AREA

Location.--Walsh, Grand Forks, and Traill Counties, which shall collectively be referred to as the study area, are situated in northeast North Dakota. Figure 1 shows the location of the study area within North Dakota.

Area.--There is a total of 9285 square kilometers (3585 square miles) in the study area; of these 3331 (1286) are in Walsh County, 3724 (1438) in Grand Forks County, and 2230 (861) in Traill County (World Almanac, 1971).

Climate.--The study area, situated in the center of the North American interior plains, has a continental climate. It is far removed from tempering influences such as extensive forests or large bodies of water; and, as a result, the daily weather is subject to rapid fluctuations. Summers are hot and winters cold. Grand Forks has an annual mean temperature of 4.2° C (39.6° F). The month with the highest mean temperature is July with 21.4° C (70.5° F); the month with the lowest mean temperature is January with -15.3° C (4.5° F). Table 1 includes the mean temperatures of selected weather stations within the study area.

The average annual total precipitation for Grand Forks, Grand Forks County, is 51.1 cm (20.12 inches). The month with the highest average amount of precipitation is June, with 8.9 cm (3.52 inches); the

Fig. 1.--Map of North Dakota: Location of the Study Area

1. Walsh County
2. Grand Forks County
3. Traill County

(Modified from H. M. Leppart, 1939)

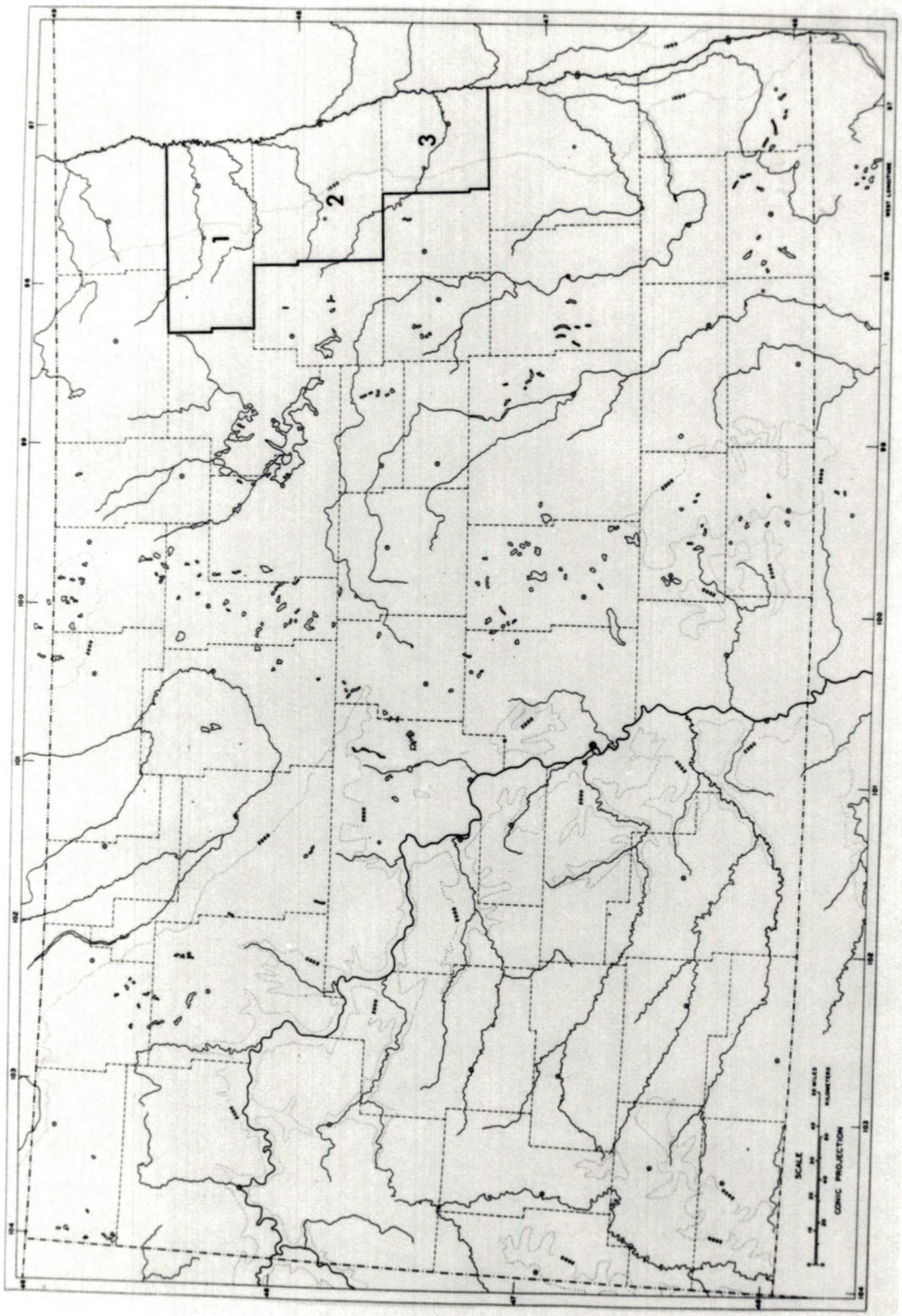

1
2
3
SCALE
CONIC PROJECTION

TABLE 1

MEAN TEMPERATURES FOR SELECTED WEATHER STATIONS[a]
(Temperatures in Degrees Centigrade)
(Elevation in Meters)

	County	Annual	Warmest Month		Coldest Month		Elevation
Grafton	Walsh	4.3	July	21.3	January	-15.2	252
Grand Forks	Grand Forks	4.2	July	21.4	January	-15.3	253
Hillsboro	Traill	4.9	July	21.8	January	-14.1	275
Larimore	Grand Forks	4.2	July	21.3	January	-14.8	346
Mayville	Traill	5.1	July	21.9	January	-13.9	297
Park River	Walsh	4.1	July	21.0	January	-15.2	304

[a]1946-1966

Source: Climatological Data. Annual Summary 1970. 1971. 4 p.

month with the lowest average amount of precipitation is February with 1.3 cm (0.53 inch). Table 2 lists the precipitation totals for selected weather stations within the study area.

The average annual growing season ranges from less than 120 days in the northwest to more than 130 days in the southeast portion of the study area. Grand Forks has an average of 131 days between killing frosts, with the average date of the last killing frost May 15, and the average date of the first killing frost September 24 (Stommel, 1967).

TABLE 2

PRECIPITATION TOTALS FOR SELECTED WEATHER STATIONS[a]
(Precipitation in Centimeters)

	County	Annual	Highest Month		Lowest Month	
Grafton	Walsh	49.1	June	8.2	February	1.4
Grand Forks	Grand Forks	51.1	June	8.9	February	1.3
Hillsboro	Traill	50.9	June	9.6	February	1.3
Larimore	Grand Forks	45.8	June	7.9	February	1.1
Mayville	Traill	45.8	June	8.9	December	1.2
Park River	Walsh	43.9	June	8.0	February	0.9

[a]1946-1966

Source: Climatological Data. Annual Summary 1970. 1971. 4 p.

GEOLOGY OF STUDY AREA

Physiography.--The study area is located in the Young Drift Plains, a part of the Central Lowlands. The Young Drift Plains occupy the eastern half of the state, its western boundary being the Missouri Couteau, a northwest-southeast trending escarpment (Figure 2). Glacial drift covers almost all parts of the Young Drift Plains, with underlying bedrock that influences the form of the landscape at only a few widely separated places (Fenneman, 1938).

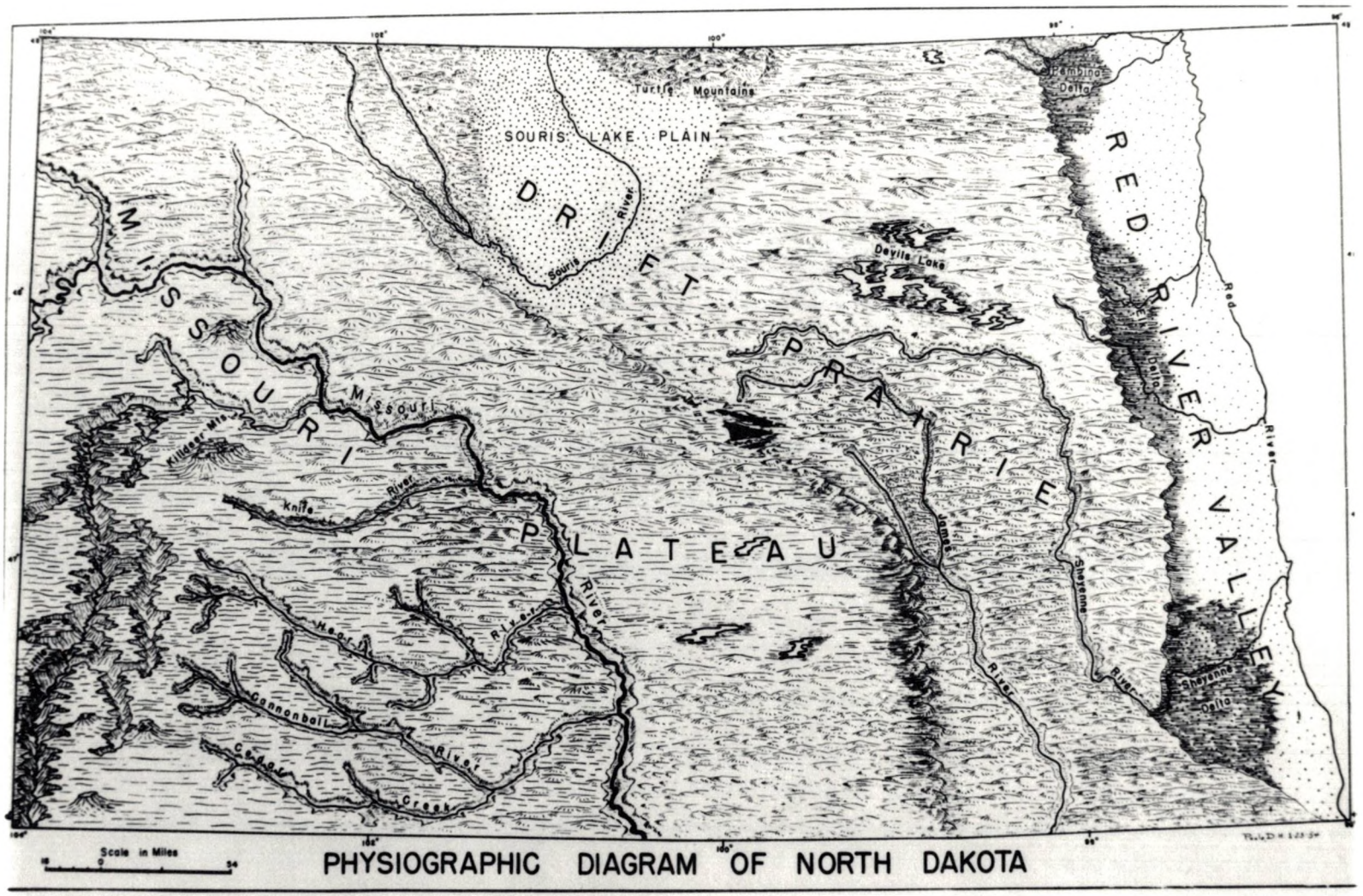
Two physiographic forms are found within the study area: the Red River Valley and the Drift Prairie, the physiographic unit lying due west of the former. An escarpment, running in a NNW by SSE direction, divides the two areas, being most conspicuous in the northwest part of the study area through outcrops of Niobrara chalk beneath Pierre shale (Fenneman, 1938).

The Red River Valley is about 48 kilometers (30 miles) wide in the study area, the width being slightly greater at the northern end. The Red River Valley is a lake bed of ancient Lake Agassiz, and not actually a valley. The lake basin was covered with up to 15 meters (50 feet) of silt when the ice receded, leaving the area with a flat appearance and a northward slope of about 0.3 meter (1 foot) per mile. Alluvium is present along the streams where they have overflowed their banks (Hainer, 1956).

The Drift Prairie lies west of a line from Township 149, Range 55,

Fig. 2.--Physiographic Diagram of North Dakota

(From D. H. Poole, 1954)


Turtle Mountains
SOURIS LAKE PLAIN
Pembina Delta
RED RIVER VALLEY
DRIFT PRAIRIE
Devils Lake
Souris River
Missouri
Killdeer Mts.
Knife River
PLATEAU
Heart River
Cannonball River
Cedar Creek
James River
Cheyenne River
Red River
Delta
Scale in Miles
0
PHYSIOGRAPHIC DIAGRAM OF NORTH DAKOTA

section 35 in Grand Forks County to Township 158, Range 56, section 5 in Walsh County (Bluemle, M., 1972 and Hansen and Kume, 1970). It has a gentle slope to the southeast and east which determines the general direction of the drainage. Within the study area the Drift Prairie is very gently rolling with ground moraine being the predominant landform (Hainer, 1956).

Lake plain and ground moraine are by far the most common landforms, and together represent more than half the study area (Figures 3-5).

Drainage.--The study area is part of the Red River drainage basin. Permanent tributaries of the Red River, listed north to south respectively, are the Park, Forest, Turtle, Goose, and Elm Rivers. There are a number of dams on these rivers which form only small lakes behind them, the majority of these in Walsh County. Numerous springs feed these permanent streams, most of which are within 16 kilometers (10 miles) of the escarpment. Lake Ardoch, the largest natural lake in the study area, is located in southeastern Walsh County and flows into the Forest River.

Many intermittent streams, sloughs, potholes and artificial drainage ditches are found that contain large amounts of water during spring runoff and after large rainfalls, but by midsummer the volume of standing water is usually insignificant. Some of these areas are very saline.

The number of surface drainage lines is governed not only by precipitation, but also by permeability of mantle, by rock, amount of relief, and topography. The escarpment and Drift Prairie region with its fine

Fig. 3.--Landform Map of Walsh County

1. Alluvium. Sand and Silt.
2. Lake Plain. Silt and Clay.
3. Beaches. Sand and Gravel.
4. Outwash and Deltas.
5. Eskers. Gravel and Sand.
6. Ground Moraine. Glacial Sediment (Till).
7. End Moraine. Glacial Sediment (Till).
8. Dunes. Fine Sand.
9. Bedrock. Shale.

(By permission of M. Blueml, 1972)

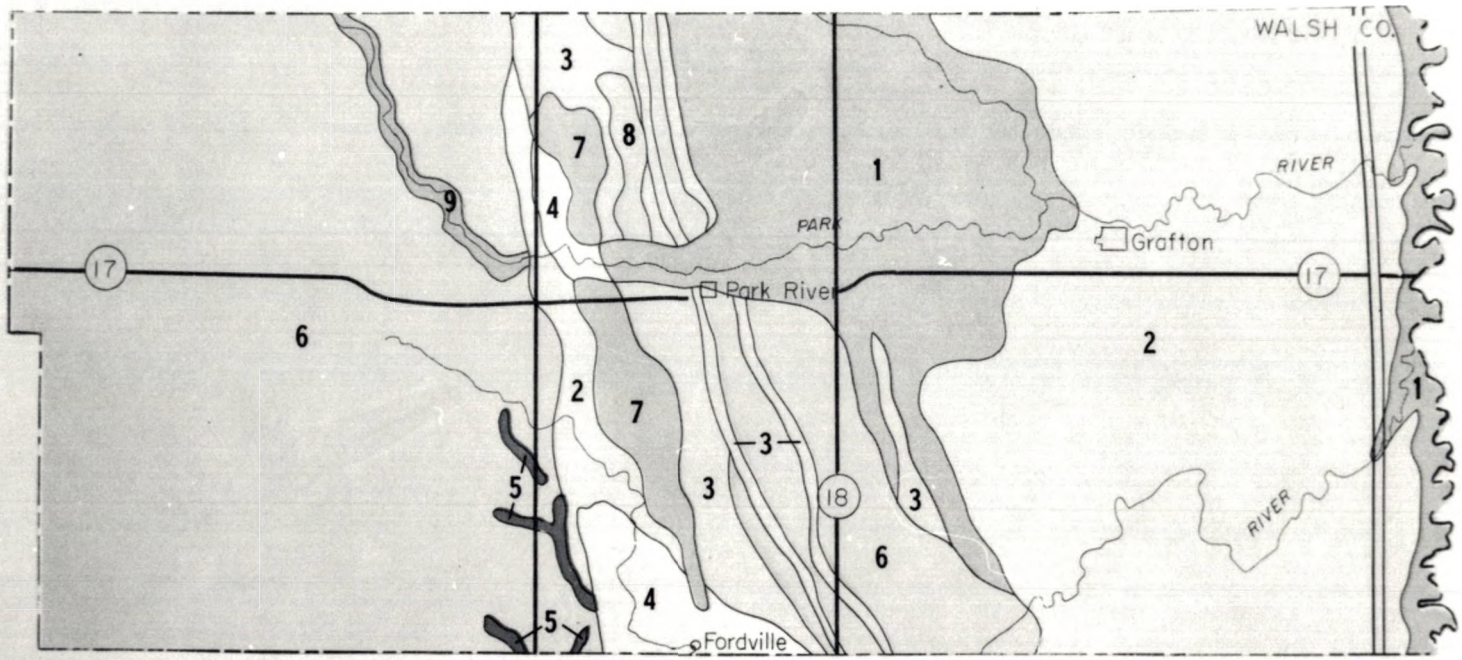

WALSH CO.
RIVER
PARK
Grafton
Park River
17
17
18
RIVER
Fordville
1
2
3
4
5
6
7
8
9

Fig. 4.--Landform Map of Grand Forks County

1. Alluvium. Sand and Silt.
2. Lake Plain. Silt and Clay.
3. Beaches. Sand and Gravel
4. Outwash and Deltas.
5. Eskers. Gravel and Sand.
6. Ground Moraine. Glacial Sediment (Till).
7. End Moraine. Glacial Sediment (Till).

(By permission of M. Bluemle, 1972)

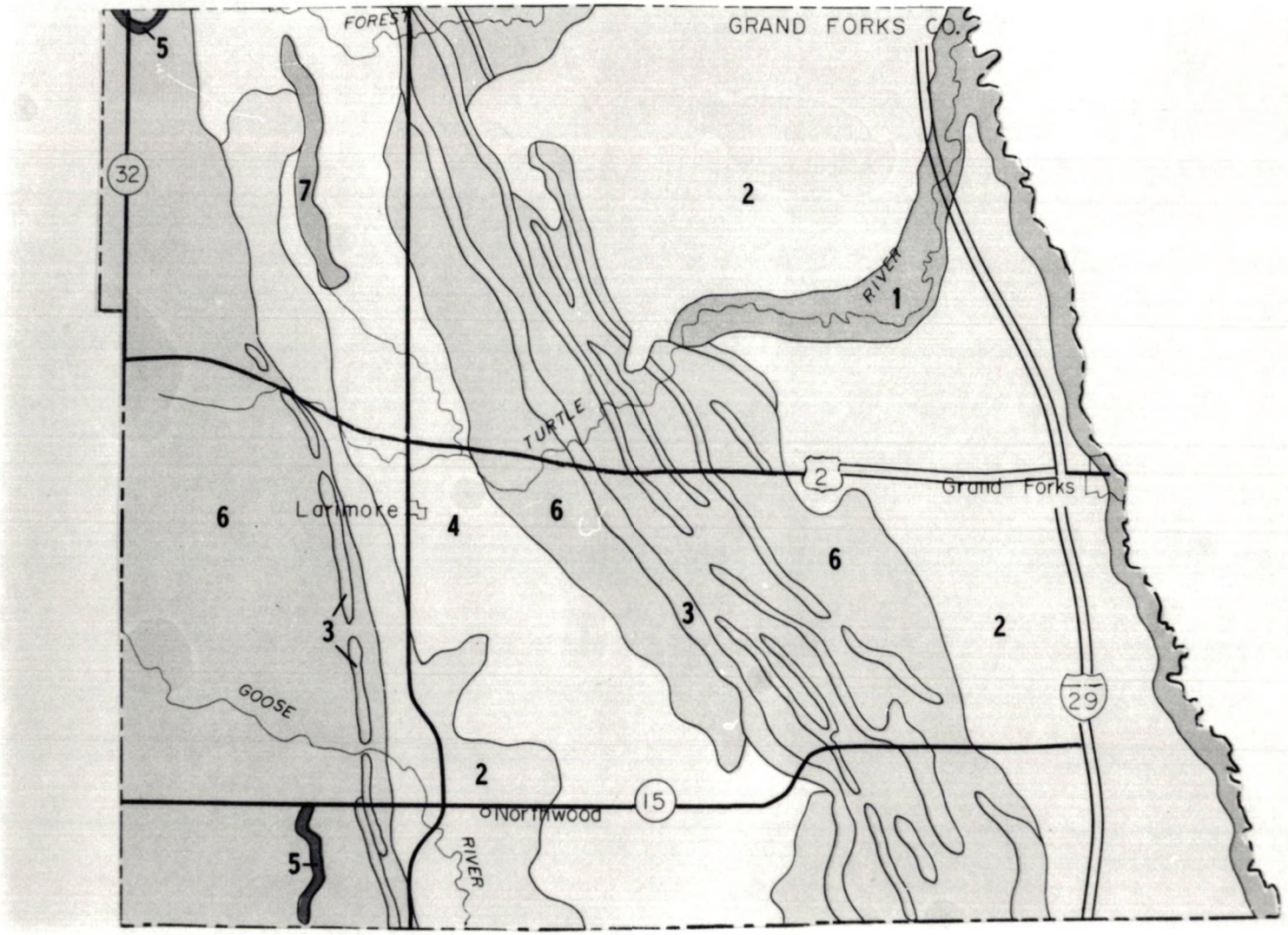
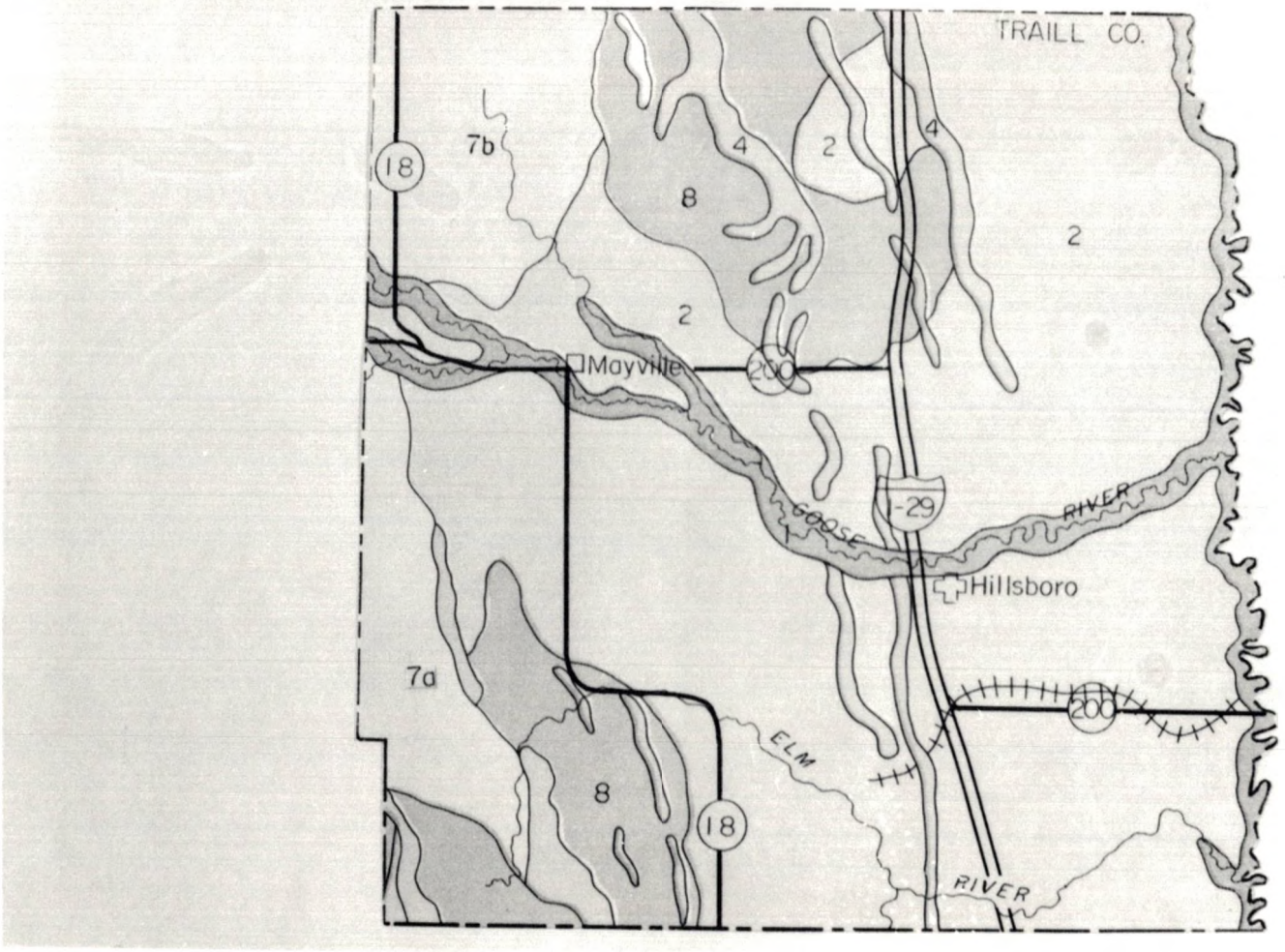

GRAND FORKS CO.
FOREST
32
5
7
2
1
RIVER
TURTLE
2
Grand Forks
Larimore
6
4
6
6
3
3
2
29
GOOSE
2
15
Northwood
RIVER
5

Fig. 5.--Landform Map of Traill County

1. Alluvium. Sand and Silt.
2. Lake Plain. Silt and Clay.
4. Beaches. Sand and Gravel.
7. Deltaic Deposits.
   A. Coarse to fine sand.
   B. Fine sand to silt.
8. Ground Moraine. Glacial Sediment (Till).

(By permission of J. Bluemle, 1972)


TRAILL CO.
18
7b
4
2
4
8
2
2
Mayville
200
I-29
GOOSE
RIVER
Hillsboro
7a
200
ELM
8
18
RIVER

texture of impermeable till and shale, and high relief has the greatest frequency of drainage lines. The texture and soil type is also partly responsible for the water in the streams being clearer in the western part of the study area than in the east (Hansen and Kume, 1970).

Figures 6-10 show some of the different types of drainage areas along with some of the plants collected at these sites.

Fig. 6.--Spring-fed Branch of the Forest River

Hippuris vulgaris, upright emergent, between the bank and floating leaves of Nuphar advena (T. 154 R. 56 sec. 16 SW 1/4, Grand Forks County).

Fig. 7.--Typical Slough

Typha latifolia and Scirpus spp. are predominant, with Sparganium eurycarpum also present (T. 151 R. 51 sec. 33 SE 1/4, Grand Forks County).

Fig. 8.--Spring-fed Ditch Leading into the Turtle River

Yellowish algae is prominent, with Nuphar advena in the center of the ditch. Utricularia vulgaris, abundant but not in bloom, and Sparganium chlorocarpum are also present (T. 153 R. 55 sec. 34 NE 1/4, Grand Forks County).

Fig. 9.--Clear Pond Along the Turtle River

This pond is somewhat shaded and deep enough to remain relatively cool and algae-free throughout the growing season. The white flowers of Ranunculus longirostris are along the edge of the pond. Penthorum sedoides, Mimulus ringens, and Lysimachia thyrsiflora were also collected here (T. 152 R. 53 sec. 20 SW 1/4, Grand Forks County).

Fig. 10.--Typical Topography of Drift Prairie Drainage Areas

Springs feed this portion of the Goose River, the site of Zannichellia palustris, Callitriche verna, Nuphar advena, Sparganium chlorocarpum, Leersia oryzoides, Lysimachia thyrsiflora, Epilobium glandulosum, and Cyperus erythrorhizos (T. 150 R. 56 sec. 22 SW 1/4, Grand Forks County).

TAXONOMIC LIST

The following list is a compilation of specimens of aquatic vascular plants found at the University of North Dakota, North Dakota State University, and University of Minnesota herbaria. Species not previously recorded for the study area at these herbaria are designated by one asterisk (*) and those not previously recorded for North Dakota are designated by two asterisks (**).

Equisetaceae

Equisetum arvense L.

Typhaceae

Typha latifolia L.

Typha angustifolia L.

Sparganiaceae

Sparganium eurycarpum Engelm.

Sparganium chlorocarpum Rydb.*

Najadaceae

Potamogeton zosteriformis Fern.

Potamogeton foliosus Raf.

Potamogeton vaginatus Turcz.

Potamogeton pectinatus L.

Zannichellia palustris L.*

Juncaginaceae

Triglochin maritima L.

Alismataceae

Alisma subcordatum Raf.

Alisma gramineum Gmel.

Sagittaria cuneata Sheldon

Sagittaria latifolia Willd.*

Hydrocharitaceae

Anacharis nuttallii Planch.

Vallisneria americana Michx.*

Gramineae

Puccinellia nuttalliana (Schult.) Hitch.

Glyceria borealis (Nash) Batchelder*

Glyceria striata (Lam.) Hitch.

Glyceria grandis S. Wats.

Scolochloa festucacea (Willd.) Link

Poa pratensis L.

Eragrostis hypnoides (Lam.) BSP

Eragrostis pectinacea (Michx.) Nees.

Catabrosa aquatica (L.) Beauv.

Phragmites communis Trin.

Elymus virginicus L.

Deschampsia cespitosa (L.) Beauv.

Calamagrostis canadensis (Michx.) Beauv.

Calamagrostis inexpansa Gray

Calamagrostis neglecta (Ehrh.) Gaertn.

Agrostis stolonifera L.

Alopecurus pratensis L.*

Alopecurus aequalis Sobol.

Muhlenbergia richardsonis (Trin.) Rydb.

Muhlenbergia racemosa (Michx.) BSP

Muhlenbergia mexicana (L.) Trin.

Beckmannia syzigachne (Steud.) Fern.

Spartina pectinata Link.

Hierochlöe odorata (L.) Beauv.

Phalaris arundinacea L.

Leersia oryzoides (L.) Sw.

Zizania aquatica L.

Echinochloa crusgalli (L.) Beauv.

Cyperaceae

Cyperus odoratus L.

Cyperus erythrorhizos Muhl.*

Dulichium arundinaceum (L.) Britt.

Eleocharis palustris (L.) R. & S.

Eleocharis acicularis (L.) R. & S.*

Scirpus americanus Pers.

Scirpus validus Vahl.

Scirpus acutus Muhl.

Scirpus heterochaetus Chase

Scirpus fluviatilis (Torr.) Gray

Scirpus maritimus va. paludosus (A. Nels.) Kukenth.

Scirpus atrovirens Willd.

Scirpus rubrotinctus Fern.

Eriophorum angustifolium Honckeny

Carex sartwellii Dewey*

Carex rosea Schrank

Carex vulpinoidea Michx.

Carex diandra Schrank

Carex prairea Dewey

Carex stipata Muhl.

Carex bebbii Olney

Carex aurea Nutt.

Carex granularis Muhl.

Carex lasiocarpa Ehrh.

Carex stricta Lam.

Carex aquatilis Wahl.

Carex lenticularis Michx.**

Carex hystericina Muhl.

Carex atherodes Spreng.*

Carex laeviconica Dewey

Carex cristatella Britt.

Carex retrorsa Schw.

Carex rostrata Stokes

Lemnaceae

Spirodela polyrhiza (L.) Schleiden

Lemna trisulca L.

Lemna minor L.

Lemna perpusilla Torr.

Pontederiaceae

Heteranthera dubia (Jacq.) Macm.

Juncaceae

Juncus balticus Willd.

Juncus torreyi Cov.*

Orchidaceae

Cypripedium calceolus L.

Habenaria hyperborea (L.) R. Br.

Salicaceae

Populus deltoides Marsh.

Salix lucida Muhl.

Salix amygdaloides Anderss.

Salix interior Rowlee

Salix rigida Muhl.

Salix bebbiana Sarg.

Salix discolor Muhl.

Salix petiolaris Sm.

Salix candida Fluegge

Salix lutea Nutt.

Betulaceae

Betula glandulosa var. glandulifera (Regel) Gl.

Alnus rugosa (DuRoi) Spreng.

Urticaceae

Urtica dioica L.

Laportea canadensis (L.) Wedd.

Polygonaceae

Rumex occidentalis Wats.

Rumex mexicanus Meissn.

Rumex maritimus L.*

Rumex persicarioides L.

Polygonum aviculare L.

Polygonum coccineum Muhl.

Polygonum natans Eat.

Polygonum lapathifolium L.

Polygonum pensylvanicum L.

Polygonum hydropiper L.

Polygonum persicaria L.

Ceratophyllaceae

Ceratophyllum demersum L.*

Nymphaeaceae

Nuphar advena (Ait.) Ait. f.

Ranunculaceae

Caltha palustris L.

Ranunculus aquatilis L.*

Ranunculus longirostris Godr.**

Ranunculus cymbalaria Pursh

Ranunculus abortivus L.

Ranunculus flabellaris Raf.

Ranunculus gmelini DC*

Ranunculus sceleratus L.

Ranunculus pensylvanicus L. f.

Ranunculus macounii Britt.

Thalictrum dasycarpum Fisch. & Ave-Lall.

Cruciferae

Armoracia rusticana Gaertn., Mey. & Scherb.*

Cardamine pensylvanica Muhl.

Rorippa islandica (Oeder) Borbas

Erysimum cheiranthoides L.

Crassulaceae

Penthorum sedoides L.

Saxifragaceae

Mitella nuda L.

Ribes americanum Mill.

Rosaceae

Spiraea alba DuRoi

Potentilla paradoxa Nutt.

Potentilla anserina L.

Geum aleppicum var. strictum (Ait.) Fern.

Fabaceae

Amorpha fruticosa L.

Lathyrus palustris L.

Glycyrrhiza lepidota Pursh

Callitrichaceae

Callitriche hermaphroditica L.

Callitriche verna L.*

Balsaminaceae

Impatiens biflora Walt.

Impatiens pallida Nutt.

Rhamnaceae

Rhamnus alnifolius L'Her

Violaceae

Viola papilionacea Pursh

Onagraceae

Epilobium angustifolium L.

Epilobium glandulosum Lehm.

Haloragaceae

Myriophyllum verticillatum L.*

Hippuridaceae

Hippuris vulgaris L.*

Umbelliferae

Sium suave Walt.

Cicuta bulbifera L.

Cicuta maculata L.

Cornaceae

Cornus stolonifera Michx.

Primulaceae

Lysimachia ciliata L.

Lysimachia hybrida Michx.*

Lysimachia thyrsiflora L.*

Oleaceae

Fraxinus pennsylvanica var. subintegerrima (Vahl) Fern.

Gentianaceae

Gentiana andrewsii Griseb.

Apocynaceae

Apocynum sibiricum Jacq.

Asclepiadaceae

Asclepias incarnata L.*

Verbenaceae

Verbena urticifolia L.

Verbena hastata L.

Labiatae

Teucrium canadense L.

Scutellaria lateriflora L.

Scutellaria galericulata L.

Physostegia parviflora Nutt.

Stachys palustris L.

Lycopus americanus Muhl.

Lycopus asper Greene

Mentha arvensis L.

Scrophulariaceae

Mimulus ringens L.

Mimulus glabratus HBK

Mimulus guttatus DC

Limosella aquatica L.

Veronica americana (Raf.) Schw.

Veronica anagallis-aquatica L.

Veronica catenata Pennell

Gerardia tenuifolia Vahl.*

Pedicularis lanceolata Michx.

Lentibulariaceae

Uticularia vulgaris L.*

Plantaginaceae

Plantago major L.

Plantago eriopoda Torr.

Rubiaceae

Galium boreale L.

Galium trifidum L.

Cucurbitaceae

Echinocystis lobata (Michx.) T. & G.

Lobeliaceae

Lobelia kalmii L.*

Compositae

Helianthus tuberosus L.

Helenium autumnale L.

Bidens cernua L.

Bidens tripartita L.

Bidens frondosa L.

Bidens vulgata Greene

Iva ciliata Willd.

Xanthium strumarium L.

Artemisia biennis Willd.

Senecio congestus (R. Br.) DC

Senecio aureus L.

Solidago gigantea Ait.

Solidago graminifolia (L.) Salisb.

Aster junciformis Rydb.*

Aster brachyactis Blake

Aster simplex Willd.

Eupatorium maculatum L.

Cirsium muticum Michx.*

Cirsium arvense (L.) Scop.

Crepis runcinata (James) T. & G.

KEY TO THE TAXA

A. Plant rush-like; stems conspicuously jointed; sporangia borne on terminal spike-like cones . . . . . Equisetum

A. Plants with true flowers; reproduction by seeds (excepting vegetative reproduction) . . . . . B

B. Stems with bundles, when present, distributed throughout; leaves chiefly parallel-veined C

B. Stems with wood forming a zone between pith and bark; leaves chiefly net-veined . . . . . a

C. Plants unattached or floating . . . . . Group I

C. Plants rooting in the substratum . . . . . D

D. Carpels 1 or, if more, becoming distinct or separated when mature . . . . . E

E. Flowers not in the axils of regularly imbricated scales . F

F. Flowers in dense spikes or heads; leaves long, coarse

Leaves flat or plano-convex . . . . . Typha

Leaves with lower median, ventral keel . . Sparganium

F. Flowers not densely spicate or in heads . . . . . G

G. Flowers without distinct colored petals

Submerged or emergent plants with flat or filiform leaves . . . . . .Group II

Paludal plant with terete leaves . . . . Triglochin

G. Flowers with distinct white to pink petals . . Group III

E. Flowers in the axils of regularly imbricated scales

H. Stem commonly hollow, cylindric; cauline leaves 2-ranked, the sheath usually open . . . Group IV

H. Stem commonly solid and 3-angled; cauline leaves 3-ranked, with closed sheath

Achene not enclosed in a perigynium. . . . Group V

Achene enclosed in a perigynium . . . . . Group VI

D. Carpels 3, united into a compound ovary

I. Ovary superior . . . . . Juncaceae

I. Ovary inferior

Submerged plants with whorled or basal leaves . . . . . Hydrocharitaceae

Terrestrial plants with characteristic flowers . . . . . Orchidaceae

a. Trees or shrubs . . . . . Group VII

a. Herbs . . . . . b

b. Flowers crowded on a common receptacle . . . . . Group VIII

b. Flowers not crowded on a common receptacle c

c. Flowers with many stamens and/or pistils . . . . . Group IX

c. Flowers usually with 1 pistil and 4-10 stamens . . . . . d

d. Plants contain milky juice . . . . . Group X

d. Plants with no milky juice . . . . . e

e. Plants usually submerged, floating, inflorescence

either submerged or emergent . . . . . Group XI

e. Plants terrestrial or somewhat emergent . . . . . f

f. Carpels united, forming a 5 or 6-beaked capsule . . . . . Penthorum

f. Carpels not forming a beaked capsule . . . . . g

g. Stamens united into a tube by their anthers . Lobelia

g. Stamens not united by their anthers . . . . . h

h. Ocrea present; leaves simple, alternate . . Group XII

h. Ocrea not present l

i. Stem square in cross section and/or irregular gamopetalous corolla with 4-lobed ovary and/or irregular gamopetalous corolla with the fruit a 2-locular and usually many-seeded capsule . . . . . Group XIII

i. Stems not square in cross section . . . . . j

j. Flowers in umbels . . . . . Group XIV

j. Flowers not in umbels . . . . . k

k. Tendrils present; fruit spiny . . Echinocystis

k. Tendrils not present; fruit various l

l. Flower with saccate sepal . . . Impatiens

l. Flower without saccate sepal . . . . m

m. Flowers regular, hypogynous; petals 4, distinct; tetradynamous or didynamous . . . . . Group XV

m. Flowers not regular, hypogynous and/or petals 4, distinct, and/or tetradynamous or didynamous . . . . . n

n. Flowers less than 1 cm wide . . . Group XVI

n. Flowers about 1 cm or more wide . Group XVII

Group I

1. Plants red on the lower surface. Spirodela

1. Plants green on the lower surface. Lemna 2

2. Joints of plant long and narrow, stalked. L. trisulca

2. Joints rounded, not stalked 3

3. Joints symmetrical or nearly so. L. minor

3. Joints asymmetrical. L. perpusilla

Group II

1. Leaves opposite. Zannichellia

1. Leaves alternate. Potamogeton 2

2. Stipules united with the base of the leaf for a distance of 10 mm or more 3

2. Stipules free from the leaf or united for a distance of less than 10 mm 4

3. Leaves acute and sharp-pointed at apex; fruits 2.5-4 mm long, with a short beak. P. pectinatus

3. Leaves obtuse and blunt at apex, or sometimes minutely

apiculate; fruits 3 mm long, beakless. P. vaginatus

4. Leaves 15-35 nerved; fruits 3-3.5 mm wide. P. zosteriformis

4. Leaves 3-5 nerved; fruits strongly compressed, 2-2.5 mm long. P. foliosus

Group III

1. Carpels in a single ring; stamens 6. Alisma 2

1. Carpels in dense heads; stamens more than 6. Sagittaria . . 3

2. Petals white; mature nutlet with 2 ridges and a groove down the back. A. subcordatum

2. Petals pink; mature nutlet with 3 ridges and 2 grooves down the back. A. gramineum

3. Fruit 2-3 mm long, with an erect beak 0.5 mm or less long. S. cuneata

3. Fruit 3-3.5 mm long, with a horizontal beak 1-2 mm long. S. latifolia

Group IV

1. Fertile floret 1 per spikelet 2

1. Fertile florets 2 or more per spikelet 17

2. Disarticulation below the glumes 3

2. Disarticulation above the glumes 8

3. Leaves sharply scabrous on margin. Leersia oryzoides

3. Leaves not sharply scabrous on margin 4

4. Inflorescence of separate pistillate and staminate spikelets; monoecious. Zizania aquatica

4. Inflorescence with staminate and pistillate spikelets intermixed on the same branches 5

5. Spikelets laterally compressed, nearly circular. Beckmannia syzigachne

5. Spikelets dorsally compressed 6

6. Panicle cylindrical; no extra flower parts present in each spikelet 7

6. Branches of flower cluster 1-sided; extra sterile flower parts present in each spikelet. Echinochloa crusgalli

7. Glumes acute; awn exserted 2.3-6.5 mm. Alopecurus pratensis

7. Glumes obtuse; awn equaling the glumes or exserted to 0.5 mm. Alopecurus aequalis

8. Stems decumbent and rooting at lower nodes. Catabrosa aquatica

8. Stems ascending or erect 9

9. Spikelets 1-flowered 10

9. Spikelets with 2 sterile lemmas below the fertile floret . . . 16

10. Lemma surrounded at base by a tuft of callus hairs 11

10. Lemma glabrous or hairy, but no callus hair present . . . 13

11. Panicle open, spreading or drooping. Calamagrostis canadensis

11. Panicle dense, erect or nearly so 12

12. Leaves stiff; ligule 4-6 mm long, lacerate. Calamagrostis inexpansa

12. Leaves soft; ligule 1-3 mm long, not lacerate. Calamagrostis neglecta

13. First glume surpassing the lemma; palea much shorter than the lemma or obsolete. Agrostis stolonifera

13. First glume shorter than or rarely equaling the lemma; palea about equaling the lemma 14

14. Lemma glabrous at base. Muhlenbergia richardsonis

14. Lemma pilose at base 15

15. Glumes lance-attenuate, mostly awnless, the blades shorter than the lemma. Muhlenbergia mexicana

15. Glumes linear-lanceolate; awns 4.5-8 mm long, much longer than lemma. Muhlenbergia racemosa

16. Sterile lemmas much shorter than the fertile lemma; panicles dense. Phalaris arundinacea

16. Sterile lemmas staminate, exceeding the fertile lemma. Hierochlöe odorata

17. Inflorescence one-sided. Spartina pectinata

17. Inflorescence symmetrical 18

18. Stems 2 m or more high. Phragmites communis

18. Stems usually 1 m or less in height 19

19. Spikelets (except the terminal one) sessile along opposite sides of the rachis. Elymus virginicus

19. Spikelets pedicelled 20

20. Glumes shorter than lowest lemma 21

20. Glumes overtopping the lowest lemma. Deschampsia cespitosa

21. Plants dioecious; the staminate and pistillate spikes dissimilar 22

21. Plants with perfect florets in each spikelet 23

22. Principal culms creeping, rooting at the nodes. Eragrostis hypnoides

22. Principal culms erect or ascending. Eragrostis pectinacea

23. Lemmas keeled. Poa pratensis

23. Lemmas rounded on back 24

24. Lemma with basal tuft of hairs. Scolochloa festucacea

24. Base of lemma glabrous 25

25. Sheaths open; lemmas faintly nerved. Puccinellia nuttalliana

25. Sheaths closed; lemmas strongly 7-nerved 26

26. Spikelets 1 cm or more long. Glyceria borealis

26. Spikelets 7 mm or less long 27

27. First glume 1 mm or less long. Glyceria striata

27. First glume 1.4 mm or more long. Glyceria grandis

Group V

I. Scales of the spikelet strictly 2-ranked II

I. Scales of the spikelet spirally arranged III

II. Inflorescences terminal. Cyperus

II. Inflorescences axillary, from the leaf-sheaths. Dulichium

III. Achene with tubercle at top. Eleocharis

III. Achene without tubercle IV

IV. Perianth of bristles barely overtopping the achene. Scirpus

IV. Perianth of elongate, white silky bristles. Eriophorum

Cyperus

1. Scales 3 mm long or less, with 7-13 well distributed strong nerves. C. odoratus

1. Scales less than 2 mm long, with 3-5 nerves close together in the center, the sides nerveless. C. erythrorhizos

Eleocharis

1. Plants about 1 m high; style branches 2; achenes flattened. E. palustris

1. Plants 1-2 dm high; style branches 3; achenes 3-angled or rounded. E. acicularis

Scirpus

1. Involucre a single bract, erect or nearly so, the spikelets

thus appearing lateral 2

1. Involucre of 2 or more leaves, the inflorescence thus terminal 5

2. Inflorescence without elongate branches; culms 3-angled. S. americanus

2. Inflorescence with elongate branches in compound umbels; culms terete 3

3. Achenes trigonous; scales glabrous, much exceeding the achene. S. heterochaetus

3. Achenes flat 4

4. Scales about as long as the achene; spikelets reddish brown; rhizome reddish. S. validus

4. Scales much exceeding the achene; spikelets gray; rhizome drab or brown. S. acutus

5. Culms sharply trigonous; spikelets 15-25 mm long 6

5. Culms obtusely angled; spikelets 3-10 mm long 7

6. Achenes equilaterally 3-angled; spikelets 5-10 mm thick; culm 1-1.5 m high. S. fluviatilis

6. Achenes flat; spikelets less than 5 mm thick; culm 0.4-1 m high. S. maritimus

7. Achenes flat, with 4 bristles; at least the lower sheaths red. S. rubrotinctus

7. Achenes 3-angled, with 3 or 6 bristles; all sheaths green. S. atrovirens

Group VI

1. Spikes mostly uniform, bearing the staminate flowers at base or apex or sometimes mixed 2

1. Some of the spikes strictly pistillate, the staminate flowers in distinct or mixed spikes 9

2. Some or all spikes with terminal staminate flowers . . . 3

2. Some or all spikes with the staminate flowers at base or scattered 8

3. Rhizomes mostly slender; culms mostly solitary. Carex sartwellii

3. Rhizomes short to none; culms cespitose 4

4. Spikes 4-6 (10) in interrupted heads. C. rosea

4. Spikes numerous, in paniculate spiciform heads 5

5. Perigynia spongy at base. C. stipata

5. Perigynia not spongy at base 6

6. Scales awned; perigynia stramineous, yellow or green. C. vulpinoidea

6. Scales not awned; perigynia brown, purple or black . . . 7

7. Head of spikes straight, dense, or slightly open; perigynia not wholly covered by the scales. C. diandra

7. Head lax and open; perigynia covered by the scales. C. prairea

8. Tips of mature perigynia rosulate-spreading; leaves 3-7

mm wide, with loose sheaths. C. cristatella

8. Tips of mature perigynia ascending to but slightly spreading; leaves 1.5-4.5 mm wide, with tight sheath. C. bebbii

9. Achenes more or less flattened; stigmas 2 10

9. Achenes 3-angled or rounded; stigmas 3 13

10. Culms slender, 0.3-5.5 dm high; leaves only 1-3 mm wide; bracts sheathing. C. aurea

10. Culms mostly coarser, 0.5-10 dm or more high; leaves 1-12 mm or more broad; bracts nearly or quite sheathless 11

11. Flowering culms arising laterally; lowest leaves reduced to bladeless sheaths. C. stricta

11. Flowering culms arising centrally, surrounded by the dried-up leaf-bases of the preceding year; lowest leaves of the current year bearing blades 12

12. Perigynia nerveless, at least on the upper side. C. aquatilis.

12. Perigynia with a few sharp, elevated nerves on each face. C. lenticularis

13. Pistillate spikes drooping on slender stalks. C. hystericina

13. Pistillate spikes erect or spreading at maturity 14

14. Beak of perigynium not more than one-fourth as long as the body 15

14. Beak of perigynium one-half as long as, to equaling the

body of the perigynium 16

15. Perigynia densely hairy. C. lasiocarpa

15. Perigynia not hairy. C. granularis

16. Plants with long rhizomes; base of style straight . . . 17

16. Plants lacking rhizomes; base of style S-curved . . . 18

17. Leaf-blades pubescent beneath; perigynia lance-ovate to lanceolate, with mostly curving teeth. C. atherodes

17. Leaf-blades glabrous beneath; perigynia ovoid, with erect to barely curving teeth. C. laeviconica

18. Perigynia soon reflexed or horizontally spreading; bracts lax. C. retrorsa

18. Perigynia ascending to merely spreading; bracts strongly ascending. C. rostrata

Group VII

1. Flowers in aments 2

1. Flowers not in aments 13

2. Bracts of pistillate ament upwardly dilated, usually 3 or 5-lobed at summit 12

2. Bracts of ament unlobed 3

3. Aments soon arching or pendulous; leaves deltoid. Populus deltoides

3. Aments ascending or divergent 4

4. Bracts of ament falling before maturing of fruit . . . 5

4. Bracts of ament persistent 7

5. Stamens 2, or connate into 1. Salix interior

5. Stamens 3-8 6

6. Leaves green beneath; petioles glandular near leaf base. Salix lucida

6. Leaves glaucous beneath; petioles not glandular. Salix amygdaloides

7. Aments appear with or after leaf development 8

7. Aments appear before the leaves 10

8. Aments flowering from base to apex. Salix bebbiana

8. Aments usually flowering from apex to base 9

9. Flowering branches with brown or darker bark. Salix rigida

9. Flowering branches with yellow or yellowish bark, becoming gray. Salix lutea

10. Fruiting pedicel at most twice length of gland; young branchlets and leaves with a dull whitish flocculent tomentum. Salix candida

10. Fruiting pedicel three to six times length of gland; pubescence not flocculent-tomentose 11

11. Leaves glabrous or sparsely hairy beneath; stigmas slender and elongate. Salix discolor

11. Leaves permanently pubescent to glabrate beneath; stigmas short and thick. Salix petiolaris

12. Stamens 2; leaves broadest above the middle. Betula

glandulosa

12. Stamens 4; leaves broadest at or below the middle.

Alnus rugosa

13. Leaves opposite 14

13. Leaves alternate 16

14. Leaves pinnately compound; tree. Fraxinus pennsylvanica var. subintegerrima

14. Leaves simple; shrubs 15

15. Bark of young branches red. Cornus stolonifera

15. Bark not red. Rhamnus alnifolius

16. Flowers yellow; fruit a many-seeded berry. Ribes americanum

16. Flowers not yellow 17

17. Flowers white; leaves simple; fruit dehiscent. Spiraea alba

17. Flowers purple; leaves pinnately compound; fruit indehiscent.

Amorpha fruticosa

Group VIII

1. Heads with only disk flowers 2

1. Heads with ray flowers 12

2. Bracts of involucre spiny-tipped, spines hooked 3

2. Bracts not spiny 4

3. Flowers perfect; involucre cobwebby, 2-3.5 cm high.

Cirsium muticum

3. Flowers imperfectly dioecious; involucre 1-2 cm high; *Cirsium arvense*

4. Flowers purple. *Eupatorium maculatum*

4. Flowers yellow, whitish, greenish, or gray 5

5. Flowers yellow 6

5. Flowers whitish, greenish, or gray 9

6. Primary leaves simple or merely deeply cleft into 3-5 coarse lobes 7

6. Primary leaves pinnate, with distinct leaflets, or deeply pinnate-divided and cleft into fine lobes 8

7. Leaves mostly sessile; achenes with a convex cartilaginous summit. *Bidens cernua*

7. Leaves with winged petioles, 1-4 cm long; achenes truncate or concave at summit. *Bidens tripartita*

8. Outer involucre of 10-20 copiously hispid-ciliate phyllaries. *Bidens vulgata*

8. Outer involucre of 2-8 sparingly ciliate or smooth-margined phyllaries. *Bidens frondosa*

9. Leaves opposite. *Iva ciliata*

9. Leaves alternate 10

10. Fruit a bur, 1-3 cm long. *Xanthium strumarium*

10. Fruit not a bur, smaller 11

11. Heads 6-15 mm wide; pappus a tuft of hairs. *Aster brachyactis*

11. Heads 2-3 mm wide; pappus none. *Artemisia biennis*

12. Heads with both ray and disk flowers 13

12. Heads with only ray flowers; leaves mostly basal. *Crepis runcinata*

13. Rays yellow 14

13. Rays white, blue, or purple 20

14. Pappus of many slender bristles 15

14. Pappus of a few scales or awns 18

15. Heads 1-2 cm wide 16

15. Heads 2-5 mm wide 17

16. Annual or biennial; fibrous-rooted. *Senecio congestus*

16. Perennial from a branching rhizomatous caudex. *Senecio aureus*

17. Inflorescence flat topped; leaves 4-12 mm wide. *Solidago graminifolia*

17. Inflorescence not flat topped; leaves 1-3 cm wide. *Solidago gigantea*

18. Pappus of stiff, barbed awns 6

18. Pappus of scales or short awn 19

19. Receptacle chaffy; leaves thick and hard. *Helianthus tuberosus*

19. Receptacle naked; leaves mostly membranaceous. *Helenium autumnale*

20. Leaves sessile and usually slightly auriculateclasping *Aster junciformis*

20. Leaves sessile or tapering to a petiole-like base, sometimes a little clasping, but scarcely auriculate. Aster simplex

Group IX

1. Leaves leathery, floating; flowers yellow. Nuphar advena
1. Leaves not leathery, floating; flowers yellow or white . . . 2
2. Plants submerged except for flowers 3
2. Plants emergent or terrestrial 6
3. Flowers white 4
3. Flowers yellow 5
4. Achenes nearly beakless. Ranunculus aquatilis
4. Achenes with distinct 1 mm beak. Ranunculus longirostris
5. Submersed leaves nearly orbicular, with 3-5 lobes; petals 3.5-5 mm long. Ranunculus gmelini
5. Submersed leaves ternately decompound into linear-filiform segments; petals 0.6-1.7 cm long. Ranunculus flabellaris
6. Plants stoloniferous 7
6. Plants not spreading by stolons 8
7. Plants erect; leaves simple, roundish, crenate-dentate. Ranunculus cymbalaria
7. Plants prostrate; leaves pinnately compound, silvery below. Potentilla anserina
8. Plants dioecious. Thalictrum dasycarpum

8. Plants monoecious 9

9. Leaves cordate, unlobed. Caltha palustris

9. Leaves lobed, not cordate 10

10. Lower leaves compound 11

10. Lower leaves simple 14

11. Lower leaves with five or more leaflets 12

11. Lower leaves with three leaflets 13

12. Terminal leaflet large, with others much smaller. Geum aleppicum

12. All leaflets nearly equal in size. Potentilla paradoxa

13. Fruiting heads ovoid to cylindric, 0.6-1,8 cm long; achenes thin-margined with erect or ascending deltoid-acuminate beak. Ranunculus pensylvanicus

13. Fruiting heads globose or ovoid, 6-10 mm in diameter; achenes narrow-margined with ascending or oblique straight flat-subulate beak. Ranunculus macounii

14. Base and margin of achene corky-thickened; stems mostly 0.5-1.5 cm thick, fleshy. Ranunculus sceleratus

14. Base and margin of achene not corky; stems mostly 2-4 mm thick. Ranunculus abortivus

Group X

1. Flowers white. Apocynum sibiricum

2. Flowers pink to rose-purple. Asclepias incarnata

Group XI

1. Bladders present on the leaves or stems. Utricularia vulgaris

1. Bladders absent 2

2. Leaves divided into many fine segments 3

2. Leaves wider, opposite or in whorls of 6-12 6

3. Leaves spiny-toothed on one side. Ceratophyllum demersum

3. Leaves with entire margins 4

4. Bracts shorter than the flowers and fruits, not lobed; rachis of leaves thread-like and of nearly equal diameter throughout. Myriophyllum exalbescens

4. Bracts mostly longer than the flowers, toothed or lobed; rachis of leaves flat and much broader toward the base of the leaf 5

5. Bracts lance-ovate, toothed. Myriophyllum heterophyllum

5. Bracts deeply lobed. Myriophyllum verticillatum

6. Leaves in whorls of 6-12. Hippuris vulgaris

6. Leaves opposite 7

7. Flowers without bracts at base. Callitriche hermaphroditica

7. Flowers 2-bracted at base. Callitriche verna

Group XII

I. Outer 3 sepals unchanged in fruit, persistent at the base of the accrescent inner 3 sepals. Rumex

I. Outer sepals in fruit at least as large as the inner and often concealing them. Polygonum

Rumex

1. Valves without grains. R. occidentalis

1. Valves (or at least one of them) with a prominent grain . . . 2

2. Margins of the valves entire to undulate. R. mexicanus

2. Margins of the valves with a few long bristles 3

3. Grain ellipsoid-ovoid; marginal bristles about as long as breadth of valve. R. persicarioides

3. Grain linear-lanceolate; marginal bristles longer than breadth of valve. R. maritimus

Polygonum

1. Flowers in small axillary clusters; leaves jointed at the base. P. aviculare

1. Flowers in terminal (or also axillary) spikes or racemes; leaves not jointed 2

2. Perennial; racemes terminal, solitary or paired 3

2. Annual; racemes terminal and axillary 4

3. Peduncles mostly glabrous; spike 1-4 cm long; leaf surfaces harshly scabrous. P. natans

3. Peduncles pubescent; leading spike 4-18 cm long; leaf surfaces glabrous to pubescent. P. coccineum

4. Ocrea entire or merely lacerate 5

4. Ocrea fringed with bristles 6

5. Spikes dense, 1-6 cm long, 1-1.5 cm thick; achenes mostly 3-3.5 mm long, 2.2-3 mm broad. P. pensylvanicum

5. Spikes dense, 1-8 cm long, 5-9 mm thick; achenes 1.8-2.2 mm long, 1.6-2 mm broad. P. lapathifolium

6. Mature calyx punctate or dotted with glands (under magnification); calyx greenish or red-tipped. P. hydropiper

6. Mature calyx not dotted; calyx pink or rose and green. P. persicaria

Group XIII

I. Stamens 5; flowers yellow. Lysimachia

I. Stamens 2, 4, or 8 II

II. Stamens 8. Epilobium glandulosum

II. Stamens 2 or 4 III

III. Fruit splitting into 4 nutlets . . . . . Labiatae

III. Fruit with many small seeds . . . . . Scrophulariaceae

Lysimachia

1. Main leaves ovate or broadly lanceolate, with rounded to subcordate bases; petioles long-ciliate to summit. L. ciliata

1. Main leaves linear to narrowly lanceolate or oblong, gradually tapering at base. L. hybrida

Labiatae

1. Corolla without distinct upper and lower lip 2
1. Corolla with distinct upper and lower lip 5
   2. Corolla 8-12 mm long. Teucrium occidentale
   2. Corolla 2-5 mm long 3
3. Stamens 4; plant aromatic. Mentha arvensis
3. Stamens 2; plants not aromatic 4
   4. Lower and median leaf-blades tapering to petioles or to subpetiolar bases; calyx teeth with long subulate tips. Lycopus americanus
   4. Lower and median leaf-blades sessile; calyx-teeth triangular to ovate, acuminate. Lycopus asper
5. Calyx with a helmet-like projection on the upper side 6
5. Calyx without a helmet-like projection 7
   6. Flowers in axillary or terminal racemes, subtended individually by bracteal leaves obviously smaller than the foliage leaves. Scutellaria lateriflora
   6. Flowers mostly solitary in the axils of ordinary foliage leaves. Scutellaria galericulata
7. Spike dense, 3-15 cm long; calyx membranaceous; corolla 0.8-1.5 cm long. Physostegia parviflora

7. Spike 5-25 cm long; calyx firm; corolla 1.2-1.5 cm long. Stachys palustris

Scrophulariaceae

1. Leaves all or nearly all basal; cauline leaves, if present, greatly reduced. Limosella aquatica

1. Cauline leaves predominant 2

2. Foliage leaves alternate. Pedicularis lanceolata

2. Foliage leaves opposite or whorled 3

3. Corolla strongly irregular 4

3. Corolla little, if at all, bilabiate 6

4. Corolla violet-purple. Mimulus ringens

4. Corolla yellow 5

5. Flowering calyx 0.8-1.7 cm long; corolla 1-4 cm long, the throat nearly closed by 2 hairy ridges. Mimulus guttatus

5. Flowering calyx 0.5-0.8 cm long; corolla 0.7-2.2 cm long, the throat open. Mimulus glabratus

6. Stamens 4. Gerardia tenuifolia

6. Stamens 2 7

7. Leaves of flowering stems distinctly petioled. Veronica americana

7. Leaves of flowering stems sessile 8

8. Leaves 1.5-3 times as long as wide; corolla bluish-lilac, 4-5 mm wide. Veronica anagallis-aquatica

8. Leaves 3-5 times as long as wide; corolla white to pale blue, smaller. Veronica catenata

Group XIV

1. Leaves once compound. Sium suave

1. Leaves twice compound 2

2. Axils of upper leaves bearing clustered bulblets. Cicuta bulbifera

2. Axils without bulblets. Cicuta maculata

Group XV

1. Petals yellow 2

1. Petals white 3

2. Plant closely pubescent with 2-3-parted hairs; leaves scarcely toothed. Erysimum cheiranthoides

2. Plant glabrous or nearly so; leaves toothed to pinnate. Rorippa islandica

3. Upper leaves crenate. Armoracia rusticana

3. Upper leaves pinnatifid. Cardamine pensylvanica

Group XVI

1. Plants with stinging hairs 2

1. Plants without stinging hairs 3

2. Leaves opposite. Urtica dioica

2. Leaves alternate. Laportea canadensis

3. Leaves in 4's at the nodes 4

3. Leaves not in 4's at the nodes 5

4. Plant erect; leaves mostly 2-6 cm long. Galium boreale

4. Plants reclining or loosely ascending; leaves mostly 0.7-2 cm long. Galium trifidum

5. Flowers in a raceme or cyme 6

5. Flowers in spikes 8

6. Flowers in a cyme. Stellaria longifolia

6. Flowers in a raceme 7

7. Flowers greenish-yellow, 2-13. Mitella nuda

7. Flowers yellow, numerous. Lysimachia thyrsiflora

8. Plants essentially stemless 9

8. Plants with cauline leaves 10

9. Seeds reticulate. Plantago major

9. Seeds not reticulate; dense brownish wool at base of leaves. Plantago eriopoda

10. Flowers remote; petals white. Verbena urticifolia

10. Flowers compact; petals violet-blue. Verbena hastata

Group XVII

1. Flowers white; fruit with hooked prickles. Glycyrrhiza lepidota

1. Flowers mostly blue (pink); fruit without prickles 2

2. Plants mostly stemless; leaves mostly cordate.

Viola papilionacea

2. Plants with definite stems 3

3. Leaves compound with lanceolate leaflets. Lathyrus palustris

3. Leaves not compound 4

4. Ovary superior; petals united; seeds without a coma.

Gentiana andrewsii

4. Ovary inferior; petals not united; seeds bearing a terminal coma; stamens 8 5

5. Stem mostly terete; petals 1-2 cm long. Epilobium angustifolium

5. Stem square; petals 4-9 mm long. Epilobium glandulosum

DESCRIPTION OF TAXA

Arthrophyta

Equisetaceae

Equisetum arvense L. (Map No. 1). Fertile stems appearing in early spring, white or pinkish, 0.5-3 cm long; leaves with 8-12 distinct teeth; sterile stems usually erect, to 8 dm high, the main stem 10-14-furrowed; branches 3-4-angled, not recurving, their sheaths with lance-attenuate teeth. Infrequent. Wet soil.

Anthophyta

Typhaceae

Typha latifolia L. (Map No. 1). Stout, erect, 1-1.5 m; leaves 1-2 cm wide; the staminate and dark brown pistillate parts of the spike usually contiguous; latter 2-3 cm thick in fruit; pollen shed in tetrads. Very abundant. Sloughs, low areas.

Typha angustifolia L. (Map No. 1). Stout, erect, 1-1.5 m; leaves 3-8 mm wide; the staminate and reddish-brown pistillate parts of the spike usually separated 2-8 cm; latter 8-15 mm thick in fruit; pollen shed singly. Infrequent. Saline sloughs and low areas.

Sparganiaceae

Sparganium eurycarpum Engelm. (Map No. 2). Stout, erect, 0.5-1.5 m; leaves 6-12 mm wide; inflorescence forked, branches usually with 1-3 pistillate and 2-20 staminate heads; fruits sessile, obpyramidal, 6-10 mm long. Abundant. Mud or shallow water.

Sparganium chlorocarpum Rydb. (Map No. 2). Ordinarily erect, up to 8 dm; leaves usually much exceeding the stem, 2-12 mm wide; pistillate heads 1-4, the lowest usually supra-axillary; fruits ribbed at summit between angles, with beak about as long as body. Very rare. Fresh water.

Najadaceae

Zannichellia palustris L. (Map No. 3). Stems very slender; leaves 3-10 cm long, 0.5 mm wide, 1-nerved; fruits sessile to short-stalked, smooth or slightly dentate on the convex back, the body 2-3 mm long, with beak 0.8-1.5 mm long. Very rare. Fresh or brackish water.

Potamogeton vaginatus Turcz. (Map No. 3). Stems 2-3 mm thick; sheaths of lower leaves large, loose, inflated; upper leaves more slender, with closer sheaths; flowers in 5-12 whorls, 3-8 cm long; fruits 3-3.5 mm long, 2-2.5 mm broad, with nearly central wart-like beak. Very rare. Fresh or brackish water.

Potamogeton pectinatus L. (Map No. 3). Stems freely dichotomously branched above, the internodes 1-3 cm; leaves 0.2-1 mm broad, tapering

to sharply pointed tips; sheaths 2-5 cm long, the free tip less than half as long; flowers in 2-6 unequally remote whorls; fruits obliquely obovoid, 2.6-4.2 mm long, with a short slightly curved beak near the ventral margin. Abundant. Shallow saline water.

Potamogeton foliosus Raf. (Map No. 4). Stems compressed-filiform, usually freely branched; leaves 2-8 cm long and 0.5-20 mm broad, 3-5 nerved; the midrib prominent; stipules at first with connate margins, forming blunt sheaths 0.7-1.8 cm long, soon rupturing and deciduous; spike 4-10 flowered; fruits obliquely suborbicular, strongly compressed, 2-2.5 mm long, thin dorsal keel, beak 0.2-0.4 mm long. Rare. Fresh or brackish water.

Potamogeton zosteriformis Fern. (Map No. 4). Stem freely branching, strongly compressed; leaves linear and grass-like, 1-2 dm long, 2-5 mm wide, with 1 or 3 main nerves; stipules firm, 1-3 cm long, the lower obtuse, the upper acuminate; spikes cylindric, 1.5-3 cm long, with 7-11 subdistant whorls. Very rare. Quiet water.

Juncaginaceae

Triglochin maritima L. (Map No. 5). Plants to 1 m high; leaves 1-3 mm wide, erect; raceme 1-4 dm; fruit ovoid-oblong, 5 mm long; carpels 3 or usually 6 with beaks recurving. Infrequent. Saline margins of sloughs.

Alismataceae

Alisma subcordatum Raf. (Map No. 5). Leaves usually long-petioled,

the blade elliptic to broadly ovate, up to 2.5 dm long and 1.5 dm broad; flowers 3-3.5 mm broad; achenes 1.5-2.5 mm. Abundant. Shallow water or muddy shores.

Alisma gramineum Gmel. (Map No. 5). Submersed leaves up to 1 m long and 3-15 mm broad or emersed leaves up to 1 dm long and 2 cm broad; flowers 6 mm broad; achenes 2-2.7 mm long. Very rare. Mud or wet soil.

Sagittaria cuneata Sheldon (Map No. 6). Leaves long-petioled, sagittate to lanceolate; flowers in 2-5 whorls, the upper staminate or perfect, being subsessile or on pedicels up to 3 cm long; achenes 2-3 mm, the beak erect or suberect, 0.2-0.4 mm long, terminating the strongly rounded ventral keel. Abundant. Muddy shores and shallow water.

Sagittaria latifolia Willd. (Map No. 6). Leaves sagittate to linear; flowers in whorls of 2-10, the upper staminate or perfect; achenes obovate, 2.5-4 mm, winged on the margins, the subhorizontal beak 1-2 mm long. Very rare. Shallow water.

Hydrocharitaceae

Anacharis nuttallii Planch. (Map No. 6). Leaves whorled in 3's or 4's, linear, 0.7-1.8 mm wide; staminate flower sessile, 4-5 mm wide; pistillate flower 2.5-4 mm wide. Abundant. Quiet water.

Vallisneria americana Michx. (Map No. 6). Leaves thin, to 2 m, 0.5-2 cm wide, net-veined; pistillate peduncle arising from the base of the plant to the water-surface. Rare. Quiet water.

Gramineae

Puccinellia nuttalliana (Schult.) Hitchc. (Map No. 7). Cespitose, 2-9 dm; leaves 1-2 mm wide; panicle 0.4-3 dm long, the branches and pedicels strongly scabrous; spikelets 3-6-flowered, 4-8 mm. Infrequent. Alkaline marshes and prairies.

Glyceria borealis (Nash) Batchelder (Map No. 7). Culms 0.5-1.5 m high, often decumbent; leaves 2-5 mm wide; panicle 1.5-5 dm long; spikelets 7-13 flowered, 1-1.8 cm long, on pedicels one fourth to two-thirds as long. Very rare. Fresh water.

Glyceria striata (Lam.) Hitchc. (Map No. 7). Cespitose, erect, 0.3-1.5 m; leaves 2-8 mm wide; panicle 1-2 dm long, loose and open; spikelets 3-7 flowered, 2-4 mm long. Abundant. Wet soil.

Glyceria grandis S. Wats. (Map No. 7). Cespitose, stout, erect, to 1.5 m high; leaves 6-15 mm wide; panicle 2-4 dm long, loose and open; spikelets 4-8-flowered, 5-6 mm long. Abundant. Shallow water.

Scolochloa festucacea (Willd.) Link. (Map No. 8). Stout, erect, 1-2 m high; leaves 2-3 dm long, 5-10 mm wide; panicles 1-3 dm long; spikelets 7-11 mm long; glumes nearly as long as the florets, 3-5 nerved. Infrequent. Sloughs.

Poa pratensis L. (Map No. 8). Culms cespitose, 3-8 dm; leaves soft, up to 6 mm wide; spikelets 3-5-flowered, 4-5 mm long; lemmas distinctly 5-nerved. Very abundant. Wet or dry soil.

Eragrostis hypnoides (Lam.) BSP. (Map No. 9). Culms creeping, rooting

at the nodes, with short flowering culms 0.5-2 dm high; leaves 1-4 cm long, 1-3 mm wide; spikelets linear, 10-35-flowered, 5-15 mm long, 1-2.5 mm wide. Very rare. Mud or sandy shores.

Eragrostis pectinacea (Michx.) Nees. (Map No. 9). Culms cespitose, usually erect, 1-8 dm high, branching from the lower nodes; leaves 1-3 mm wide; panicles loose, up to 3 dm long; spikelets linear, 1-1.5 mm wide, 5-11 (15)-flowered. Very rare. Moist soil.

Catabrosa aquatica (L.) Beauv. (Map No. 9). Smooth, soft, decumbent and rooting at lower nodes; leaves 0.5-2 dm long, 4-10 mm wide; panicle loose and open, 1-2.5 dm. Very rare. Fresh water.

Phragmites communis Trin. (Map No. 10). Erect, stout, 2-4 m; leaves 2-5 dm long, 1-5 cm wide; panicle 1.5-4 dm long; spikelets 10-17 mm long, 3-7-flowered. Infrequent. Slough and stream edges.

Elymus virginicus L. (Map No. 10). Cespitose, erect, 0.3-1.5 m; leaves 6-13 mm wide, scabrous; spike stiff, 5-15 cm long, 1-4 cm thick; spikelets 2-4-flowered. Infrequent. Wet soil and shores.

Deschampsia cespitosa (L.) Beauv. (Map No. 10). Culms slender, loosely cespitose, 5-12 dm; leaves mostly below the middle of the culm; panicle 0.2-4 dm long; spikelets 2-6 mm long; lemmas glabrous, the midnerve diverging at or below the middle into a short awn. Very rare. Shores and boggy ground.

Calamagrostis canadensis (Michx.) Beauv. (Map No. 11). Culms clustered, 5-15 dm high; leaves 4-8 mm wide; panicle somewhat nodding, 8-20 cm; spikelets 2-6 mm long; callus hairs nearly equaling to exceed-

ing the lemma; awn inserted at or slightly below the middle of the lemma. Very rare. Lowland prairie and sloughs.

Calamagrostis inexpansa Gray. (Map No. 11). Cespitose, stoloniferous, 0.3-1 m high; leaves harshly scabrous and hard, 2-8 mm wide; panicle 0.5-2 dm long; spikelets 3-5.5 mm long; callus hairs half to three-fourths as long as the lemma; awn inserted near the middle, about equaling the lemma. Infrequent. Slough edges and lowland prairie.

Calamagrostis neglecta (Ehrh.) Gaertn. (Map No. 11). Culms solitary or tufted, 1-10 dm high; leaves 1-3 mm wide; panicle spike-like, 4-12 cm long; spikelets 2-5 mm long; callus hairs one-fourth to three-fourths as long as the lemma; awn inserted near the middle of the lemma. Very rare. Lowland prairie.

Agrostis stolonifera L. (Map No. 12). Culms cespitose, 0.2-1.3 dm high; leaves 3-8 mm wide; panicle comparatively open, 1-3 dm long; spikelets 2-3 mm long; glumes scabrous on the midnerve only. Very rare. Shores and wet soil.

Alopecurus pratensis L. (Map No. 12). Culms erect or decumbent at base, 4-10 dm high; panicle cylindrical, 3-10 cm long, 6-10 mm thick; awn inserted below the middle of the lemma, exserted about 5 mm. Very rare. Stream edges.

Alopecurus aequalis Sobol. (Map No. 12). Culms slender, erect or decumbent at base, up to 6 dm high; panicle cylindrical, 2-8 cm long, 3-5 mm thick; awn inserted near the middle of the lemma, included or exserted 1-2 mm. Rare. Shores and sloughs.

Muhlenbergia richardsonis (Trin.) Rydb. (Map No. 13). Culms slender, cespitose, 2-6 dm high; leaves 1-2 mm wide; panicles slender, 1-8 cm long; spikelets about 3 mm long; glumes much shorter than the lemma. Very rare. Lowland prairie.

Muhlenbergia racemosa (Michx.) BSP. (Map No. 13). Culms erect, 5-10 dm; leaves firm, scabrous, 3-6 mm wide; panicle stiff, 3-12 cm long, 0.4-2 cm thick; glumes awned, subequal, much longer than the lemma. Infrequent. Stream edges.

Muhlenbergia mexicana (L.) Trin. (Map No. 13). Culms erect or often decumbent at base, 0.4-1 m high; leaves flat, 2-8 mm wide; panicles rather stiff, 4-15 cm long; glumes barely shorter than or equaling the lemmas, sharp-pointed or short awned. Very rare. Wet soil.

Beckmannia syzigachne (Steud.) Fern. (Map No. 14). Culms 5-10 dm high; leaves 4-8 mm wide; panicle 1-2.5 dm long; the spikes appressed, 1-2 cm long; spikelets strongly flattened, nearly circular in outline. Infrequent. Sloughs, mud, and lowland prairie.

Spartina pectinata Link. (Map No. 14). Culms stout, erect, 1-2 m high; leaves 4-15 mm wide; spikes 2-10 cm long, 5-8 mm. wide including the awns; second glume lanceolate, the midnerve prolonged into an awn 3-10 mm. Abundant. Lowland prairie, slough and stream edges.

Hierochlöe odorata (L.) Beauv. (Map No. 15). Culms 3-6 dm high; cauline leaves 2-3 cm; leaves of sterile shoots 2-6 dm long; panicle pyramidal, 4-10 cm long; spikelets 4-8 mm long. Rare. Lowland prairie and shallow, quiet water.

Phalaris arundinacea L. (Map No. 15). Culms stout, 8-15 dm; leaves 8-20 mm wide; panicle 0.5-2 dm long, often having a purple cast; lemmas awnless, shorter than the glumes. Infrequent. Slough edges and shallow, quiet water.

Leersia oryzoides (L.) Sw. (Map No. 15). Culms 7-15 dm, ascending or sprawling; leaves rough on the margins with stiff colorless spinules; panicle 1-2 dm long; glumes none. Very rare. Quiet water and stream edges.

Zizania aquatica L. (Map No. 16). Culms up to 3 m high; leaves flat, large and soft; panicle erect, 1-6 dm, the staminate branches widely spreading, the pistillate at first erect, at anthesis ascending; lemma of staminate spikelets awnless or with an awn to 3 mm; lemma of pistillate spikelets with awn 1-6 cm. Very rare. Quiet water and stream edges to mid-stream.

Echinochloa crusgalli (L.) Beauv. (Map No. 16). Culms coarse, 0.5-1 m high; leaves 0.5-2 cm wide; second glume and sterile lemma as long as the spikelet, awnless or prominently awned. Infrequent. Slough edges.

Cyperaceae

Cyperus odoratus L. (Map No. 17). Culms 1-8 dm high; leaves 3-10 mm wide; involucral leaves usually exceeding, by several times, the inflorescence; inflorescence a simple or compound unbel; spikelets narrowly linear, 1-2 cm, 10-20-flowered. Very rare. Wet soil.

Cyperus erythrorhizos Muhl. (Map No. 17). Culms to 8 dm high; roots red; leaves 2-10 mm wide; involucral leaves usually exceeding, by several times, the inflorescence; spikes 1-4 cm long. Very rare. Stream edges.

Eleocharis palustris (L.) R. & S. (Map No. 17). Culms 0.1-1.2 m high; spikelet 5-25 mm, acute; achene 1-2 mm, dark brown; tubercle conic, one-third to one-half as wide as the achene. Infrequent. Wet soil and stream edges.

Eleocharis acicularis (L.) R. & S. (Map No. 17). Cespitose, forming dense mats; culms 5-20 cm high; spikelets flattened, 2-7 mm long; scales with slender greenish midrib, usually with reddish-brown sides; achenes 0.7-1.2 mm long. Infrequent. Muddy shores.

Scirpus americanus Pers. (Map No. 18). Culms sharply triangular, 0.2-1.2 m high; spikelets one to several, 0.5-2 cm long; achene smooth, plano-convex obovoid with minute beak. Infrequent. Stream and slough edges.

Scirpus validus Vahl. (Map No. 18). Culms soft, terete, 0.5-3 m high; style 2-cleft; perianth-bristles 4-6; achene plano-convex, obovate, olivaceous to brown. Very abundant. Shallow water and muddy shores.

Scirpus acutus Muhl. (Map No. 19). Culms firm, terete, 0.5-3 m high; style 2-cleft; achene plano-convex, becoming black and lustrous. Infrequent. Shallow water and muddy shores.

Scirpus heterochaetus Chase. (Map No. 19). Culms slender, firm, 0.5-2 m high; style 3-cleft; achene trigonous; bristles 2-4, unequal, shorter

than achene. Rare. Sloughs.

Scirpus fluviatilis (Torr.) Gray (Map No. 20). Culms stout, trigonous, 0.5-2 m high; involucre much exceeding the compound umbel; achene obovoid, sharply triangular, 4-5 mm long, nearly or quite equaled by the 6 retrorsely barbed bristles. Abundant. Sloughs, streams, and wet ditches.

Scirpus maritimus var. paludosus (A. Nels.) Kukenth. (Map No. 20). Culms trigonous, 0.3-1.5 m high; involucre of 1 or 2 (3) bracts; spikelets whitish to pale brown; achene 2.8-4 mm long, somewhat dorsiventrally compressed. Infrequent. Sloughs and muddy shores.

Scirpus atrovirens Willd. (Map No. 21). Culms somewhat cespitose, 0.5-1.5 m high; panicle umbelliform, 0.3-2 dm high; achene pale to white, compressed-trigonous; bristles 3 or 6. Abundant. Streams and muddy shores.

Scirpus rubrotinctus Fern. (Map No. 21). Culms solitary, stout, 0.3-1.m high; panicle umbelliform, 0.5-2 dm high; achene pale to white, plano-convex or biconvex; bristles usually 4. Rare. Streams and muddy shores.

Eriophorum angustifolium Honckeny. (Map No. 22). Culms slender, 2-8 dm high; involucral leaves 2 or 3, dark purple at least at base; spikelets 3-several, on peduncles to 5 cm; achenes 2.5-3.5 mm long; bristles white. Very rare. Sloughs.

Dulichium arundinaceum (L.) Britt. Culms erect, 3-10 dm high; spikelets linear, in 2 ranks on peduncles emerging from the sheaths of the leaves;

achene flattened, linear-oblong, 4 mm long, beaked with the slender persistent style, exceeded by the bristles. Very rare. Sloughs.

Carex sartwellii Dewey (Map No. 22). Culms 0.4-1 m high; spikes 12-25, androgynous or some wholly staminate, the pistillate subglobose or short ovoid, 6-9 mm long, the lowest with spathiform bracts; perigynia ovate, 2.5-4.5 mm long, contracted to a serrulate beak one-fourth to one-third as long as body; styles 2. Very rare. Prairie potholes.

Carex rosea Schk. (Map No. 22). Culms cespitose, slender, 2-5 dm high; leaves 1-3 mm wide; spikes 4-8, closely aggregate or the lower distinctly separate, androgynous; perigynia 3-20, lance-ovate, 2.2-4.2 mm, two-fifths as wide, spongy at base, gradually tapering to a short bidentate beak a third as long as the body. Rare. Stream edges and woods.

Carex vulpinoidea Michx. (Map No. 23). Culms cespitose, 0.3-1 m high; inflorescence 4-10 cm long, the clusters of spikes crowded; bracts often 5 cm long; perigynia ovate, 2-2.7 mm long, half as wide, tapering gradually to a beak two-thirds as long as the body. Very rare. Wet soil.

Carex diandra Schrank. (Map No. 23). Culms cespitose, 0.3-1 m high; leaves 1-3 mm wide; inflorescence stiff, dense, 1-6 cm long; perigynia soon widely divergent, narrowly deltoid-ovate, 2-3 mm long, half as wide, tapering to a rough-margined beak two-thirds as long as the body. Very rare. Sloughs and stream edges.

Carex prairea Dewey (Map No. 23). Culms cespitose, 0.4-1 m high; inflorescence flexuous and open, 3-10 cm long; bracts scarcely exceeding

the spike; perigynia lance-ovoid, 2.5-3.5 mm long, half as wide, tapering to a beak nearly as long as the body. Very rare. Sloughs.

Carex stipata Muhl. (Map No. 24). Culms cespitose, 0.4-1 m high; leaves soft, 4-8 mm wide; inflorescence 3-10 cm long; perigynia spongy at base, lance-ovoid, 4-6 mm long, one-third as wide, tapering to a bidentate beak as long as the body. Very rare. Sloughs.

Carex bebbii Olney. (Map No. 24). Culms cespitose, slender, 2-8 dm high; inflorescence compact, ovoid to ellipsoid, 1-2.5 cm long, of 5-12 globose-ovoid to ellipsoid spikes 5-9 mm long; perigynia ovate, 2.5-3.5 mm long, one-half as wide, narrowly winged to the base. Very rare. Stream edges.

Carex aurea Nutt. (Map No. 24). Culms loosely cespitose, 1-5 dm high; terminal spike staminate or with a few apical perigynia; 2 or 3 bracts much prolonged; perigynia elliptic-obovoid, 2-3 mm long, orange, drying brown. Very rare. Wet soil.

Carex granularis Muhl. (Map No. 25). Culms cespitose, 3-8 dm high; terminal spike staminate, barely exceeding the uppermost pistillate spike and much overtopped by the bracts; perigynia ovoid to subglobose, usually strongly nerved, 2.5-4 mm long, barely more than half as wide, with a short beak. Rare. Slough edges.

Carex lasiocarpa Ehrh. (Map No. 25). Culms colonial, 0.4-1 m high; staminate spikes usually 2; pistillate spikes 1-3, widely separate; perigynia plumply ovoid, 2.5-5 mm long, one-half as wide, densely hairy. Abundant. Quiet water and muddy shores.

Carex aquatilis Wahl. (Map No. 25). Culms cespitose 0.4-1 m high; leaves 3-8 mm wide; pistillate scales brown with narrow, pale or green center; perigynia elliptic to obovate, 2.5-3 mm long, 2-ribbed, nerveless or nearly so, minutely beaked. Abundant. Stream edges.

Carex lenticularis Michx. (Map No. 26). Culms cespitose, 2-6 dm high; leaves 1-3 mm wide; pistillate scales with dark purple-brown sides and broad green center; perigynia rhombic-elliptic, 2-3 mm long, half as wide, 2-ribbed, brown-nerved. Very rare. Shallow streams and stream edges.

Carex stricta Lam. Culms cespitose, 4-10 dm high; pistillate scales reddish-brown with conspicuous pale center; perigynia ovate, 1.6-2.9 mm long, three-fifths as wide, minutely beaked, 2-ribbed, nerveless or nearly so. Very rare. Sloughs.

Carex hystericina Muhl. (Map No. 26). Culms cespitose, 2-10 dm high; staminate and pistillate scales awned; perigynia inflated, ovoid, 6 mm long, 15-20-nerved, the slender beak sharply toothed. Very rare. Sloughs.

Carex laeviconica Dewey (Map No. 26). Culms cespitose, stout, 5-10 dm high; pistillate spikes 1.5-7.5 cm long; perigynia ovoid, 5-8 mm long, with teeth 1-1.8 mm long, the nerves obscure. Very rare. Stream edges.

Carex atherodes Spreng. (Map No. 27). Culms loosely cespitose, stout, 5-12 dm high; leaves 4-12 mm wide; perigynia ovoid, 6-11 mm long, strongly ribbed, tapering to slender beak with outwardly curving teeth

1.6-3 mm long. Infrequent. Sloughs and streams.

Carex cristatella Britt. (Map No. 27). Culms cespitose, stout, 4-9 dm high; leaves soft, 3-7 mm wide; involucre 2-4 cm long, of 6-15 crowded spikes 5-10 mm in diameter; perigynia oblong, 2.5-4 mm long, the narrow wing abruptly contracted above the base. Very rare. Wet soil.

Carex retrorsa Schw. (Map No. 27). Culms densely cespitose, stout, 4-10 dm high; pistillate spikes 3-8, thick cylindric, 1.5-8 cm long, 1.2-2 cm thick; perigynia much inflated, soon reflexed or horizontally spreading, 5-10 mm long, with sharply 2-toothed conical beak. Rare. Wet soil and sloughs.

Carex rostrata Stokes. (Map No. 27). Culms cespitose, stout, 4-10 dm high; pistillate spikes 2-5, 1-15 cm long; perigynia ovoid, inflated, ascending, 3-10 mm long, with slender teeth 0.5-1 mm long. Rare. Wet soil and sloughs.

Lemnaceae

Spirodela polyrhiza (L.) Schleiden. (Map No. 28). Fronds round-obovate, 3-8 mm long, purplish-red beneath, green above, with 6-18 roots. Rare. Backwashes and streams.

Lemna trisulca L. (Map No. 28). Fronds oval or oblong, 4-10 mm long, obscurely 3-veined, tapering to a 4-16 mm stipe. Abundant. Streams.

Lemna minor L. (Map No. 28). Fronds round to elliptic-obovate, 2-5 mm in diameter, obscurely 3-nerved. Very abundant. Sloughs and streams.

Lemna perpusilla Torr. (Map No. 28). Fronds oblong to obovate, 2-3 mm

long, obscurely 3-nerved. Very rare. Sloughs.

Juncaceae

Juncus balticus Willd. (Map No. 29). Culms scattered or in small tufts, slender, terete, 4-8 dm high; cyme usually loosely forking; seeds acute, short-beaked, 0.7-1 mm long, delicately reticulate. Infrequent. Wet soil.

Juncus torreyi Cov. (Map No. 29). Culms stout, 0.4-1 m high, with thick leaves; heads few, 1-1.5 cm in diameter, 25-90-flowered; flowers 4-5 mm long; seeds 4.5-5.5 mm long. Very rare. Ditches and shores.

Orchidaceae

Cypripedium calceolus L. (Map No. 29). Stem with ovate to lanceolate pointed leaves, 2-8 dm high; flowers 1 or 2, terminal; sepals purplish; petals wide-spreading, purple-brown; lip yellow 2.5-4 cm long. Very rare. Wet soil.

Habenaria hyperborea (L.) R. Br. (Map No. 29). Stems thick, stout, 2-10 dm high; lower leaves up to 2 dm long and 5 cm wide; spike dense, 0.5-2.5 dm long; flowers green or greenish white; lip lance-ovate, 4-7 mm long; spur as long as the lip. Very rare. Wet soil.

Salicaceae

Populus deltoides Marsh. (Map No. 30). Tree up to 30 m high, with old bark gray to black and deeply furrowed; leaves deltoid, 8-14 cm long,

nearly as wide, coarsely crenate-dentate. Very abundant. Lowland prairie, stream banks and ditches.

Salix lucida Muhl. (Map No. 30). Large shrub or small tree up to 8 m high; stipules reniform to semi-lunate, 2-5 mm long; leaves lanceolate to lance-ovate, 0.5-1.7 dm long and 2-5 cm wide. Very rare. Wet soil.

Salix amygdaloides Anderss. (Map No. 30). Large shrub or small tree up to 12 m high; sprouts with minute stipules or none; leaves lanceolate to lance ovate, pale green above, whitened beneath, closely serrulate, 0.5-1.5 dm long, 1-5 cm wide, on petioles 0.5-3 cm long. Abundant. Shores and lowland prairie.

Salix interior Rowlee. (Map No. 31). Colonial shrub up to 5 m high; stipules none; leaves linear to narrowly lanceolate, 5-14 cm long, 5-10 mm wide, tapering to short petioles. Abundant. Sandbars and wet soil.

Salix rigida Muhl. (Map No. 31). Shrub up to 4 m high; stipules 5-10 mm, acutish; leaves lanceolate to oblanceolate, 7-12 cm long, 1.5-3 cm wide, with petioles 5-14 mm long. Very rare. Stream banks and wet soil.

Salix bebbiana Sarg. (Map No. 31). Shrub or small tree 2-5 m high, with furrowed gray or brown bark; stipules small or none; leaves oblong to ovate or oblong-oblanceolate, toothed or subentire, 4-8 cm long, 1.5-3 cm wide. Rare. Wet soil.

Salix discolor Muhl. (Map No. 32). Large shrub or small gray-barked tree up to 6 m high; stipules large, roundish to semi-ovate; leaves mostly elliptic or elliptic-oblanceolate, 5-8 cm long, 2-3.5 cm wide. Rare.

Sloughs and wet soil.

Salix petiolaris Sm. (Map No. 32). Shrub with green or olive-brown branches 1-3 m high; stipules none; leaves lanceolate or oblanceolate, 5-12 cm long, 0.8-2.5 cm wide, with petioles 5-15 mm long. Rare. Streambanks and lowland prairie.

Salix candida Fluegge. (Map No. 32). Shrub 2-15 dm high; branchlets whitish-tomentose with flocculent dull wool when young, the older branches reddish; stipules lanceolate, glandular; leaves linear oblong to oblong, 4-10 cm long, 0.7-2 cm wide, pubescent. Very rare. Wet soil.

Salix lutea Nutt. (Map No. 32). Gray barked shrub or small tree; leaves acuminate, with rounded to cordate or attenuate bases; stipules rounded. Rare. Streambanks.

Betulaceae

Betula glandulosa var. glandulifera (Regel) Gl. (Map No. 33). Erect shrub 1-2 m high; leaves obovate above a cuneate base, varying to ovate and rounded at base, 2-4 cm long; young twigs persistently resinous. Very rare. Wet soil.

Alnus rugosa (DuRoi) Spreng. (Map No. 33). Spreading or loosely ascending shrub, up to 6 m high; leaves oval, elliptic, or ovate, broadest near or below the middle, usually doubly serrate. Very rare. Wet soil.

Urticaceae

Urtica dioica L. (Map No. 33). Erect perennial, 4-15 dm high, with stiff, stinging bristles 0.75-2 mm long on stem, leaves or both; lower and median leaves cordate-ovate, coarsely toothed; upper leaves ovate to lanceolate, all with blades many times longer than petiole. Abundant. Wet woods and streambanks.

Laportea canadensis (L.) Wedd. (Map No. 33). Stem 3-10 dm high; leaves ovate, coarsely toothed, slender-tipped, 0.7-2 dm long, long-petioled; flowers in loose cymes. Very rare. Streambanks and wet soil.

Polygonaceae

Rumex occidentalis Wats. (Map No. 34). Perennial, erect, up to 1.5 m high; rosette and basal cauline leaves lanceolate to lance-ovate, 0.5-2 dm long and 2-10 cm wide; panicle dense, with erect racemes; mature valves without grains or rarely with 1 poorly developed grain. Very rare. Wet soil.

Rumex mexicanus Meissn. (Map No. 34). Stout, erect perennial up to 1 m high, with numerous branches; leaves flat, narrowly lanceolate, long-tapering at both ends; valves triangular, 3-6 mm long and wide; grains 3, one-half to two-thirds as long as the valve. Infrequent. Wet soil.

Rumex maritimus L. (Map No. 34). Erect annual, up to 8 dm high; basal and lower cauline leaves broadly to narrowly lanceolate; with more or

less crisped margin and cordate to truncate base; valves triangular ovate, with 2 or 3 long divergent marginal bristles; grains 3, narrowly lanceolate. Very rare. Muddy shores.

Rumex persicarioides L. (Map No. 34). Soft hollow-stemmed annual or biennial, 1-6 dm high; leaves linear to oblong-lanceolate, cordate or subcordate; valves 2 mm long, 1 mm wide, about as wide as length of marginal bristles; grains ellipsoid. Very rare. Shores.

Polygonum aviculare L. (Map No. 35). Prostrate or loosely ascending annual; leaves linear to elliptic or oblong, 1-3 cm long, 1-8 mm wide; flowers included in the ocrea or barely exserted; fruiting calyx 2-3 mm long, with roseate to purple sepals barely 2 mm long; achenes dark brown, 2-2.5 mm long. Abundant. Shores.

Polygonum coccineum Muhl. (Map No. 35). Rhizomatous perennial; terrestrial forms having lanceolate to lance-ovate leaves, 1-2 dm long; sepals scarlet to pink or rarely white; achenes dark brown to black, 2.5-3 mm long and wide. Infrequent. Sloughs.

Polygonum natans Eat. Rhizomatous perennial; leaves elliptic-oval to lanceolate; sepals 5 mm long, scarlet to pink; achenes broadly ovoid to orbicular, 2.5-3 mm long. Very rare. Sloughs.

Polygonum lapathifolium L. (Map No. 35). Erect to depressed annual, up to 2 m high; leaves usually lanceolate, often tomentose beneath; sepals rose, white, or green, 3-4 mm long at maturity; achene flat or concave on both sides, 1.7-3.2 mm long. Infrequent. Wet soil.

Polygonum pensylvanicum L. (Map No. 36). Ascending to erect annual,

up to 1.5 m high; leaves lanceolate, acuminate; sepals 3-4 mm long, rose to white; achene round-ovoid to orbicular, 2.2-3.5 mm wide, flattened on one face, concave on the other, slightly shining. Rare. Wet soil.

Polygonum hydropiper L. (Map No. 36). Erect or ascending annual, up to 7 dm high; leaves narrowly lanceolate to lance-ovate, up to 9 cm long; sepals greenish or red-tipped, 2-4.5 mm long; achene dull, 2-3.5 mm long. Rare. Wet soil.

Polygonum persicaria L. (Map No. 36). Erect or ascending annual, up to 9 dm high; leaves narrowly lanceolate; sepals pink or purplish to pink and green, 2-4 mm long; achene lustrous, 2.5-3 mm long. Rare. Wet soil.

Caryophyllaceae

Stellaria longifolia Muhl. (Map No. 36). Weak-stemmed perennial, 1.5-4.5 dm high; leaves linear, 2-5 cm long, 2-6 mm wide; cymes open, long-peduncled; flowers 5-7 mm wide; sepals 2.5-4 mm long, barely exceeded by the petals; capsule 4-6 mm long; seeds light reddish brown, smooth. Infrequent. Shores.

Ceratophyllaceae

Ceratophyllum demersum L. (Map No. 37). Stems prolonged, freely branching; leaves in whorls of 5-12, the ultimate segments being flat and having one smooth margin and one serrate margin. Rare. Quiet

waters.

Nymphaeaceae

Nuphar advena (Ait.) Ait. f. (Map No. 37). Leaves floating, or emersed in shallow water; blades ovate to rounded-oblong, 1-4 dm long, the basal lobes separated by a U-shaped sinus; flowers yellow, 3-4 cm high, when spread open, 6-10 cm wide. Very rare. Fresh quiet water.

Ranunculaceae

Caltha palustris L. (Map No. 37). Stem hollow, erect or decumbent, 2-6 dm high; leaves cordate; sepals yellow, broadly oval to narrowly obovate; pistils 4-12. Very rare. Springs and fresh water.

Ranunculus aquatilis L. (Map No. 37). Stems elongate, submersed, bearing only finely dissected flaccid foliage which collapses upon removal from water; flowers at the water-surface, white, 1-1.5 cm wide; achenes 8-35, with a minute beak. Rare. Ponds and sloughs.

Ranunculus longirostris Godr. (Map No. 38). Stems elongate, submersed; leaves often stiff; flowers white, 1-2 cm wide; achenes 10-25, about 1.5 mm long, with beak averaging 1 mm long. Very rare. Calcareous waters.

Ranunculus cymbalaria Pursh. (Map No. 38). Stems 5-15 cm high, stoloniferous; leaves long-petioled, roundish or reniform, mostly basal; flowers 6-9 mm wide, with bright yellow narrow petals, 3-5 mm long; achenes longitudinally nerved. Abundant. Wet soil.

Ranunculus abortivus L. (Map No. 38). Stems erect, 2-6 dm high; basal leaves reniform to rotund; cauline leaves very variable, simple or divided, the lower petioled; petals 1.5-4 mm long, oblong to oval, shorter than the sepals; achenes lustrous, 1.2-1.5 mm long, with a very short beak. Rare. Wet soil.

Ranunculus flabellaris Raf. (Map No. 39). Submersed leaves ternately decompound; emersed leaves (when present) broadly reniform, 3-parted; flowers 1-7, on long peduncles; petals yellow, broadly obovate, 0.6-1.7 cm long; achenes prominently corky-thickened at base and along the ventral margin when mature, with beak 2.5-3.5 mm long. Infrequent. Ponds and water-filled ditches.

Ranunculus gmelini DC. (Map No. 39). Submersed leaves 3-5-parted, each segment 2-6 cm wide; emersed or floating leaves reniform to orbicular; petals yellow, obovate, 3.5-5 mm long, longer than sepals; achenes without or with only slight corky-thickening at base and margin, with slender beak 1.5-2 mm long. Very rare. Sloughs and water-filled ditches.

Ranunculus sceleratus L. (Map No. 39). Stems erect, up to 2 cm thick; lower leaves succulent, long-petioled, floating or emersed; peduncles pilose; petals yellow, 2-4 mm long, shorter than the sepals; achenes suborbicular to obovate, corky-thickened at base. Rare. Sloughs and shores.

Ranunculus pensylvanicus L. f. (Map No. 40). Stems erect or ascending, 0.2-1 m high; leaves numerous, ternately compound, with each segment

deeply 3-lobed, the lobes toothed or incised; petals pale yellow, obovate, 2-4 mm long, shorter than the sepals; fruiting head ovoid to cylindric, 0.6-1.8 cm long, 5-9 mm thick; achenes thin, thin-margined, 2-2.5 mm long excluding the short beak. Very rare. Wet soil and shores.

Ranunculus macounii Britt. (Map No. 40). Stems ascending or declined, 0.2-1 m long; leaves ternately compound; leaflets ovate to obovate, 2-3 cleft into lacerate or dentate acute lobes; petals 3.5-5 mm long, yellow, usually longer than the sepals; fruiting heads globose or ovoid, 6-10 mm in diameter; achenes thin, narrow margined, 2.5-3.3 mm long, excluding the short beak. Infrequent. Wet soil and shores.

Thalictrum dasycarpum Fisch. & Ave-Lall. (Map No. 40). Stem up to 1.5 m high, from a thick caudex; cauline leaves sessile; leaflets usually puberulent beneath, mostly 3-lobed; inflorescences corymbose-paniculate, mostly dioecious. Infrequent. Wet soil.

Cruciferae

Armoracia rusticana Gaertn., Mey. & Scherb. (Map No. 41). Erect perennial up to 1.2 m high; basal leaves oblong or oblong-ovate, long-petioled, up to 4 dm long; upper leaves smaller, short-petioled to sessile, lanceolate; racemes elongating, panicled; flowers white. Very rare. Wet soil.

Cardamine pensylvanica Muhl. (Map No. 41). Erect or spreading biennial up to 7 dm high; rosette-leaves with 1-6 pairs of elliptic, obovate or rounded glabrous leaflets, the terminal leaflet largest; cauline leaves

with leaflets linear-oblanceolate to obovate; petals white, 1.5-4 mm long; siliques narrowly linear, 1-3 cm long. Very rare. Stream edges.

Rorippa islandica (Oeder) Borbas. (Map No. 41). Annual or biennial, 0.2-1 m high; leaves lanceolate to oblong-obovate, at least the lower pinnatifid; petals yellow, 1.7-2 mm long, about as long as the sepals; siliques slenderly ellipsoid to subglobose, 2-10 mm long. Infrequent. Muddy shores.

Erysimum cheiranthoides L. (Map No. 41). Erect annual 2-10 dm high; leaves lanceolate, finely pubescent; petals yellow, 3-5 mm long, longer than the sepals; siliques slender, 1-3 cm long. Rare. Wet soil and muddy shores.

Crassulaceae

Penthorum sedoides L. (Map No. 42). Erect perennial, 2-5 dm high; leaves elliptic or broadly lanceolate, finely serrate; sepals 5 (7); petals usually none; stamens 10; pistils 5 (7), united below, forming a crown-shaped, 5-horned capsule. Very rare. Muddy shores.

Saxifragaceae

Mitella nuda L. Stems 0.5-2 dm high; basal leaves cordate-suborbicular to reniform, deeply and doubly crenate; cauline leaves one or none; racemes 1.5-12.5 cm long; flowers yellowish-green; petals 3-5 mm long; seeds black, shining, 1 mm. Very rare. Sloughs and wet woods.

Ribes americanum Mill. (Map No. 42). Stems erect or ascending, with-

out spines, up to 1.5 m high; leaves reniform-ovate, cordate, 3-5-lobed, gland-dotted and sparsely villosulous beneath; flowers large, yellow and whitish; fruit black, glabrous. Infrequent. Wet woods and stream banks.

Rosaceae

Spiraea alba DuRoi. (Map No. 43). Erect shrub, 4-15 dm high; leaves oblanceolate, finely serrate, 3-6 cm long; inflorescence tomentulose; flowers white, 5-8 mm wide. Infrequent. Lowland prairie.

Potentilla paradoxa Nutt. (Map No. 43). Annual to short-lived perennial with decumbent or ascending stems; leaves all pinnate, oblong-obovate, with 2-5 distant pairs of small obovate to oblong crenate-dentate leaflets; flowers yellow, 5-7 mm wide; achenes smooth, provided on the inner face with a corky thickening nearly as large as the achene. Very rare. Wet soil.

Potentilla anserina L. (Map No. 43). Prostrate perennial, producing many long stolons; leaves interruptedly pinnate; leaflets silky-tomentose beneath, green above; flowers yellow, 1.5-2.5 cm wide; achenes 2.5 mm long, about as thick, deeply furrowed on the summit and back. Infrequent. Wet soil and shores.

Geum aleppicum var. strictum (Ait.) Fern. (Map No. 43). Stem erect, stout, hirsute, up to 1.2 m high; lower leaves on long petioles, the principal leaflets often mingled with minute ones; cauline leaves with 3-5 acute, mostly incised or deeply cut rhombic-ovate or oblong acute leaflets; petals orange to yellow, 5-10 mm long, 5-9 mm wide; body of

achene long-villous. Rare. Wet woods.

Fabaceae

Amorpha fruticosa L. (Map No. 44). Shrub up to 4 m high; petioles 2-5 cm long with 11-27 leaflets; racemes 6-20 cm long; fruits 6-8 mm long. Very rare. Streambanks.

Lathyrus palustris L. (Map No. 44). Perennial with stems up to 1 m long; stipules obliquely lanceolate to ovate, sharp-pointed at both ends; principal leaves with 2-5 pairs of ovate to linear firm leaflets; raceme of 2-9 red-purple flowers 12-20 mm long. Very rare. Muddy shores.

Glycyrrhiza lepidota Pursh. (Map No. 44). Stems 5-10 dm high; leaflets 11-19, oblong-lanceolate, the largest 2.5-5 cm long; flowers yellow, 12-15 mm long; fruits oblong, 1.5 cm long, beset with hooked prickles. Infrequent. Lowland Prairie and muddy shores.

Callitrichaceae

Callitriche hermaphroditica L. (Map No. 45). Submerged or floating perennial, up to 3 dm long; leaves oblong-linear, 1-nerved; flowers without subtending bracts; fruits nearly circular, 1.5-2.5 mm across. Infrequent. Fresh streams.

Callitriche verna L. (Map No. 45). Submerged or floating perennial, up to 2 dm long; submerged leaves linear, 1-nerved; floating leaves narrowly obovate or broadly spatulate, 3-nerved; flowers with subtending bracts; fruits narrowly obovate to ellipsoid, 1-1.4 mm long. Very rare.

Fresh streams.

Balsaminaceae

Impatiens biflora Walt. (Map No. 45). Ascending annual, 5-15 dm high; leaves soft, ovate or elliptic, 3-10 cm long, on long petioles; flower orange, usually with crimson spots, the saccate sepal longer than broad, its spur one-third to one-half its length. Very rare. Wet or springy places.

Impatiens pallida Nutt. (Map No. 45). Ascending annual, 5-20 dm high; leaves elliptical, mostly exceeding their petioles; flowers usually pale yellow, dotted with reddish-brown, the saccate sepal dilated and very obtuse, broader than long, with the short spur bent at right angles. Very rare. Wet or springy places.

Rhamnaceae

Rhamnus alnifolius L'Her. Low shrub, up to 1 m high; leaves oval, crenate-serrate; flowers 5-merous, with no petals; drupes black, 3-seeded. Very rare. Low woods.

Violaceae

Viola papilionacea Pursh. (Map No. 46). Poorly developed stem above ground; leaves broadly cordate-ovate, 4-12 cm wide when mature; petals blue-violet. Abundant. Wet soil.

Onagraceae

Epilobium angustifolium L. (Map No. 46). Erect, smooth perennial, up to 2 m high; leaves alternate, lanceolate, up to 2 dm long; petals pink-purple, 1-2 cm long, slightly unequal; capsules 5-8 cm long. Very rare. Wet soil.

Epilobium glandulosum Lehm. (Map No. 46). Stem slender, 4-sided, up to 1 m high; leaves mostly opposite, sessile and clasping to petiolate; petals light to dark pink, notched, 3-10 mm long; seeds with a white coma. Rare. Springs and fresh streams.

Haloragaceae

Myriophyllum verticillatum L. (Map No. 47). Stems up to 2.5 m long; leaves whorled, pinnately dissected into capillary segments, 2-4 cm long; flowers in whorls of 4-6; bracteoles palmately 7-lobed, 0.5 mm long. Rare. Shallow waters.

Myriophyllum spicatum L. Leaves whorled, 1.2-3 cm long, with 6-11 pairs of capillary flaccid or slightly stiffish divisions; bracts whorled, deeply pinnatisect, the lower usually longer than the flowers. Rare. Shallow waters.

Myriophyllum heterophyllum Michx. Leaves whorled, the submersed pinnate ones 2-5 cm long, with 7-10 pairs of divisions; bracts whorled, sharply denticulate, 4-18 mm long. Very rare. Shallow waters.

Hippuridaceae

Hippuris vulgaris L. (Map No. 47). Perennial from creeping rhizomes; stems cylindric, up to 7 dm high; leaves in whorls of 6-12, the emersed ones linear-attenuate, 1-3 cm long; flowers in middle and upper axils. Very rare. Quiet fresh streams.

Umbelliferae

Sium suave Walt. (Map No. 48). Ascending or erect perennial, up to 2 m high; emersed basal leaves long-petioled, pinnate, with 5-17 serrate leaflets 3-15 cm long; cauline leaves similar, gradually reduced upward; umbels 3-12 cm wide; fruit oval, 2.5-3 mm long, with prominent ribs. Very rare. Wet meadows and sloughs.

Cicuta bulbifera L. (Map No. 48). Stems slender, up to 1 m high; leaves 2-3-pinnate; leaflets linear, sparsely slender-toothed, 1-7 cm long; umbels 2-5 cm wide; fruit reniform, 1.5-2 mm long, with low and broad round-backed subequal ribs and slender intervals. Very rare. Sloughs.

Cicuta maculata L. (Map No. 48). Stem stout, 0.5-2 m high, from fleshy tuberiform finger-like roots; leaves 2-3-pinnate; leaflets linear to lance-ovate, 3-10 cm long, sharply and coarsely serrate to nearly entire; umbels 5-12 cm wide; fruits ellipsoid or ovoid, 3-4 mm long, with alternating rounded ribs and dark furrows. Rare. Wet shores.

Cornaceae

Cornus stolonifera Michx. (Map No. 49). Shrub up to 3 m high; younger

branches red; leaves broadly ovate to lanceolate, with 5-7 pairs of veins; fruit white, 7-9 mm thick. Infrequent. Wet soil.

Primulaceae

Lysimachia ciliata L. (Map No. 49). Stem erect, square in cross section, up to 1 m high; leaves ovate-lanceolate to ovate, the blades 3-15 cm long, all on long ciliate-fringed petioles; flowers 1.5-2.5 cm wide; sepals lanceolate; petals yellow, 10-13 mm long. Rare. Wet soil.

Lysimachia hybrida Michx (Map No. 49). Stem erect, square in cross section, up to 1 m high; cauline leaves lance-linear to narrowly oblong, 4-10 cm long, gradually tapering below to a short, winged petiole; flowers 1.5-2.5 cm wide; petals yellow, obovate. Very rare. Lowland prairie.

Lysimachia thyrsiflora L. (Map No. 49). Stem smooth, terete, erect, 2-8 dm high; leaves mostly lanceolate, 0.5-1.5 dm long; inflorescence a few dense racemes, 1-3 cm long; flowers mostly 6-merous, yellow marked with black. Very rare. Shallow fresh water.

Oleaceae

Fraxinus pennsylvanica var. subintegerrima (Vahl) Fern. (Map No. 50). Tree up to 25 m; leaflets 5-9, usually 7, ovate or oblong-lanceolate, toothed; branchlets, petioles and leaf-rachises glabrous; samaras 2.7-4.5 cm long. Abundant. Streambanks.

Gentianaceae

Gentiana andrewsii Griseb. (Map No. 50). Perennial with smooth, ascending stems, 3-8 dm high; median and upper leaves gradually larger, lanceolate to oblong-ovate, acuminate, narrowed to the sessile base; the uppermost 0.3-1.1 dm long, forming a 4-6-leaved involucre; corolla blue-violet, closed, 3-4 cm long. Very rare. Wet woods and lowland prairie.

Apocynaceae

Apocynum sibiricum Jacq. (Map No. 50). Erect or ascending shrub, up to 5 dm high; leaves oblong to oblong-lanceolate, 1-4 cm wide, sessile or nearly so; corolla 3-6 mm long, milky-white; follicles 4-9 cm long. Infrequent. Moist soil and lowland prairie.

Asclepiadaceae

Asclepias incarnata L. (Map No. 51). Stout, erect perennial, up to 1.5 m high; leaves oblong-lanceolate to ovate; umbels forming a broad corymb; flowers pink to rose-purple; follicles 5-9 cm long. Rare. Wet ditches and shores.

Verbenaceae

Verbena urticifolia L. (Map No. 51). Erect annual or perennial, 5-15 dm high; leaves broadly lanceolate to oblong-ovate, petiolate, 8-20 cm long,

coarsely and somewhat doubly crenate-serrate; slender spikes interrupted; mature calyx 2-2.3 mm long, about equaling or shorter than the mature fruit. Rare. Streambanks.

Verbena hastata L. (Map No. 51). Erect perennial, up to 15 dm high; leaves lanceolate or lance-oblong to narrowly ovate, 0.5-1.8 dm long, acuminate, petioled, coarsely incised-serrate; spikes pencil-like, compact; corolla-limb violet-blue. Rare. Wet soil.

Labiatae

Teucrium canadense L. (Map No. 52). Stem stiff, erect, pubescent, up to 1 m high; leaves lanceolate to lance-ovate, serrate, 1.5-3 cm wide, short-petioled, hoary beneath; inflorescence a crowded, spiciform raceme 5-20 cm long with slender bracts to 1 cm long; corolla pink-purple, 12-18 mm long, cleft to the summit of the calyx. Rare. Wet soil.

Scutellaria lateriflora L. (Map No. 52). Stem up to 8 dm high, smooth, or minutely pilose on angles; leaves ovate, toothed, with broadly rounded or subcordate base, 3-8 cm long; racemes 1-sided, axillary and terminal, usually with 2-44 flowers in the axils of progressively smaller leafy bracts; corolla blue, 5-8 mm long. Rare. Stream edges.

Scutellaria galericulata L. (Map No. 52). Stem ascending to erect, up to 8 dm high; leaves oblong-lanceolate to oblong-ovate, crenate, 2-6 cm long; racemes 1-sided, interrupted, axillary; corolla blue-violet with whitish throat and tube, pilose, 1.2-2.5 cm long. Very rare. Stream edges.

Physostegia parviflora Nutt. (Map No. 52). Stem smooth, solitary, up to 1 m high; leaves elliptic-lanceolate, sharply serrate to subentire, sessile; terminal spikes 3-15 cm long; corolla rose-purple, 1-1.5 cm long. Rare. Sloughs and muddy shores.

Stachys palustris L. (Map No. 53). Stem ascending, pubescent, up to 1 m high; leaves sessile or with short petiole, lanceolate to narrowly ovate, crenate or crenate-serrate; spike 0.5-2.5 dm long; corolla rose-purple mottled with paler and darker tones, 1.2-1.5 cm long, pubescent without, the large 3-lobed lower lip much longer than the upper. Infrequent. Wet and muddy soil.

Lycopus americanus Muhl. (Map No. 53). Stem erect, slender, up to 8 dm high; leaves lanceolate or ovate, 3-8 cm long, tapering to a short petiole; calyx-teeth with long subulate tips; corolla barely surpassing the calyx. Rare. Wet soil.

Lycopus asper Greene. (Map No. 53). Stem stout, erect, pubescent on angles; leaves narrowly oblong to oblanceolate, sessile, the larger ones with 6-12 sharp teeth on each margin; corolla-tube scarcely exceeding calyx. Very rare. Shores.

Mentha arvensis L. (Map No. 53). Stems ascending or erect, up to 8 dm high; leaves ovate, oblong or lanceolate, serrate, short-petioled; flowers in the axils of the slightly reduced middle and upper leaves; corolla lilac-pink or purple, 4-7 mm long. Infrequent. Wet soil.

Scrophulariaceae

Mimulus ringens L. (Map No. 54). Stem erect, glabrous, square in section, up to 1 m high; leaves sessile, oblong to oblanceolate, up to 10 cm long; pedicels stout, solitary, from the upper axils, 1-6 cm long; corolla blue-violet, 2-4 cm long, the throat nearly closed by the large palate. Rare. Muddy shores.

Mimulus glabratus HBK. (Map No. 54). Stems weak, ascending to prostrate; leaves suborbicular to reniform, the lower petioled; corolla yellow, 0.7-2.2 cm long, with open throat. Very rare. Fresh water.

Mimulus guttatus DC. (Map No. 54). Stems erect to decumbent, rooting at the lower nodes, up to 6 dm high; leaves obovate to broadly lanceolate, 0.8-1.5 cm long; corolla 2-4 cm long, yellow, the throat nearly closed by the hairy ridges. Very rare. Fresh water.

Limosella aquatica L. (Map No. 55). Small decumbent annual; leaves with a slender petiole and a lanceolate to elliptic blade 2.5-6 mm wide; calyx regular; corolla pink. Very rare. Muddy shores.

Veronica americana (Raf.) Schw. (Map No. 55). Perennial, with ascending stems, 1-10 dm high; principal leaves of ascending flowering stems lanceolate to narrowly ovate, distinctly petioled, the blades 1-9 cm long; racemes lax, 4-30-flowered, the lower mature filiform divergent pedicels 6-11 mm long; corolla lilac, 5-10 mm wide. Very rare. Shallow water and streambanks.

Veronica anagallis-aquatica L. (Map No. 55). Stem ascending to erect,

up to 1 m high; leaves elliptic to elliptic-oblong, sessile, 2-10 cm long, usually about twice as long as wide; racemes mostly 20-65-flowered; corolla bluish-lilac, 4-5 mm wide. Very rare. Streams and ditches.

Veronica catenata Pennell. (Map No. 55). Stem ascending to erect, often depauperate, up to 8 dm high; leaves lanceolate or lance-oblong, dentate; racemes mostly 5-35-flowered; corolla white to pink or pale blue, 3 mm wide. Abundant. Submerged, emergent, and on muddy shores.

Gerardia tenuifolia Vahl. (Map No. 56). Slender, much-branched annual, up to 5 dm high; leaves linear, 1-6 mm wide; corolla roseate, 1-1.5 cm long; capsules mostly 5-7 mm long. Very rare. Wet soil.

Pedicularis lanceolata Michx. (Map No. 56). Stem erect, 3-8 dm high; leaves sessile, oblong-lanceolate, doubly cut-toothed; calyx 2-lobed, leafy-crested; upper lip of the pale yellow corolla incurved and bearing a short truncate beak at the apex; the lower erect, nearly closing the throat. Very rare. Wet soil and shores.

Lentibulariaceae

Utricularia vulgaris L. (Map No. 56). Stems prolonged, submersed or free-floating; leaves elliptic to ovate, mostly 2-parted at base and then repeatedly and unequally dichotomous; bladders numerous, on the leaves; flowers mostly 6-20 in a lax raceme on an emergent peduncle 6-20 cm long; corolla yellow, 1.5-2.5 cm long. Very rare. Quiet fresh water.

Plantaginaceae

Plantago major L. (Map No. 57). Acaulescent annual or perennial; leaves thick, 0.5-3 dm long, with broad petiole and broadly elliptic to cordate-ovate blades; spike rather dense, 0.1-5 dm long. Very abundant. Wet soil and waste places.

Plantago eriopoda Torr. (Map No. 57). Fleshy perennial with stout crown usually bearing a mass of yellowish wool; leaves thick, elliptic, 5-12 cm long; spikes slender, 5-20 cm long. Rare. Alkaline lowland prairie.

Rubiaceae

Galium boreale L. (Map No. 58). Erect perennial, 2-8 dm high; leaves in 4's, linear-lanceolate; flowers in terminal panicles; corolla white, 3.5-7 mm wide. Infrequent. Wet soil.

Galium trifidum L. Creeping or ascending perennial; primary leaves chiefly in 4's, linear or linear-oblanceolate, 0.7-2 cm long; flowers solitary or, when terminal, in 3's; corolla white, 1-1.5 mm wide. Very rare. Wet soil.

Cucurbitaceae

Echinocystis lobata (Michx.) T. & G. (Map No. 58). Annual with branched tendrils; leaves long-petioled, deeply and sharply 5-lobed; fruit ovoid, 3-5 cm long, with long, weak spines. Rare. Wet soil.

Lobeliaceae

Lobelia kalmii L. (Map No. 58). Slender perennial, 1-4 dm high; basal leaves spatulate to obovate; cauline leaves linear or linear-lanceolate; racemes lax, often 1-sided; bracts linear or filiform, up to 15 mm long; flowers 8-15 mm long; corolla blue, with conspicuous white eye. Very rare. Wet soil.

Compositae

Helianthus tuberosus L. (Map No. 59). Stem stout, up to 3 m high; leaves thick and hard, broadly lanceolate to broadly ovate, those of lower quarter of stem opposite, the upper ones alternate; disk 1.5-2.5 cm wide, yellow; ligules broad, 2.5-4 cm long. Very rare. Wet soil.

Helenium autumnale L. (Map No. 59). Perennial, up to 15 dm high; leaves numerous, elliptic, oblong or lanceolate, 0.5-1.6 dm long; heads peduncled, the disk yellow, 8-20 mm wide; ray flowers 10-20, usually fertile. Rare. Ditches and muddy shores.

Bidens cernua L. (Map No. 60). Annual, up to 1 m high; leaves sessile, linear to oblanceolate, strongly serrate to subentire, 4-20 cm long; heads discoid or radiate, usually strongly nodding in fruit; achenes with coarsely retrorse-barbed margins and keels, the 4 (rarely 2) erectish awns retrorsely barbed, 2-6 mm long. Rare. Stream edges.

Bidens tripartita L. (Map No. 60). Annual, up to 2 m high; leaves simple, incised-serrate, 3-5-lobed, the petiole margined and short; heads

erect, hemispherical; achenes flat, with corky-thickened margin and midribs, 2-4-awned; the inner 6-8.5 mm long, with marginal awns 2.3-3 mm long. Rare. Stream edges.

Bidens frondosa L. (Map No. 60). Somewhat slender annual, up to 1 m high; leaves pinnately compound, long-petiolulate, with 3-5-lanceolate, serrate leaflets; achenes blackish, with margins upwardly ciliate to the bases of the awns; the outer 5.3-7 mm long, with awns 2-4 mm long; the inner 7-10 mm long, with awns 2.5-5 mm long. Rare. Stream edges.

Bidens vulgata Greene. (Map No. 60). Coarse annual, up to 1.5 m high; leaves slender-petioled, the principal cauline ones with 3-5 mostly petiolulate leaflets; leaflets lance-acuminate, coarsely serrate; achenes flat, with slender midribs, 2-awned, the erect to divaricate awns retrorsely barbed; outer achenes 6.5-11.3 mm long, with awns 3-6 mm long; inner 0.9-1.7 cm long, with awns 4-9.5 mm long. Very rare. Wet soil.

Iva ciliata Willd. (Map No. 61). Annual, up to 2 m high; leaves broadly lanceolate to broadly ovate, on slender ciliate petioles; heads in dense spikes. Very rare. Sloughs and shores.

Xanthium strumarium L. (Map No. 61). Coarse, erect or ascending annual, up to 2 m high; leaves broadly ovate to suborbicular or reniform, sometimes shallowly 3-4-lobed, often 15 cm long, long petiolate; involucre of the pistillate heads completely enclosing the 2 flowers, forming a conspicuous 2-chambered bur with hooked prickles. Infrequent. Shores and wet soil.

Artemisia biennis Willd. Glabrous annual or biennial, up to 2 m high; leaves 2-pinnately parted or the upper pinnatifid, 5-15 cm long; inflorescence dense, spike-like or of spiciform branches. Very rare. Shores.

Senecio congestus (R. Br.) DC. (Map No. 61). Coarse, single-stemmed, up to 8 dm high; leaves linear to oblong-lanceolate, dentate or shallowly pinnatifid; corymb somewhat open, its branches, pedicels and involucres more or less villous-lanate; mature pappus four or five times as long as the smooth slender achenes. Very rare. Sloughs.

Senecio aureus L. (Map No. 61). Rhizomatous perennial, up to 8 dm high; basal leaves long-petiolate, cordate, suborbicular to ovate; cauline leaves variously pinnatifid; disk 5-12 mm wide; involucre 5-10 mm high. Infrequent. Streambanks and wet soil.

Solidago gigantea Ait. (Map No. 62). Stems clustered or solitary, mostly glabrous, up to 2 m high; leaves numerous, essentially uniform, lanceolate to narrowly oblong, 7-14 cm long; branches of the inflorescence recurved-secund, 0.5-5 dm long; involucre 3-4 mm long. Infrequent. Streambanks and wet soil.

Solidago graminifolia (L.) Salisb. (Map No. 62). Stem glabrous to closely puberulent, up to 12 dm high; leaves numerous, mostly linear, to linear-elliptic, 4-15 cm long, the lower ones soon deciduous; inflorescence corymbiform, the heads mostly glomerulate; involucre 2.5-5 mm long. Infrequent. Shores and wet soil.

Aster junciformis Rydb. (Map No. 63). Stem slender, glabrous or nearly so, up to 8 dm high; leaves narrow, linear or nearly so, 4-13 cm long,

sessile and usually slightly auriculate clasping; heads few; phyllaries in 3-5 series, the outer much the shorter, 0.5-1 mm wide. Very rare. Muddy soil.

Aster brachyactis Blake. (Map No. 63). Taprooted annual, up to 7 dm high; leaves linear-attenuate, entire, mostly ciliate at base, 13-30 times as long as wide; heads several or many in an open-paniculiform to spiciform inflorescence; marginal flowers rayless; involucre 5-11 mm long, its bracts loose. Rare. Shores.

Aster simplex Willd. (Map No. 63). Stem relatively stout, from strong extensively creeping rootstocks, up to 15 dm high; leaves lanceolate or linear, serrate or occasionally entire, sessile or tapering to a petiole-like base; panicle usually large and with forking branches; involucres 4.5-6 mm long. Very rare. Shores and wet soil.

Eupatorium maculatum L. (Map No. 64). Stems up to 2 m high; leaves usually in 4's or 5's, oblong-lanceolate to narrowly ovate-lanceolate, sharply irregularly serrate to crenate, 6-21 cm long; inflorescence a corymb; involucre 6.5-9 mm long, often purplish; flowers purple, 9-22 per head. Rare. Streambanks.

Cirsium muticum Michx. (Map No. 64). Villous to glabrescent biennial, up to 20 dm high; cauline leaves sessile, green above, paler and more or less webby beneath, the principal ones deeply pinnatifid; upper leaves much reduced; involucre cobwebby, 2-3.5 cm long; flowers purple. Very rare. Muddy shores.

Cirsium arvense (L.) Scop. (Map No. 64). Perennial with extensively

creeping roots, up to 1 m high; leaves oblong or lanceolate, smooth, or slightly woolly beneath, finally green on both sides, strongly sinuate-pinnatifid, very prickly-margined; heads imperfectly dioecious; flowers pinkish-purple. Abundant. Wet soil.

Crepis runcinata (James) T. & G. (Map No. 64). Perennial, up to 6 dm high; basal leaf blades narrowly obovate, elliptic, lanceolate, or spatulate, 0.5-3.5 cm wide, 4-8 times as long, sessile or longer than the petiole; cauline leaves few and much reduced; heads loosely corymbose, 2 cm broad, Rare. Ditches and wet soil.

SPECIES DISTRIBUTION

Equisetaceae

Equisetum arvense L. (Inkster; 7-14-60; Facey: 154-55-14; 5-22-70; Kaloupek 9)

Typhaceae

Typha latifolia L. (Stewart's slough; 7-9-64; Hegg: Grand Forks; ---; Halpin: O.P.; 7-5-61; Enpeldin: 151-50-5; 9-29-49; Wilson: 150-52-34; 7-1-70; Kaloupek 198: 150-56-22; 7-1-70; Kaloupek 208)

Typha angustifolia L. (Stewart's slough; 7-9-64; Hegg: 9.2 W of Grand Forks; 7-3-61; Facey: O.P.; 7-5-61; Empeldin: Northwood; 7-31-63; ---; 149-50-3; 6-30-70; Kaloupek 180)

Sparganiaceae

Sparganium eurycarpum Engelm. (151-50-5; ---; Halpin: F.R.B.S.; 7-12-60; Facey: Northwood; 8-28-58; Stevens: 150-52-19; 6-24-70; Kaloupek 140: 149-50-3; 6-30-70; Kaloupek 175: 151-52-16; 6-30-70; Kaloupek 189)

Sparganium chlorocarpum Rydb. (153-55-34; 7-16-70; Kaloupek 279: 150-56-22; 8-25-70; Kaloupek 448)

Najadaceae

Zannichellia palustris L. (150-56-22; 7-23-70; Kaloupek 322: 144-53-11; 8-18-70; Kaloupek 423)

Potamogeton vaginatus Turcz. (Lake Ardoch; 7-30-40; Stevens)

Potamogeton pectinatus L. (F.R.B.S.; 8-11-55; Facey: Stewart's slough; 6-30-64; Hegg: 150-52-19; 6-24-70; Kaloupek 138: 150-50-10; 7-6-70; Kaloupek 233: 154-55-14; 8-15-70; Kaloupek 409)

Potamogeton foliosus Raf. (Grand Forks County; 7-1-33; Schonberger: 150-52-19; 7-8-70; Kaloupek 253; 157-54-17; 8-20-70; Kaloupek 427)

Potamogeton zosteriformis Fern. (F.R.B.S.; 7-16-59; Facey)

Juncaginaceae

Triglochin maritima L. (Stewart's slough; 7-19-64; Hegg: Kelly's slough; 8-23-55; Facey: O.P.; 7-27-60; Facey: 151-51-27; 6-8-70; Kaloupek 30: 152-52-13; 6-9-70; Kaloupek 43)

Alismataceae

Alisma subcordatum Raf. (F.R.B.S.; 7-12-60; Facey: 151-50-5; ---; Halpin: 150-52-19; 6-17-70; Kaloupek 84: 151-52-16; 7-21-70; Kaloupek 299)

Alisma gramineum Gmel. (Highway 81 reservoir, Traill County; 8-16-63; Facey: 151-52-17; 8-13-70; Kaloupek 385)

Sagittaria cuneata Sheldon (F.R.B.S.; 8-10-55; Facey: Grand Forks;

6-21-52; Hundley: Grand Forks County; 6-20-33; Schonberger: 152-53-20; 7-21-70; Kaloupek 302: 150-52-19; 8-2-70; Kaloupek 356: 151-52-17; 8-13-70; Kaloupek 391)

Sagittaria latifolia Willd. (154-55-14; 9-12-70; Kaloupek 465)

Hydrocharitaceae

Anacharis nuttallii Planch. (151-50-5; 6-27-70; Kaloupek 170: 151-50-5; 7-13-70; Hall: 152-53-20; 8-13-70; Kaloupek 394: 153-50-19; 9-11-70; Kaloupek 468)

Vallisneria americana Michx. (149-50-3; 6-8-70; Kaloupek 28: 150-52-19; 6-10-70; Kaloupek 46: 150-50-11; 7-27-70; Kaloupek 335)

Gramineae

Puccinella nuttalliana (Schult.) Hitchc. (151-52-16; 7-27-60; Facey: 151-52-9; 8-7-58; Facey: 150-52-12; 7-24-59; Facey 1466: F.R.B.S.; 8-29-58; Stevens: Edinburg; 8-16-66; Stevens)

Glyceria borealis (Nash) Batchelder (153-55-34; 7-16-70; Kaloupek 283)

Glyceria striata (Lam.) Hitchc. (F.R.B.S.; 6-22-59; Facey: 154-55-14; 6-11-70; Kaloupek 56: 154-56-16; 7-2-70; Kaloupek 220)

Glyceria grandis S. Wats. (F.R.B.S.; 8-29-58; Stevens: Park River; 7-31-59; Stevens: 154-56-17; ---; Facey: 151-50-5; 7-15-51; Lade: 150-56-22; 8-25-70; Kaloupek 447)

Scolochloa festucacea (Willd.) Link (Stewart's slough; 7-16-64; Hegg: 150-52-19; 7-1-70; Kaloupek 207)

Poa pratensis L. (154-55-14; 7-3-61; Facey: 154-56-6; 6-26-61; Facey: 151-52-16; 7-8-66; Harrison: 151-50-5; 6-13-62; Nason: Manvel; 5-24-37; Monda: 153-51-26; 5-28-60; Behsman: 157-56-23; 7-19-50; LaBerge: 157-53-11; 7-20-50; LaBerge: 158-58-18; 6-28-50; LaBerge: 158-59-24; 6-23-50; LaBerge: 150-51-5; 6-17-70; Kaloupek 82)

Eragrostis hypnoides (Lam.) BSP. (Grand Forks; 10-7-26; Baird: 5 W of Park River; 8-14-49; LaBerge)

Eragrostis pectinacea (Michx.) Nees. (Edinburg; 8-16-66; Stevens)

Catabrosa aquatica (L.) Beauv. (F.R.B.S.; 6-28-55; Wette: 154-55-14; 7-2-70; Kaloupek 223)

Phragmites communis Trin. (Grand Forks County; 7-26-31; Baird: 151-52-6; 12-30-60; Kalin: Park River; 7-31-59; Stevens: 150-56-22; 8-15-70; Kaloupek 403)

Elymus virginicus L. (T.R.St. Park; 8-28-58; Stevens: 3 N of Hendrum; 8-6-65; Wanek 385: F.R.B.S.; 7-2-59; Facey)

Deschampsia cespitosa (L.) Beauv. (Inkster; 7-1-96; Brannon: Larimore; 6-16-53; Stevens 1425: Park River; 7-7-44; Stevens)

Calamagrostis canadensis (Michx.) Beauv. (F.R.B.S.; 10-15-60; Kalin)

Calamagrostis inexpansa Gray (151-51-4; 12-30-60; Kalin: 10 W of Grand Forks; 9-29-50; Kannowski: 155-52-4; 8-2-50; LaBerge: Inkster; 8-20-58; Stevens: 150-52-34; 7-1-70; Kaloupek 201: 151-52-16; 7-21-70; Kaloupek 300)

Calamagrostis neglecta (Ehrh.) Gaertn. (151-52-16; 8-4-60; Facey)

Agrostis stolonifera L. (Grand Forks; 7-10-49; LaBerge: F.R.B.S.;

7-25-61; Facey: 152-51-12; 6-29-60; Behsman: Grand Forks; 7-12-12; Bergman 2157: Park River; 7-31-59; Stevens)

Alopecurus pratensis L. (156-57-5; 8-31-70; Kaloupek 456)

Alopecurus aequalis Sobol. (Grand Forks; 6-7-12; Bergman 1652: 150-52-19; 7-23-70; Kaloupek 317: 151-52-17; 8-13-70; Kaloupek 390: 157-56-16; 8-20-70; Kaloupek 438)

Muhlenbergia richardsonis (Trin) Rydb. (151-52-16; 1960; Facey)

Muhlenbergia racemosa (Michx.) BSP. (4 N of Grand Forks; 9-21-50; Kannowski: T.R. St. Park; 10-6-50; Kannowski: F.R.B.S.; 8-15-60; Facey: Homme Dam-Park River; 8-21-49; LaBerge: 154-55-14; 8-25-70; Kaloupek 450)

Muhlenbergia mexicana (L.) Trin. (F.R.B.S.; 8-22-55; Facey)

Beckmannia syzigachne (Steud.) Fern. (Grand Forks County; 7-20-33; Schonberger: 151-52-6; 12-30-60; Kalin: Park River; 7-31-59; Stevens: 153-51-12; 7-20-70; Kaloupek 293: 150-52-19; 7-23-70; Kaloupek 314)

Spartina pectinata Link (Hillsboro; 7-14-91; Stockbridge: Northwood; 8-28-58; Stevens: 3.7 N of Grandin; 7-22-70; Seiler 2387: Stewart's slough; 7-19-64; Hegg: 159-60-26; 7-25-61; Oakland: 9.2 W of Grand Forks; 7-3-51; Facey: O.P.; 10-8-60; Kalin: 151-50-5; 9-29-49; Wilson: 150-52-34; 8-15-70; Kaloupek 396: 154-55-14; 8-31-70; Kaloupek 460)

Hierochlöe odorata (L.) Beauv. (151-52-16; 5-26-62; Facey: 159-60-23; 6-10-61; Oakland: 154-55-11; 6-26-63; Kristenson: 152-51-12; 5-16-60; Behsman: Grand Forks; 7-12-12; Bergman 2172: 151-52-1; 6-2-70;

Kaloupek 18)

Phalaris arundinacea L. (Grand Forks; 7-12-12; Bergman 2173: Hatton; 7-2-64; Stevens: Park River; 7-31-59; Stevens: 152-53-20; 6-15-70; Kaloupek 73: 150-52-19; 6-24-70; Kaloupek 142: 151-52-16; 6-30-70; Kaloupek 193: 150-52-34; 7-1-70; Kaloupek 202)

Leeria oryzoides (L.) Sw. (151-50-5; 9-29-49; Wilson: Hillsboro; 8-2-60; Stevens & Moir: 150-56-22; 8-15-70; Kaloupek 404: 144-51-9; 8-18-70; Kaloupek 417)

Zizania aquatica L. (Northwood; 8-28-58; Stevens: 151-50-5; 7-21-63; Kristensen: Kelly's slough; 9-23-28; Baird: F.R.B.S.; 8-10-53; Facey: 154-55-14; 8-2-70; Kaloupek 365)

Echinochloa crusgalli (L.) Beauv. (4 N of Grand Forks; 9-21-50; Kannowski: 151-50-5; 9-29-49; Wilson: Edinburg; 8-16-66; Stevens: Northwood; 8-29-58; Stevens: 153-55-34; 7-16-70; Kaloupek 287: 150-50-11; 7-27-70; Kaloupek 337: 150-52-19; 8-2-70; Kaloupek 355)

Cyperaceae

Cyperus odoratus L. (4 S of Grand Forks; 8-19-65; Wanek 461)

Cyperus erythrorhizos Muhl. (150-56-22; 9-12-70; Kaloupek 463)

Eleocharis palustris (L.) R. & S. (F.R.B.S.; 7-25-60; Facey: 151-52-16; 6-10-61; Facey: 1 E, 6 N of Inkster; 7-2-69; Ward 516: 151-51-27; 6-15-70; Kaloupek 70: 150-51-5; 6-17-70; Kaloupek 81: 154-56-16; 6-25-70; Kaloupek 156)

Eleocharis acicularis (L.) R. & S. (150-52-19; 8-2-70; Kaloupek 354:

151-52-17; 8-13-70; Kaloupek 387)

Scirpus americanus Pers. (O.P.; 7-25-60; Haugen: 151-50-5; 6-28-48; Knause: F.R.B.S.; 6-18-59; Facey: 153-55-34; 7-16-70; Kaloupek 281: 150-52-34; 8-2-70; Kaloupek 352)

Scirpus validus Vahl. (F.R.B.S.; 7-22-60; Facey: Stewart's slough; 6-30-64; Hegg: Jackson's slough; 10-18-37; Wheeler: Park River; 7-31-59; Stevens: T.R. St. Park; 6-16-61; Stevens: 4 N of Blanchard; 7-28-69; Ward 924: 1.8 N of Blanchard; 7-3-69; Ward 592: 1 E, 6 N of Inkster; 7-2-69; Ward 510: 149-50-3; 6-30-70; Kaloupek 177: 153-51-30; 8-1-70; Kaloupek 347)

Scirups acutus Muhl. (2 1/4 N of Grandin; 8-9-68; Ward 23: 12 S, 15 W of Thompson; 6-5-69; Ward 168: 1 E, 6 N of Inkster; 7-2-69; Ward 511: 5 S of Blanchard; 7-28-69; Ward 925)

Scirpus heterochaetus Chase (12 S, 15 W of Thompson; 6-5-69; Ward 167: 150-52-19; 7-1-70; Kaloupek 205)

Scirpus fluviatilis (Torr.) Gray (Grand Forks; 8-8-95; Brannon: 149-50-3; 6-30-70; Kaloupek 176: 151-51-27; 6-30-70; Kaloupek 182: 151-52-16; 6-30-70; Kaloupek 190)

Scirpus maritimus var. paludosus (A. Nels.) Kukenth. (150-52-12; 7-24-59; Facey: Stewart's slough; 6-25-64; Hegg)

Scirpus atrovirens Willd. (GrandForks County; 7-20-33; Schonberger: F.R.B.S.; 7-28-54; Facey: Park River; 7-31-59; Stevens: T. R. St. Park; 8-28-58; Stevens: Hillsboro; 8-2-60; Stevens & Moir: 149-50-3; 6-30-70; Kaloupek 179; 150-52-19; 7-23-70; Kaloupek 313: 155-56-23;

8-31-70; Kaloupek 459)

Scirpus rubrotinctus Fern. (Hillsboro; 8-2-60; Stevens & Mohr: Grand Forks County; 6-16-61; Stevens 2405: 150-56-22; 7-1-70; Kaloupek 209: 150-50-10; 7-6-70; Kaloupek 238)

Eriophorum angustifolium Honckeny (Larimore; 6-16-53; Stevens)

Dulichium arundinaceum (L.) Britt. (Grand Forks County; 6-25-33; Baird)

Carex rosea Schk. (F.R.B.S.; 7-2-59; Facey 1429: 154-55-14; 6-25-70; Kaloupek 165)

Carex vulpinoidea Michx. (F.R.B.S.; 6-29-59; Facey)

Carex diandra Schrank (F.R.B.S.; 6-22-60; Facey)

Carex prairea Dewey (Larimore; 6-16-53; Stevens 1429)

Carex stipata Muhl. (F.R.B.S.; 6-22-60; Facey: 154-55-14; 6-25-70; Kaloupek 168)

Carex bebbii Olney (F.R.B.S.; 7-12-60; Facey)

Carex aurea Nutt. (F.R.B.S.; 6-22-60; Facey)

Carex granularis Muhl. (F.R.B.S.; 6-22-60; Facey: 2 SE of Manvel; 6-25-59; Facey: 150-52-34; 6-24-70; Kaloupek 136)

Carex lasiocarpa Ehrh. (Grand Forks County; 7-1-28; Baird: 1E, 6 N of Inkster; 7-2-69; Ward 512: T. R. St. Park; 6-12-61; Stevens: 152-52-19; 6-15-70; Kaloupek 72: 151-51-27; 6-23-70; Kaloupek 119: 151-52-16; 6-23-70; Kaloupek 128: 150-52-19; 6-24-70; Kaloupek 141)

Carex aquatilis Wahl. (Larimore; 6-13-58; Stevens & Moir 1721: F.R.B.S.; 1960; Facey: 151-50-5; 6-21-54; Facey: T. R. St. Park; 5-22-59; Ramnarine: 149-50-3; 6-15-70; Kaloupek 69)

Carex lenticularis Michx. (149-50-3; 6-8-70; Kaloupek 29: 151-52-6; 6-23-70; Kaloupek 129)

Carex stricta Lam. (Grand Forks County; 6-10-28; Baird)

Carex hystericina Muhl. (Arvilla; 6-16-61; Stevens: F.R.B.S.; 6-22-60; Facey: 154-55-14; 6-25-70; Kaloupek 167)

Carex laeviconica Dewey (Northwood; 7-31-63; Stevens: 150-50-10; 7-6-70; Kaloupek 237)

Carex atherodes Spreng. (150-50-11; 6-22-70; Kaloupek 114: 151-51-27; 6-23-70; Kaloupek 117: 151-52-16; 6-23-70; Kaloupek 128: 150-52-19; 6-24-70; Kaloupek)

Carex cristatella Britt. (2 NW of Park River; 7-31-59; Stevens 2150)

Carex retrorsa Schw. (F.R.B.S.; 7-25-60; Facey: 152-53-20; 6-30-70; Kaloupek 197)

Carex rostrata Stokes (Larimore; 6-13-58; Stevens & Moir 1720: F.R.B.S.; 7-12-60; Facey: 153-55-34; 7-16-70; Kaloupek 288: 150-56-22; 8-15-70; Kaloupek 401)

Lemnaceae

Spirodela polyrhiza (L.) Schleiden (Larimore; 8-29-58; Stevens 2019: 151-50-5; 7-27-70; Hall: 153-50-29; 9-4-70; Kaloupek 462: 154-55-14; 9-12-70; Kaloupek 464)

Lemna trisulca L. (151-50-5; 7-27-70; Hall: 149-50-3; 6-30-70; Kaloupek 171: 150-50-10; 7-13-70; Kaloupek 268)

Lemna minor L. (151-50-5; 7-17-70; Hall: 153-50-29; 6-9-70; Kaloupek

37)

Lemna perpusilla Torr. (Larimore; 8-29-58; Stevens 2020)

Juncaceae

Juncus balticus Willd. (O.P.; 6-22-60; Haugen: 154-55-14; 6-11-70; Kaloupek 55: 151-51-27; 6-23-70; Kaloupek 116: 153-51-26; 6-2-60; Behsman)

Juncus torreyi Cov. (151-52-16; 8-4-70; Kaloupek 373: 155-57-23; 8-31-70; Kaloupek 457)

Orchidaceae

Cypripedium calceolus L. (Grand Forks; 6-7-94; Brannon: Larimore; 6-12-61; Stevens: 150-52-20; 6-17-70; Kaloupek 83)

Habenaria hyperborea (L.) R. Br. (F.R.B.S.; 6-22-60; Facey)

Salicaceae

Populus deltoides Marsh. (152-54-36; 4-14-62; Thompson: U.N.D.; 5-3-62; Frye)

Salix lucida Muhl. (151-52-16; 5-18-62; Bakken: 151-52-9; 5-18-62; Muffenbier)

Salix amygdaloides Anderss. (151-50-5; ---; Halpin: F.R.B.S.; 7-12-60; Facey; T.R. St. Park; 6-16-61 Stevens)

Salix interior Rowlee (151-52-9; 5-26-62; Frye)

Salix rigida Muhl. (151-55-16; 5-18-62; Frye: Hillsboro; 5-26-12;

Bergman 1546)

Salix bebbiana Sarg. (154-55-14; 5-19-62; Frye: 153-51-26; 5-12-62; Frye: T.R. St. Park; 6-12-61; Stevens)

Salix discolor Muhl. (154-55-14; 5-12-62; Frye: 153-51-26; 5-18-62; Frye)

Salix petiolaris Sm. (153-55-26; 5-19-62; Frye: 151-52-16; 5-18-62; Frye)

Salix candida Fluegge (Larimore; 6-16-53; Stevens 1430)

Salix lutea Nutt. (154-55-14; 5-12-62; Frye: 153-51-26; 5-12-62; Frye: 151-55-16; 5-18-62; Frye)

Betulaceae

Betula glandulosa var. glandulifera (Regal) Gl. (Larimore; 6-16-53; Stevens 1431)

Alnus rugosa (DuRoi) Spreng. (Park River; 4-27-10; Stevens)

Urticaceae

Urtica dioica L. (F.R.B.S.; 7-6-55; Welte: Northwood; 8-29-58; Stevens: Fordville; 8-16-66; Stevens: 152-56-23; 7-8-70; Kaloupek 261: 152-53-20; 8-4-70; Kaloupek 382: 145-52-25; 8-18-70; Kaloupek 419)

Laportea canadensis (L.) Wedd. (T.R. St. Park; 8-28-58; Stevens: 154-55-14; 5-23-57; Flaten)

Polygonaceae

Rumex occidentalis Wats. (F.R.B.S.; 7-1-60; Facey: Northwood; 8-28-58; Stevens)

Rumex mexicanus Meisn. (Grafton; 7-17-57; Stevens: Grand Forks; 7-?-25; Baird: F.R.B.S.; 7-6-55; Welte: 151-51-27; 6-23-70; Kaloupek 115: 149-50-3; 6-30-70; Kaloupek 173)

Rumex maritimus L. (153-51-12; 7-20-70; Kaloupek 289)

Rumex persicarioides L. (Grand Forks County; 10-?-26; Baird: F.R.B.S.; 7-20-60; Facey)

Polygonum aviculare L. (151-50-5; 8-4-48; Krause: Grand Forks County; 9-22-27; Girard: F.R.B.S.; 7-28-55; Welte: Edinburg; 8-16-66; Stevens: Northwood; 8-29-58; Stevens)

Polygonum coccineum Muhl. (151-50-5; 9-29-49; Wilson: 3.7 N of Grandin; 7-22-70; Seiler 2381: Northwood; 7-31-63; Stevens: 152-52-10; 6-23-70; Kaloupek 132: 149-50-3; 6-30-70; Kaloupek 178: 151-52-16; 6-30-70; Kaloupek 188)

Polygonum natans Eat. (Grand Forks County; 7-19-33; Schonberger)

Polygonum lapathifolium L. (3 N of Hendrum; 8-6-65; Wanek 389: 4 S of Grand Forks; 8-19-65; Wanek 465: Edinburg; 8-16-66; Stevens: Park River; 7-31-59; Stevens: 150-52-19; 7-23-70; Kaloupek 312: 154-55-14; 8-2-70; Kaloupek 367: 151-52-16; 8-4-70; Kaloupek 372)

Polygonum pensylvanicum L. (3 N of Hendrum; 8-6-65; Wanek 390: Grand Forks County; 8-1-33; Schonberger: F.R.B.S.; 8-11-55; Facey:

154-55-14; 8-2-70; Kaloupek 366)

Polygonum hydropiper L. (F.R.B.S.; 8-9-60; Facey: Larimore; 8-28-58; Stevens: 154-55-14; 8-25-70; Kaloupek 451)

Polygonum periscaria L. (F.R.B.S.; 7-25-60; Facey: Northwood; 8-28-58; Stevens: 152-56-23; 7-23-70; Kaloupek 327)

Caryophyllaceae

Stellaria longifolia Muhl. (154-55-14; 6-22-59; Facey: Hatton; 7-2-64; Stevens: Hillsboro; 5-26-12; Bergman 1540: Grand Forks; 6-7-12; Bergman 1668: 154-55-14; 6-11-70; Kaloupek 54)

Ceratophyllaceae

Ceratophyllum demersum L. (153-51-12; 6-9-70; Kaloupek 41)

Numphaeaceae

Nuphar advena (Ait.) Ait. f. (T.R. St. Park; 1936; Walp: 154-56-16; 6-25-70; Kaloupek 157: 153-55-34; 7-16-70; Kaloupek 278)

Ranunculaceae

Caltha palustris L. (1 N of Larimore; 6-13-58; Stevens & Moir 1724: 154-55-14; 5-22-70; Kaloupek 4)

Ranunculus aquatilis L. (150-52-19; 7-1-70; Kaloupek 203; 153-51-30; 8-1-70; Kaloupek 345)

Ranunculus longirostris Godr. (152-53-20; 7-21-70; Kaloupek 307)

Ranunculus cymbalaria Pursh. (1 E, 6 N of Inkster; 7-2-69; Ward 514: 10 W of Grafton; 6-8-69; Ward 189: 151-50-5; ---; Halpin: Arvilla; 5-20-29; Baird: 150-52-6; 6-8-70; Kaloupek 33: 152-56-24; 6-10-70; Kaloupek 53: 149-50-3; 6-15-70; Kaloupek 67: 149-53-7; 6-17-70; Kaloupek 87: 154-56-16; 6-25-70; Kaloupek 152)

Ranunculus abortivus L. (F.R.B.S.; 5-19-62; Frye: T.R. St. Park; 5-16-51; Campbell: 151-50-26; 5-16-60; Shelton: Hillsboro; 5-26-12; Bergman 1534: 154-55-14; 5-22-70; Kaloupek 6: 152-56-24; 6-10-70; Kaloupek 52)

Ranunculus flabellaris Raf. (Northwood; 6-13-60; Stevens: 15 W of Thompson; 6-5-69; Ward 166: T.R. St. Park; 6-16-53; Stevens: 152-53-20; 6-8-70; Kaloupek 34: 150-50-32; 6-10-70; Kaloupek 44: 150-50-10; 7-6-70; Kaloupek 235: 153-55-35; 7-28-70; Kaloupek 343)

Ranunculus gmelini DC. (152-56-24; 6-10-70; Kaloupek 51: 153-55-35; 7-28-70; Kaloupek 343)

Ranunculus sceleratus L. (Arvilla; 6-16-61; Stevens: 153-51-13; 6-9-70; Kaloupek 39: 153-51-12; 6-9-70; Kaloupek 42: 150-56-22; 6-17-70; Kaloupek 93: 150-52-19; 7-1-70; Kaloupek 204: 153-51-12; 7-20-70; Kaloupek 291: 153-51-30; 8-1-70; Kaloupek 346)

Ranunculus pensylvanicus L. (F.R.B.S.; 7-20-60; Facey: Grand Forks; 6-22-96; Brannon: 153-55-34; 7-16-70; Kaloupek 282)

Ranunculus macounii Britt. (F.R.B.S.; 6-22-60; Facey: Hillsboro; 7-15-91; Stockbridge: Northwood; 8-28-58; Stevens: Park River; 7-31-59; Stevens: 154-55-14; 6-11-70; Kaloupek 61: 149-54-7; 6-17-70;

Kaloupek 89: 149-50-1; 6-22-70; Kaloupek 112: 151-52-16; 6-23-70; Kaloupek 124: 152-56-23; 6-24-70; Kaloupek 149: 154-56-16; 6-25-70; Kaloupek 153: 144-51-9; 8-18-70; Kaloupek 415)

Thalictrum dasycarpum Fisch. & Ave-Lall. (Northwood; 8-28-58; Stevens: Park River; 7-31-59; Stevens: 151-50-5; ---; Halpin: 154-55-14; 6-17-70; Kaloupek 103: 152-56-23; 7-1-70; Kaloupek 213)

Cruciferae

Armoracia rusticana Gaertn., Mey. & Scherb. (150-52-30; 6-10-70; Kaloupek 47)

Cardamine pensylvanica Muhl. (F.R.B.S.; 7-9-60; Facey: 154-55-14; 6-11-70 Kaloupek 60)

Rorippa islandica (Oeder) Borbas (T.R. St. Park; 6-30-36; Walp: F.R.B.S.; 8-10-55; Facey: 151-52-16; 6-30-70; Kaloupek 185: 150-50-10; 7-6-70; Kaloupek 236: 152-53-20; 7-21-70; Kaloupek 303)

Erysimum cheiranthoides L. (Grand Forks; 6-20-33; Schonberger: F.R.B.S.; 7-18-60; Facey: Edinburg; 8-16-66; Stevens: 150-56-22; 6-17-70; Kaloupek 94: 154-56-16; 6-25-70; Kaloupek 155)

Crassulaceae

Penthorum sedoides L. (T. R. St. Park; 8-5-36; Walp: 152-53-20; 8-13-70; Kaloupek 392)

Saxifragaceae

Ribes americanum Mill. (F.R.B.S.; 4-30-60; Linstrom: T. R. St. Park; 5-2-51; Boltman: Hillsboro; 5-26-12; Bergman 1542: Grand Forks; 6-7-12; Bergman 1651: 154-55-14; 6-4-70; Kaloupek 21)

Rosaceae

Spiraea alba DuRoi. (3.7 N of Grandin; 7-22-70; Seiler 2382: 158-58-18; 6-28-50; LaBerge: F.R.B.S.; 6-22-55; Welte: T.R. St. Park; 7-7-63; Pinger: 154-56-5; 7-9-63; Miller: Edinburg; 7-3-96; Brannon: 151-52-16; 6-30-70; Kaloupek 184)

Potentilla paradoxa Nutt. (154-56-5; 7-9-63; Green)

Potentilla anserina L. (Grand Forks County; 5-25-94; Engebretson: 151-52-16; 6-20-63; Miller: Grand Forks; 6-7-12; Bergman 1665; Northwood; 6-13-60; Stevens: 1 E, 6 N of Inkster; 7-2-69; Ward 515: 151-52-16; 6-15-70; Kaloupek 78: 149-53-7; 6-17-70; Kaloupek 88: 152-53-20; 8-13-70; Kaloupek 393)

Geum allepicum var. strictum (Ait.) Fern. (Grand Forks County; 6-20-33; Schonberger: 154-55-14; 6-25-70; Kaloupek 160)

Fabaceae

Amorpha fruiticosa L. (F.R.B.S.; 6-19-60; Facey: T.R. St. Park; 6-15-36; Walp)

Lathyrus palustris L. (Larimore; 6-13-58; Stevens & Moir: 151-52-16;

6-23-70; Kaloupek 125)

Glycyrrhiza lepidota Pursh. (T.R. St. Park; 7-4-63; Pinger: 152-51-12; 6-29-60; Behsman: O.P.; 7-25-60; Haugen: F.R.B.S.; 6-29-56; Facey: Grand Forks; 7-12-12; Bergman 2161: Grafton; 7-17-57; Stevens: 150-52-34; 3-8-70; Kaloupek 250)

Callitrichaceae

Callitriche hermaphroditica L. (Park River; 7-7-44; Stevens 773: Lake Ardoch; 7-26-34; Hotchkiss & Knowlton 4650: 149-50-3; 7-13-70; Kaloupek 266: 150-50-10; 7-13-70; Kaloupek 269: 150-56-22; 7-23-70; Kaloupek 319)

Callitriche verna L. (149-50-3; 6-30-70; Kaloupek 172: 150-56-22; 7-23-70; Kaloupek 322)

Balsaminaceae

Impatiens biflora Walt. (T.R. St. Park; 8-5-36; Walp: F.R.B.S.; 8-22-55; Facey: T.R. St. Park; 7-16-51; Facey: 154-55-14; 7-23-70; Kaloupek 333)

Impatiens pallida Nutt. (F.R.B.S.; 7-25-60; Facey)

Rhamnaceae

Rhamnus alnifolius L'Her. (Grand Forks County; 10-17-27; Girard)

Violaceae

Viola papilionacea Pursh. (F.R.B.S.; 5-4-62; Frye 19: T.R. St. Park; 5-16-51; Boltmann: Hillsboro; 5-26-12; Bergman 1526: 154-55-14; 5-30-70; Kaloupek 11)

Onagraceae

Epilobium angustifolium L. (T.R. St. Park; 6-30-36; Walp: Arvilla; 7-?-25; Baird: 157-57-8; 8-20-70; Kaloupek 439)

Epilobium glandulosum Lehm. (F.R.B.S.; 8-11-55; Facey: Northwood; 8-28-58; Stevens: 150-56-22; 7-23-70; Kaloupek 321: 154-55-14; 7-23-70; Kaloupek 329)

Haloragaceae

Myriophyllum verticillatum L. (150-50-10; 7-6-70; Kaloupek 232)

Hippuridaceae

Hippuris vulgaris L. (154-56-16; 6-25-70; Kaloupek 158)

Umbelliferae

Sium suave Walt. (Park River; 7-31-59; Stevens)

Cicuta bulbifera L. (Larimore; 8-28-58; Stevens)

Cicuta maculata L. (F.R.B.S.; 6-22-60; Facey: 154-55-14; 6-17-70; Kaloupek 97: 151-52-16; 7-7-70; Kaloupek 243)

Cornaceae

Cornus stolonifera Michx. (F.R.B.S.; 7-?-56; Facey: Grand Forks; 5-31-37; Monda: T.R. St. Park; 3-31-62; Thompson: Larimore; 6-13-58; Stevens & Moir 1723: 154-55-14; 6-11-70; Kaloupek 59)

Primulaceae

Lysimachia ciliata L. (Grand Forks; 7-12-12; Bergman 2156: F.R.B.S.; 7-21-56; Facey: T.R. St. Park; 7-16-51; Facey: 157-51-13; 8-1-50; LaBerge: 152-56-23; 7-1-70; Kaloupek 211: 154-55-14; 7-9-70; Kaloupek 264)

Lysimachia hybrida Michx. (151-52-16; 8-4-70; Kaloupek 368)

Lysimachia thyrsiflora L. (152-53-20; 6-15-70; Kaloupek 75; 150-56-22; 6-17-70; Kaloupek 92)

Oleaceae

Fraxinus pennsylvanica var. subintegerrima (Vahl) Fern. T.R. St. Park; 3-14-64; Miller: F.R.B.S.; 6-26-63; Roberge: 151-50-5; 5-2-62; Frye 16: 153-55-30; 7-16-70; Kaloupek 276)

Gentianaceae

Gentiana andrewsii Griseb. (2 N of Grand Forks; 8-19-55; Facey: Grand Forks; 9-7-97; Anderson)

Apocynaceae

Apocynum sibiricum Jacq. (Northwood; 7-31-63; Stevens: Grafton; 7-17-57; Stevens; 3.7 N of Grandin; 7-22-70; Seiler 2384: 154-55-11; 6-26-63; Andersen: 151-52-16; 6-19-63; Erickson: 151-52-16; 6-30-70; Kaloupek 187: 150-50-11; 7-6-70; Kaloupek 239: 150-52-34; 7-8-70; Kaloupek 251: 152-53-20; 8-4-70; Kaloupek 384)

Asclepiadaceae

Asclepias incarnata L. (152-55-2; 7-28-70; Kaloupek 344: 152-53-20; 8-4-70; Kaloupek 383; 145-51-30; 8-18-70; Kaloupek 418)

Verbenaceae

Verbena urticifolia L. (Grand Forks County; 9-30-27; Girard: Fordville; 8-16-66; Stevens: 153-55-30; 7-16-70; Kaloupek 274: 152-56-23; 7-23-70; Kaloupek 326: 157-55-19; 8-20-70; Kaloupek 431)

Verbena hastata L. (Grand Forks County 7-12-33; Schonberger: T.R. St. Park; 7-17-36; Walp: 150-56-22; 7-8-70; Kaloupek 255)

Labiatae

Teucrium canadense L. (Grand Forks; 9-14-97; Brannon: Stewart's slough; 7-4-64; Hegg: 150-50-11; 7-27-70; Kaloupek 336: 152-53-20; 8-4-70; Kaloupek 381)

Scutellaria lateriflora L. (Grand Forks County; 6-?-26; Baird: Park

River; 7-31-59; Stevens: T.R. St. Park; 8-28-58; Stevens: 154-55-14; 7-23-70; Kaloupek 332: 150-50-10; 7-27-70; Kaloupek 338: 145-52-25; 8-18-70; Kaloupek 420)

Physostegia parviflora Nutt. (Grand Forks; 8-?-96; Brannon: F.R.B.S.; 8-9-53; Facey: Northwood; 8-28-58; Stevens: Park River; 7-31-59; Stevens: T.R. St. Park; 7-31-36; Walp: 154-55-14; 8-2-70; Kaloupek 363: 152-53-20; 8-4-70; Kaloupek 375)

Stachys palustris L. (153-51-26; 7-6-61; Behsman: 151-52-9; 8-1-60; Haugen: F.R.B.S.; 7-12-60; Facey: Grand Forks; 7-12-12; Bergman 2158: 3.7 N of Grandin; 7-22-70; Seiler 2383: 153-55-30; 7-16-70; Kaloupek 273: 151-52-16; 7-21-70; Kaloupek 295: 152-53-20; 8-4-70; Kaloupek 376: 157-54-17; 8-20-70; Kaloupek 425)

Lycopus americanus Muhl. (Grand Forks County; 7-30-27; Girard: F.R. B.S.; 7-25-60; Facey: T.R. St. Park; 8-28-58; Stevens: 150-52-34; 7-23-70; Kaloupek 309: 150-56-22; 8-2-70; Kaloupek 357)

Lycopus asper Greene (Park River; 7-31-59; Stevens)

Mentha arvensis L. (Grand Forks County; 7-21-29; Baird: F.R.B.S.; 7-25-60; Facey: 151-52-9; 8-1-60 Haugen: T.R. St. Park; 8-28-58; Stevens: Park River; 7-31-59; Stevens: 153-55-34; 7-16-70; Kaloupek 285: 151-52-16; 7-21-70; Kaloupek 298: 150-56-22; 7-23-70; Kaloupek 320)

Scrophulariaceae

Mimulus ringens L. (Grand Forks; 7-28-48; Krause: Larimore; 7-?-27;

Conklin: T.R. St. Park; 7-7-36; Walp: Park River; 7-31059; Stevens: 153-51-12; 7-20-70; Kaloupek 294: 152-53-20; 7-21-70; Kaloupek 306)

Mimulus glabratus HBK. (F.R.B.S.; 7-9-60; Facey)

Mimulus guttatus DC. (F.R.B.S.; 7-?-56; Facey: 154-55-14; 6-25-70; Kaloupek 169)

Limosella aquatica L. (Park River; 8-3-30; Stevens: F.R.B.S.; 8-10-55; Facey)

Veronica americana (Raf.) Schw. (F.R.B.S.; 7-6-55; Welte: T.R. St. Park; 8-28-58; Stevens)

Veronica anagallis-aquatica L. (Park River; 7-31-59; Stevens: 154-55-14; 6-17-70; Kaloupek 99)

Veronica catenata Pennell (Park River; 7-7-44; Stevens 772: 152-56-23; 7-8-70; Kaloupek 259: 153-55-34; 7-16-70; Kaloupek 284: 152-53-20; 7-21-70; Kaloupek 304)

Gerardia tenuifolia Vahl. (151-52-17; 8-13-70; Kaloupek 386: 150-52-34; 8-15-70; Kaloupek 395)

Pedicularis lanceolata Michx. (Park River; 7-13-39; Stevens)

Lentibulariaceae

Utricularia vulgaris L. (153-55-34; 7-16-70; Kaloupek 277)

Plantaginaceae

Plantago major L. (F.R.B.S.; 7-25-60; Facey: Northwood; 8-29-58; Stevens: Edinburg; 8-16-66; Stevens: 150-52-19; 7-8-70; Kaloupek 254)

Plantago eripoda Torr. (152-51-12; 5-12-60; Behsman: 2 SW of Manvel; 6-25-59; Facey: 153-51-26; 5-16-60; Linstrom: Grand Forks; 6-27-52; Hundley: 151-51-27; 6-8-70; Kaloupek 31)

Rubiaceae

Galium boreale L. (151-52-16; 7-8-66; Harrison: 2 NW of Grand Forks; 6-23-63; Pinger: 153-56-5; 6-26-63; Kristensen: 154-55-14; 6-27-63; Miller: T.R. St. Park; 6-30-36; Walp: 151-52-16; 6-23-70; Kaloupek 126)

Galium trifidum L. (Grand Forks County; 6-25-33; Baird)

Cucurbitaceae

Echinocystis lobata (Michx.) T. & G. (T.R. St. Park; 7-14-63; Pinger: F.R.B.S.; 8-1-50; Wheeler: Park River; 8-3-37; Stevens: 152-53-20; 8-2-70; Kaloupek 380)

Lobeliaceae

Lobelia kalmii L. (150-52-34; 7-8-70; Kaloupek 248)

Compositae

Helianthus tuberosus L. (Northwood; 8-28-58; Stevens)

Helenium autumnale L. (Oakwood; 1896; Engebretson: 152-53-20; 7-21-70; Kaloupek 305: 151-52-16; 8-4-70; Kaloupek 370: 157-57-8; 8-20-70; Kaloupek 440)

Bidens cernua L. (F.R.B.S.; 8-11-55; Facey: Park River; 7-31-59; Stevens: 154-55-14; 8-15-70; Kaloupek 410)

Bidens tripartita L. (Grand Forks County; 9-30-27; Girard: 150-56-22; 8-15-70; Kaloupek 400)

Bidens frondosa L. (F.R.B.S.; 8-12-60; Facey: Park River; 7-31-59; Stevens: Northwood; 8-28-58; Stevens: 150-56-22; 8-15-70; Kaloupek 399: 157-54-17; 8-20-70; Kaloupek 430)

Bidens vulgata Greene (Northwood; 8-29-58; Stevens)

Iva ciliata Willd. (Lake Ardoch; 7-30-40; Stevens)

Xanthium strumarium L. (154-55-14; 8-15-70; Kaloupek 408)

Artemisia biennis Willd. (Grand Forks County; 9-22-27; Girard)

Senecio congestus (R. Br.) DC. (F.R.B.S.; 8-22-55; Facey)

Senecio aureus L. (F.R.B.S.; 6-23-61; ? : Clifford; 6-12-20; Rygg: Larimore; 6-12-61; Stevens: 154-55-14; 6-11-70; Kaloupek 65)

Solidago gigantea Ait. (T.R. St. Park; 7-24-36; Walp: Park River; 7-31-59; Stevens: F.R.B.S.; 8-11-55; Facey: 150-56-22; 8-2-70; Kaloupek 358: 157-54-17; 8-20-70; Kaloupek 428)

Solidago graminifolia (L.) Salisb. (F.R.B.S.; 8-11-55; Facey: T.R. St. Park; 7-21-37; Walp 100: Park River; 7-31-59; Stevens: 154-55-14; 8-2-70; Kaloupek 360: 157-54-17; 8-20-70; Kaloupek 429)

Aster junciformis Rydb. (150-56-22; 8-25-70; Kaloupek 445)

Aster brachyactis Blake (Grand Forks County; 9-30-27; Girard: 155-57-23; 8-31-70; Kaloupek 458)

Aster simplex Willd. (Grand Forks; 10-?-26; Baird: Park River; 7-31-59;

Stevens: Northwood; 8-28-58; Stevens)

Eupatorium maculatum L. (T.R. St. Park; 7-21-36; Walp: F.R.B.S.; 7-?-56; Gantner: 154-55-14; 7-23-70; Kaloupek 328: 157-54-17; 8-20-70; Kaloupek 426)

Cirsium muticum Michx. (151-51-27; 7-7-70; Kaloupek 242: 151-52-16; 7-7-70; Kaloupek 247: 153-51-12; 7-20-70; Kaloupek 292)

Cirsium arvense (L.) Scop. (F.R.B.S.; 6-28-55; Welte: O.P.; 7-25-60; Haugen: Grand Forks; 7-12-12; Bergman 2181)

Crepis runcinata (James) T. & G. (153-51-26; 6-10-60; Behsman: 2 SW of Manvel; 6-25-59; Facey: 151-51-16; 6-15-70; Kaloupek 77: 149-53-7; 6-17-70; Kaloupek 85)

SUMMARY

1. The study areas; Walsh, Grand Forks, and Traill Counties, lie in the north-east part of North Dakota and in two physiographic regions of the Young Drift Plains.
2. Four hundred and seventy collections were made by the author in the study area during the 1970 growing season.
3. Two species were recorded for North Dakota for the first time: Carex lenticularis and Ranunculus longirostris.
4. The range has been extended for Sparganium chlorocarpum, Zannichellia palustris, Sagittaria latifolia, Vallisneria americana, Glyceria borealis, Alopecurus pratensis, Cyperus erythrorhizos, Eleocharis acicularis, Carex sartwelli, Carex atherodes, Juncus torreyi, Rumex maritimus, Ceratophyllum demersum, Ranunculus aquatilis, Ranunculus gmelini, Armoracia rusticana, Callitriche verna, Myriophyllum verticillatum, Hippuris vulgaris, Lysimachia hybrida, Lysimachia thyrsiflora, Asclepias incarnata, Gerardia tenuifolia, Utricularia vulgaris, Lobelia kalmii, Aster junciformis, and Cirsium muticum.

APPENDIX

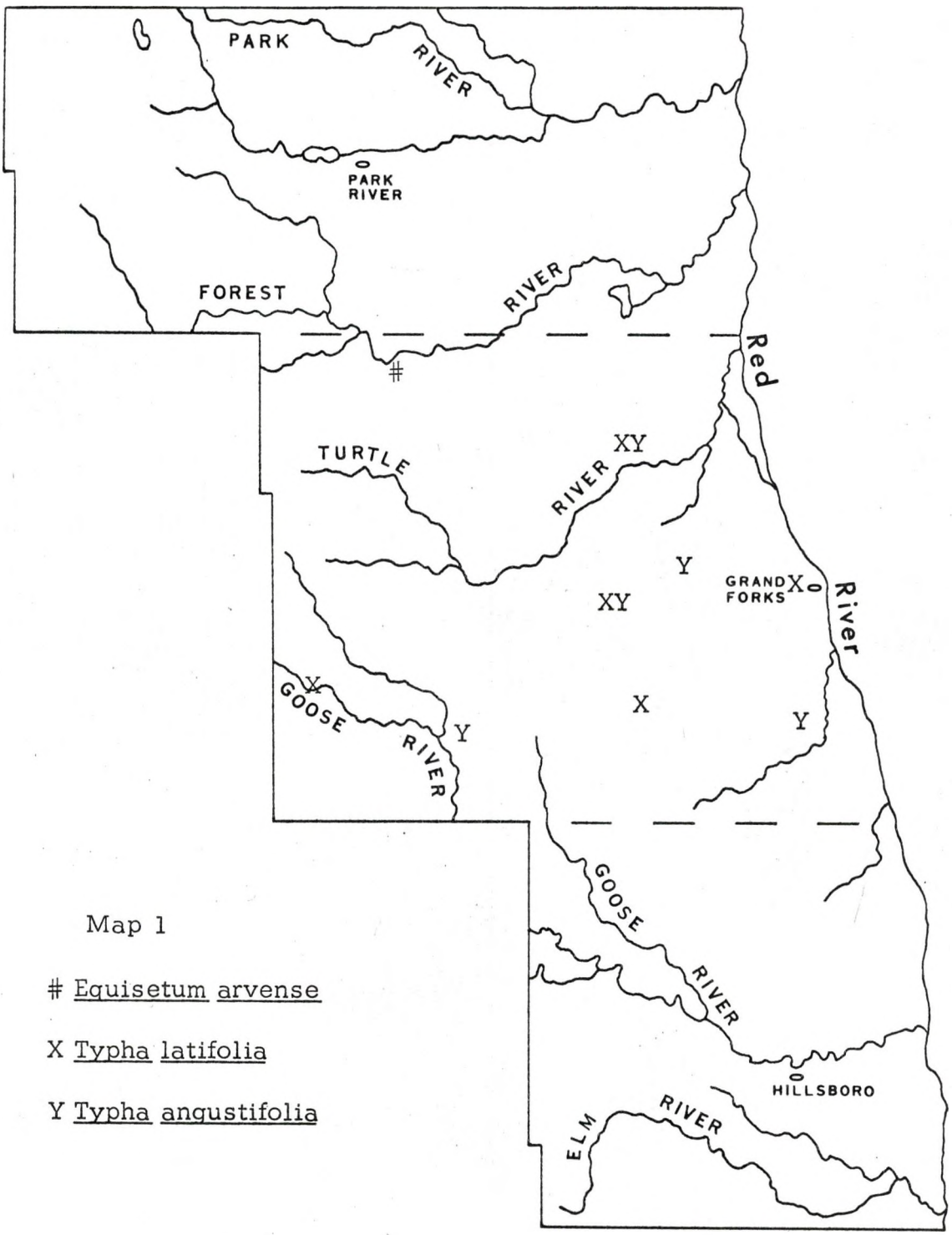
SPECIES DISTRIBUTION INDEX

AND MAPS 1-64

	Map Number
Agrostis stolonifera L.	12
Alisma gramineum Gmel.	5
Alisma subcordatum Raf.	5
Alnus rugosa (DuRoi) Spreng.	33
Alopecurus aequalis Sobol.	12
Alopecurus pratensis L.	12
Amorpha fruticosa L.	44
Anacharis nuttallii Planch.	6
Apocynum sibiricum Jacq.	50
Armoracia rusticana Gaertn., Mey. & Scherb.	41
Asclepias incarnata L.	51
Aster brachyactis Blake	63
Aster junciformis Rydb.	63
Aster simplex Willd.	63
Beckmannia syzigachne (Steud.) Fern.	14
Betula glandulosa var. glandulifera (Regel) Gl.	33
Bidens cernua L.	60
Bidens frondosa L.	60
Bidens tripartita L.	60
Bidens vulgata Greene	60

Carex vulpinoidea Michx.	23
Catabrosa aquatica (L.) Beauv.	9
Ceratophyllum demersum L.	37
Cicuta bulbifera L.	48
Cicuta maculata L.	48
Cirsium arvense (L.) Scop.	64
Cirsium muticum Michx.	64
Cornus stolonifera Michx.	49
Crepis runcinata (James) T. & G.	64
Cyperus erythrorhizos Muhl.	17
Cyperus odoratus L.	17
Cypripedium calceolus L.	29
Deschampsia cespitosa (L.) Beauv.	10
Echinochloa crusgalli (L.) Beauv.	16
Echinocystis lobata (Michx.) T. & G.	58
Eleocharis acicularis (L.) R. & S.	17
Eleocharis palustris (L.) R. & S.	17
Elymus virginicus L.	10
Epilobium angustifolium L.	46
Epilobium glandulosum Lehm.	46
Equisetum arvense L.	1
Eragrostis hypnoides (Lam.) BSP	9
Eragrostis pectinacea (Michx.) Nees.	9
Eriophorum angustifolium Honckeny	22

Scirpus maritimus var. paludosus (A. Nels.) Kukenth.	20
Scirpus rubrotinctus Fern.	21
Scirpus validus Vahl.	18
Scolochloa festucacea (Willd.) Link	8
Scutellaria galericulata L.	52
Scutellaria lateriflora L.	52
Senecio aureus L.	61
Senecio congestus (R. Br.) DC	61
Sium suave Walt.	48
Solidago gigantea Ait.	62
Solidago graminifolia (L.) Salisb.	62
Sparganium chlorocarpum Rydb.	2
Sparganium eurycarpum Engelm.	2
Spartina pectinata Link.	14
Spiraea alba DuRoi	43
Spirodela polyrhiza (L.) Schleiden	28
Stachys palustris L.	53
Stellaria longifolia Muhl.	36
Teucrium canadense L.	52
Thalictrum dasycarpum Fisch. & Ave-Lall.	40
Triglochin maritima L.	5
Typha angustifolia L.	1
Typha latifolia L.	1
Urtica dioica L.	33

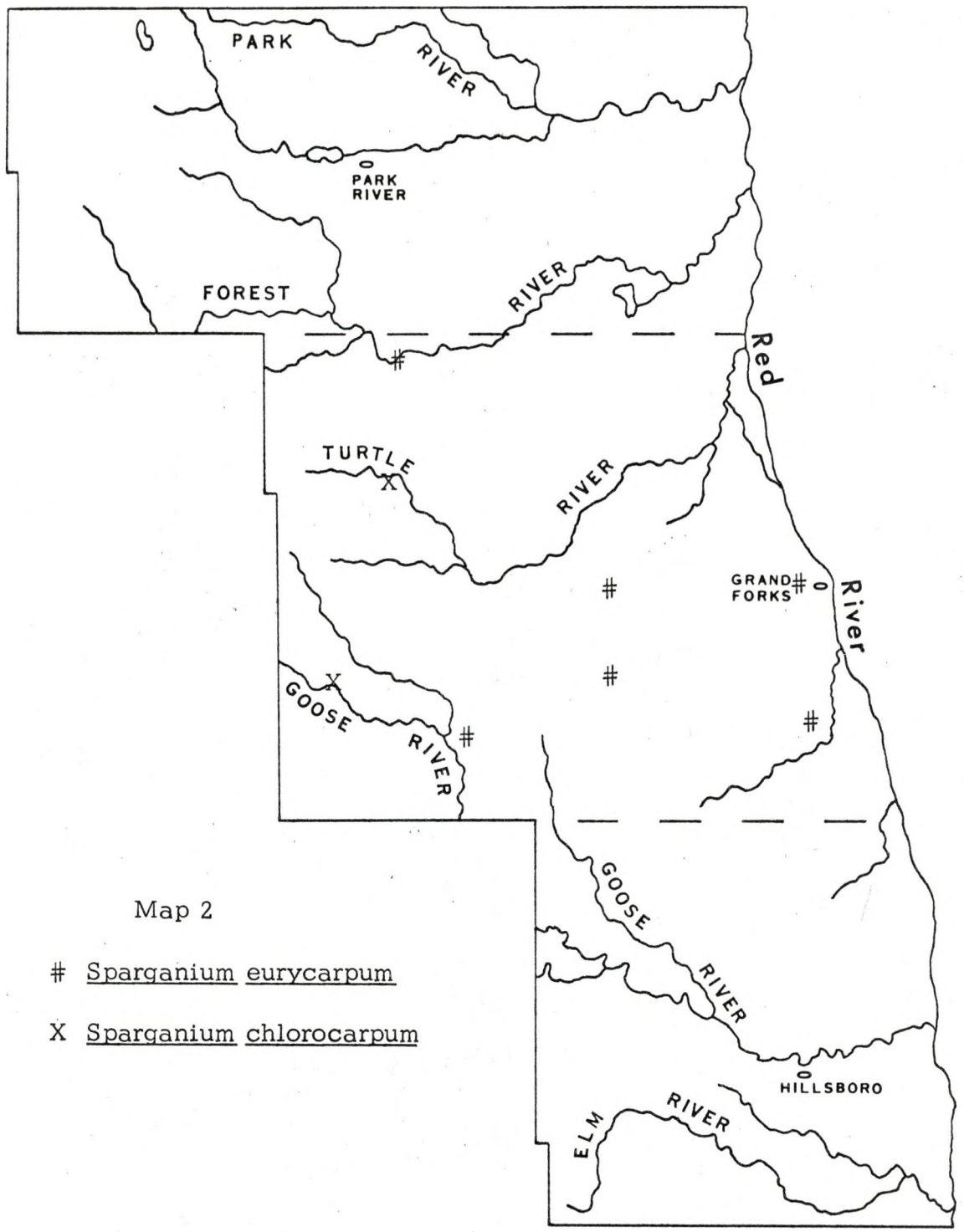


Map 1

Equisetum arvense

X Typha latifolia

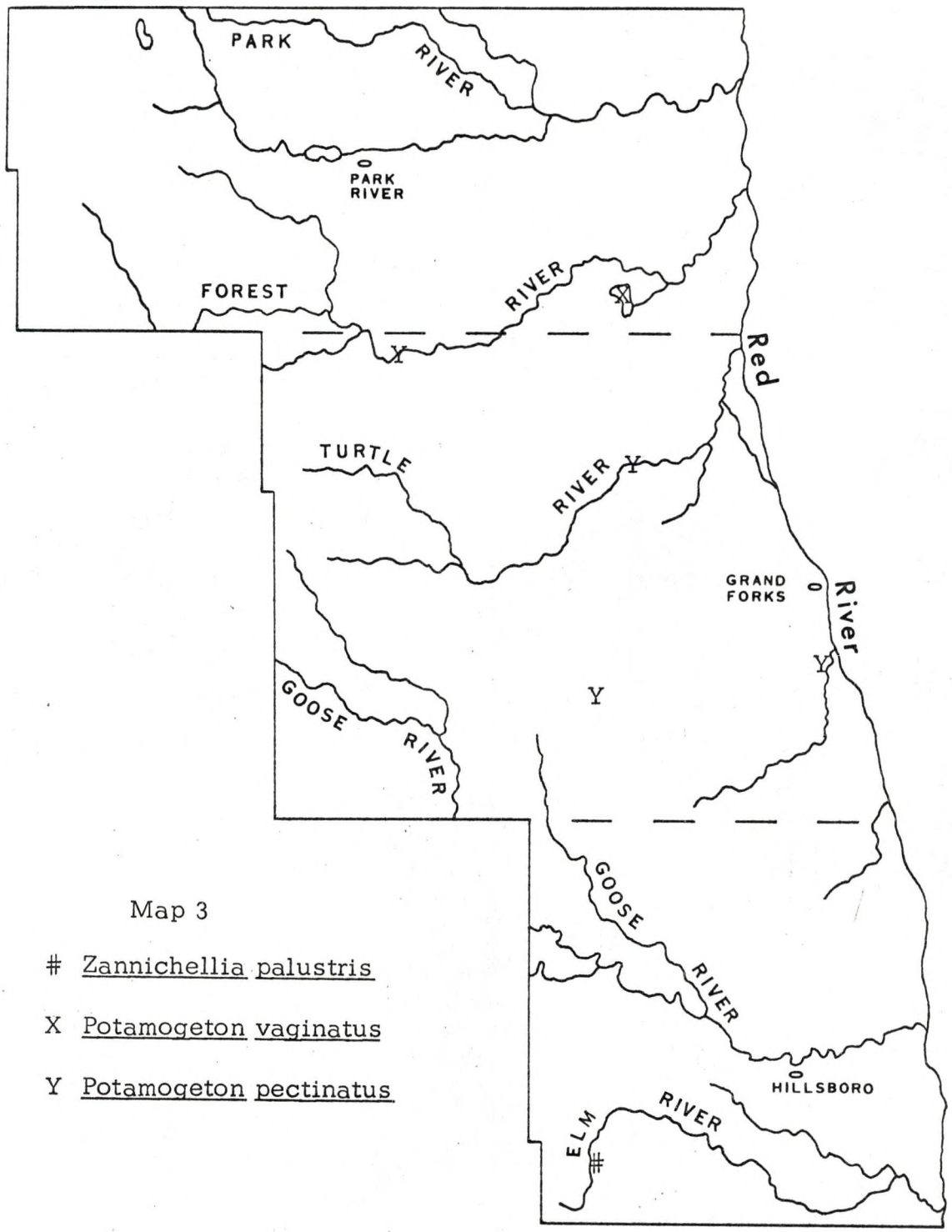
Y Typha angustifolia



Map 2

\# Sparganium eurycarpum

X Sparganium chlorocarpum

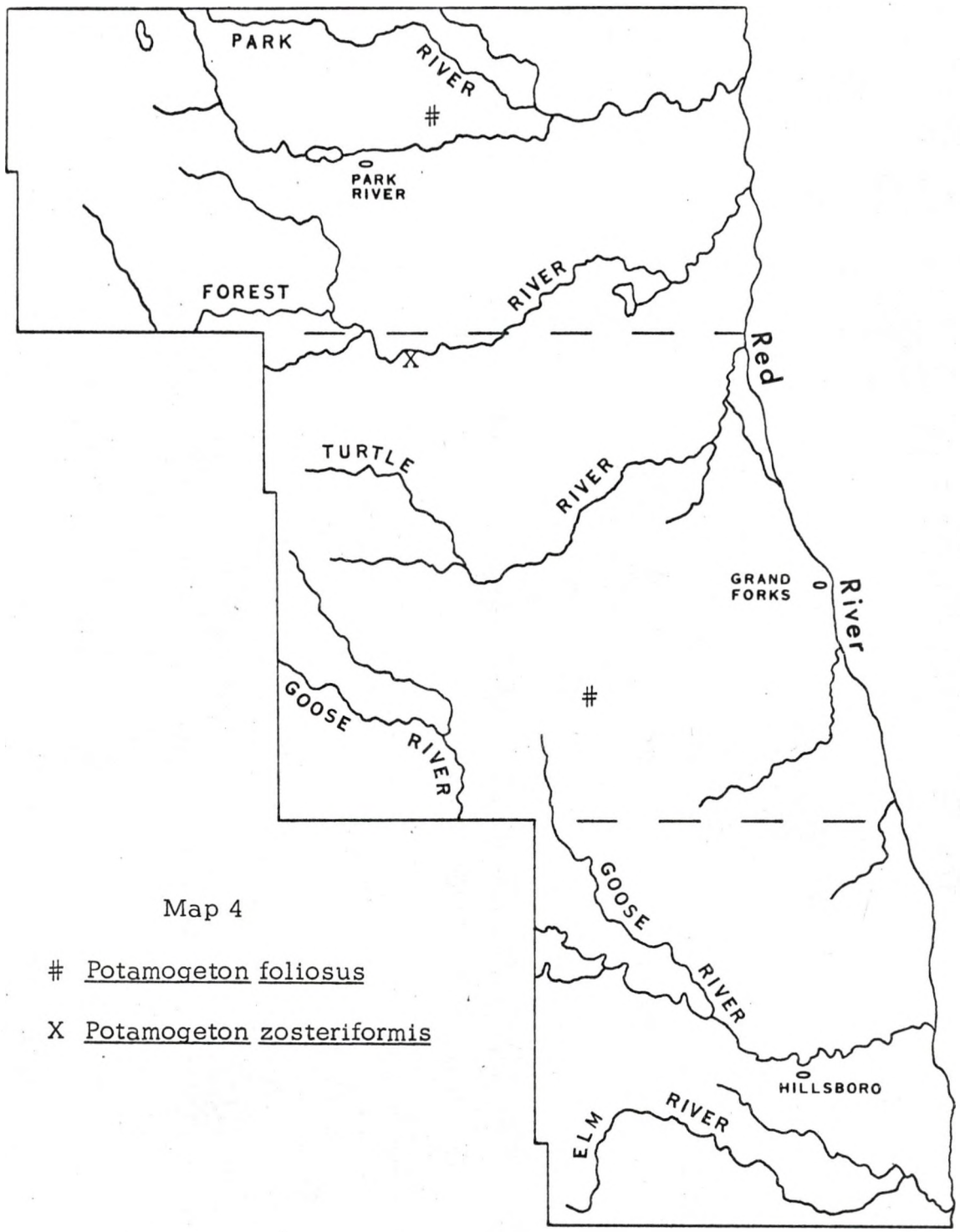


Map 3

\# Zannichellia palustris

X Potamogeton vaginatus

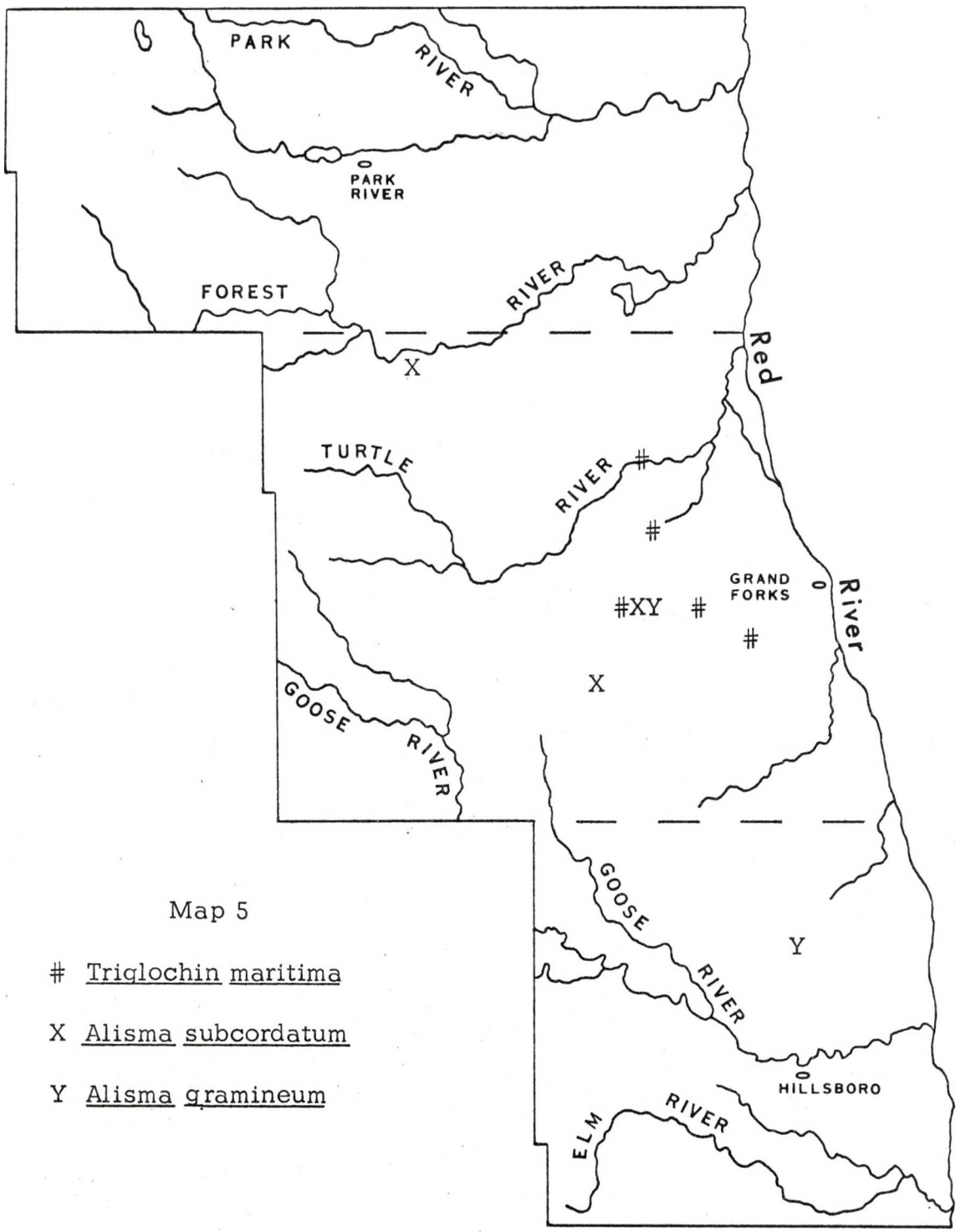
Y Potamogeton pectinatus



Map 4

Potamogeton foliosus

X Potamogeton zosteriformis

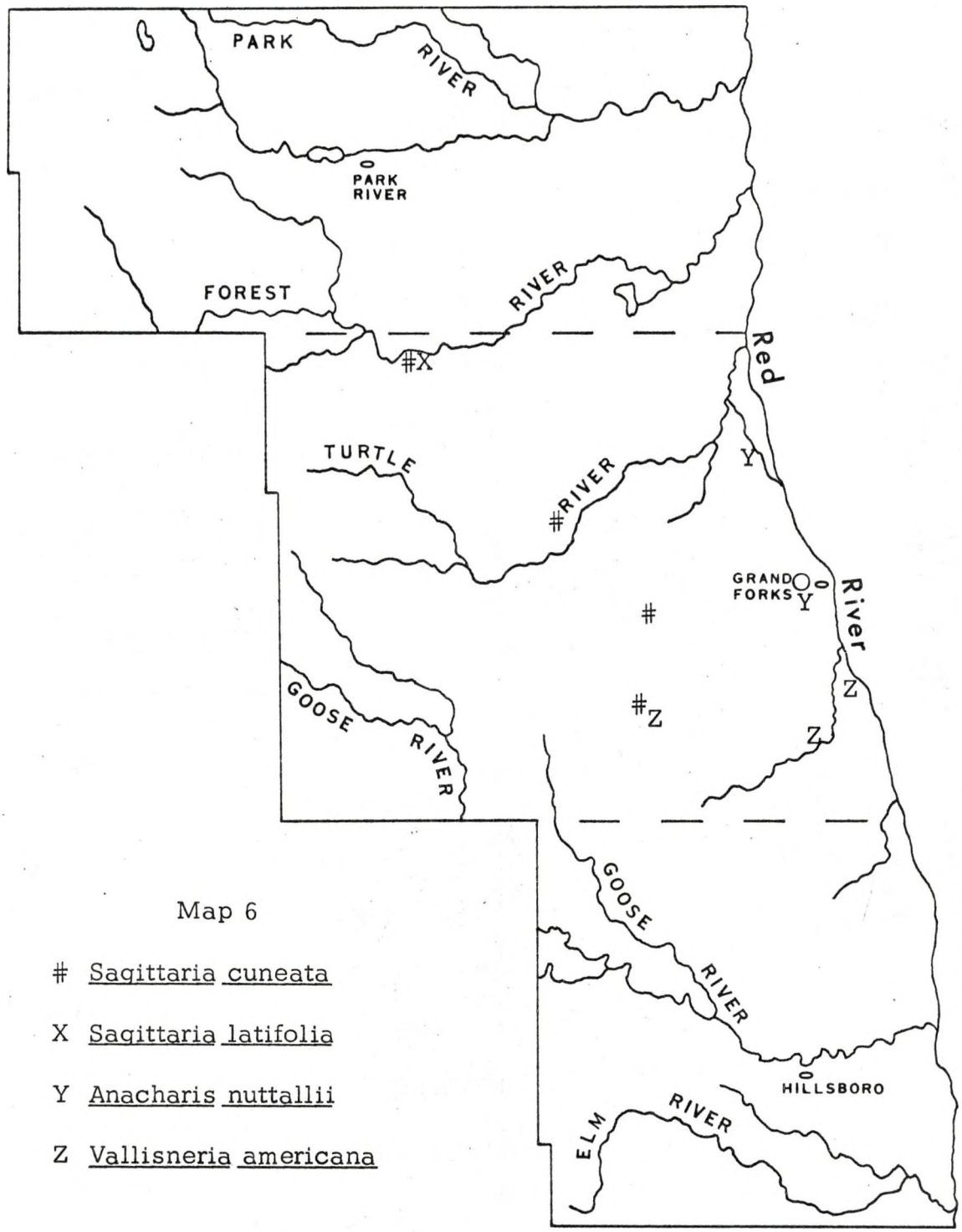


Map 5

\# Triglochin maritima

X Alisma subcordatum

Y Alisma gramineum



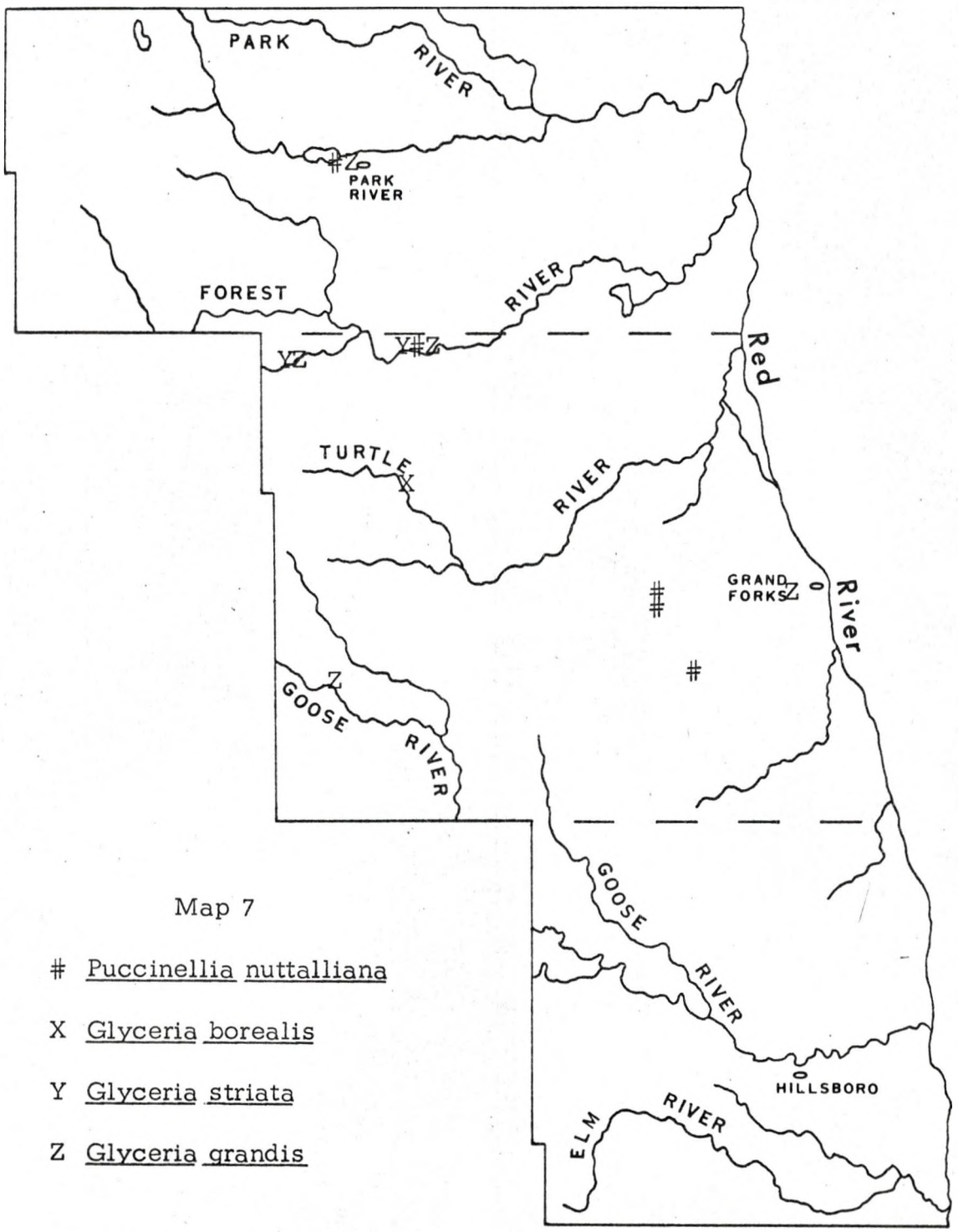
Map 6

\# Sagittaria cuneata

X Sagittaria latifolia

Y Anacharis nuttallii

Z Vallisneria americana



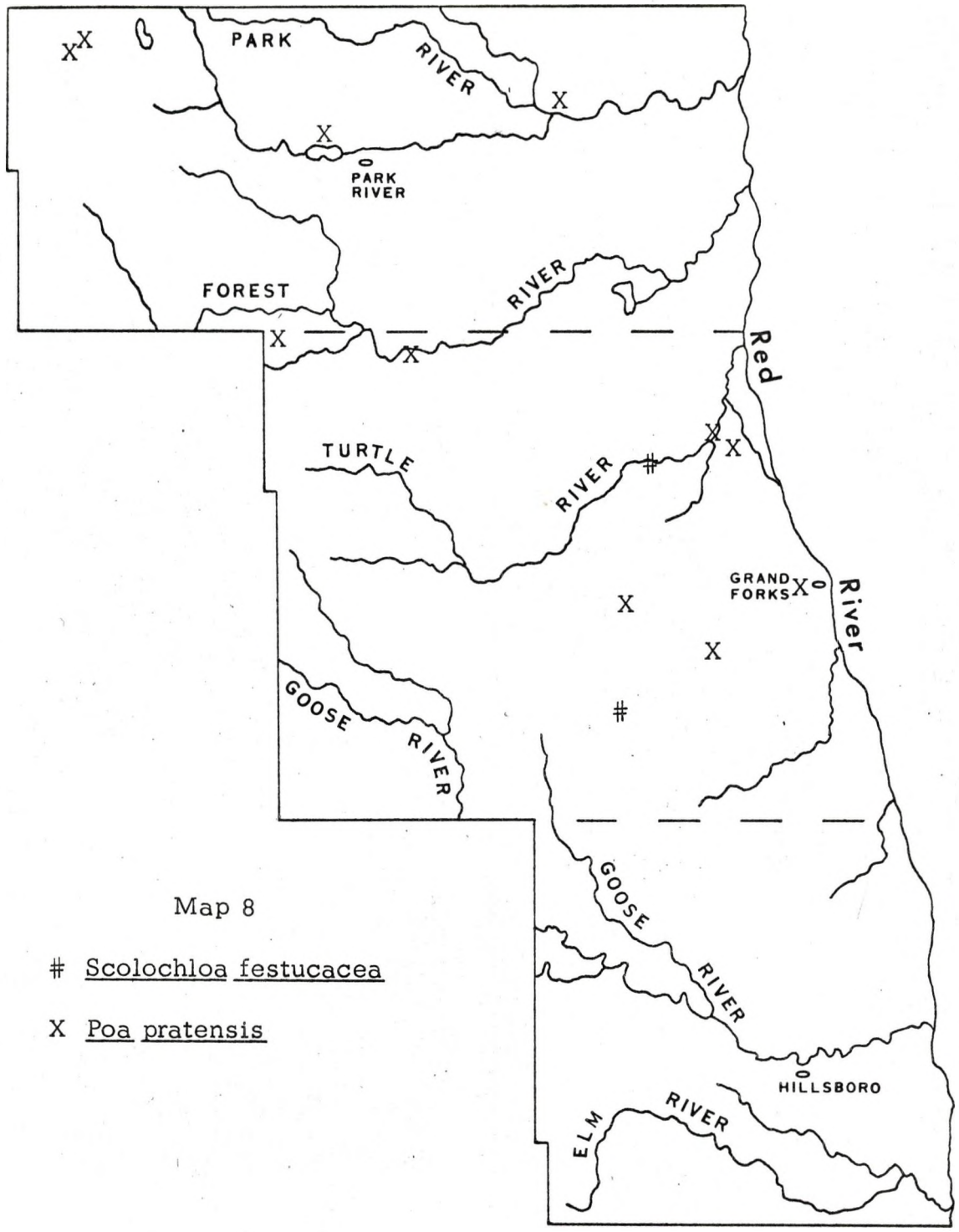
Map 7

\# Puccinellia nuttalliana

X Glyceria borealis

Y Glyceria striata

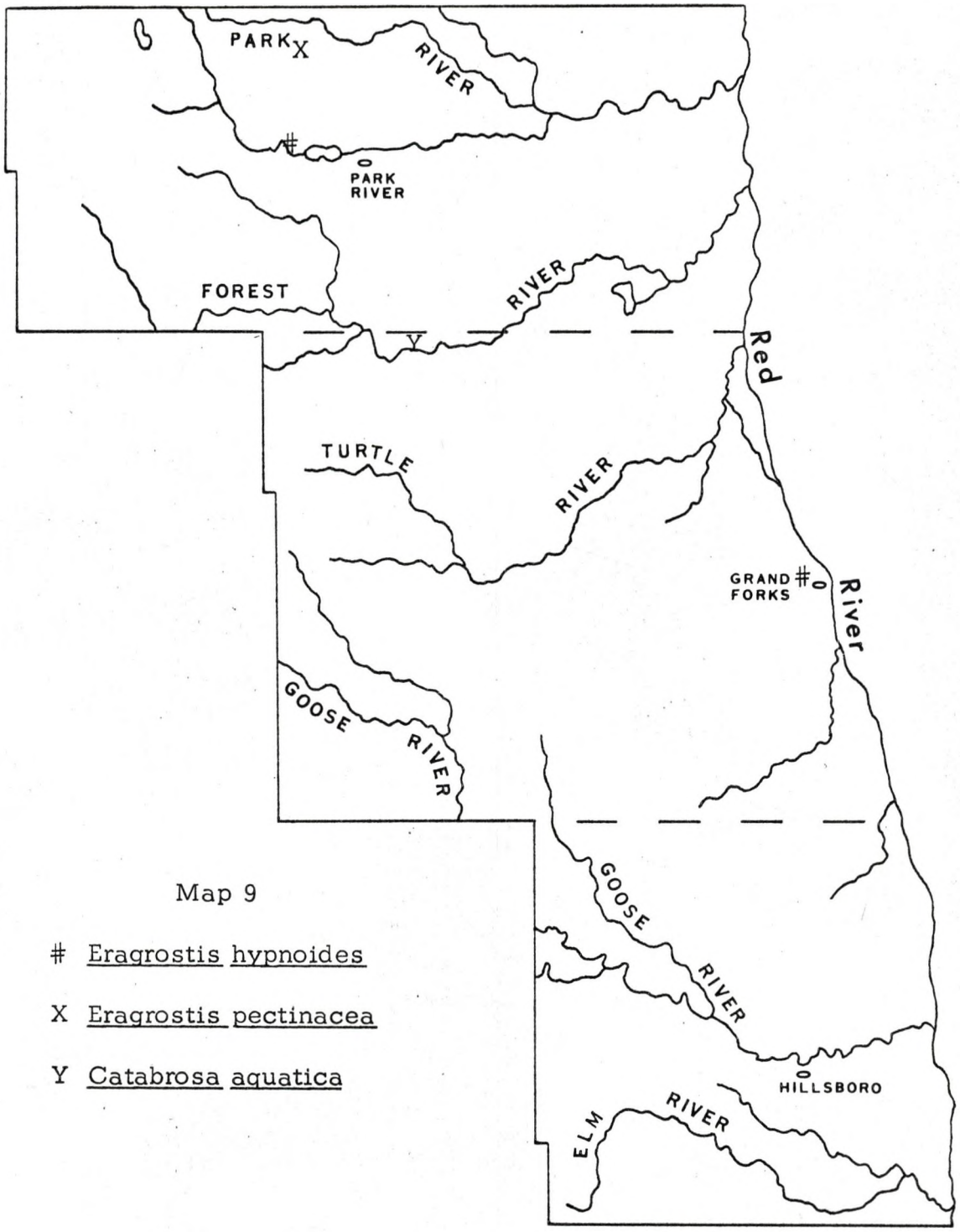
Z Glyceria grandis



Map 8

\# Scolochloa festucacea

X Poa pratensis

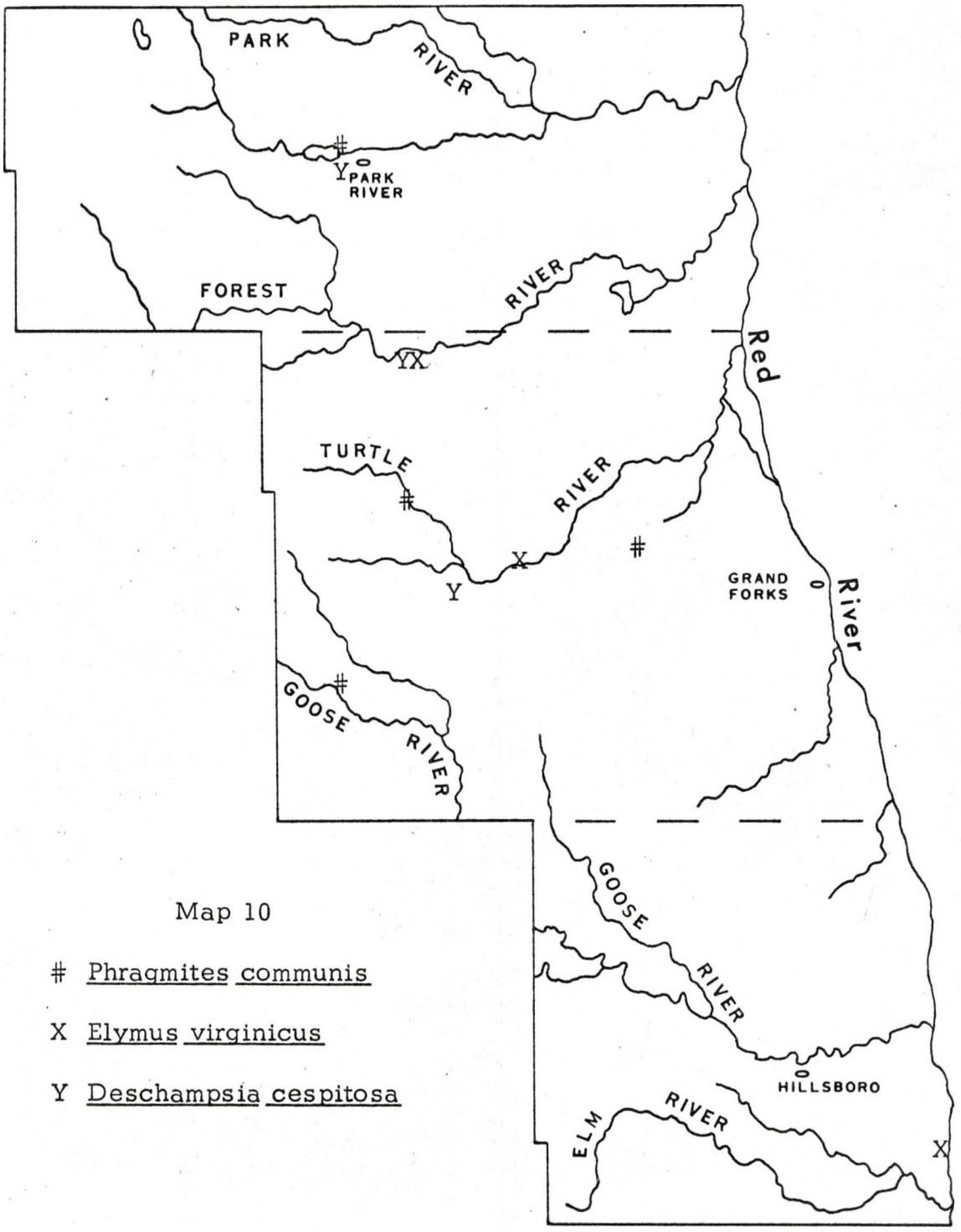


Map 9

\# Eragrostis hypnoides

X Eragrostis pectinacea

Y Catabrosa aquatica

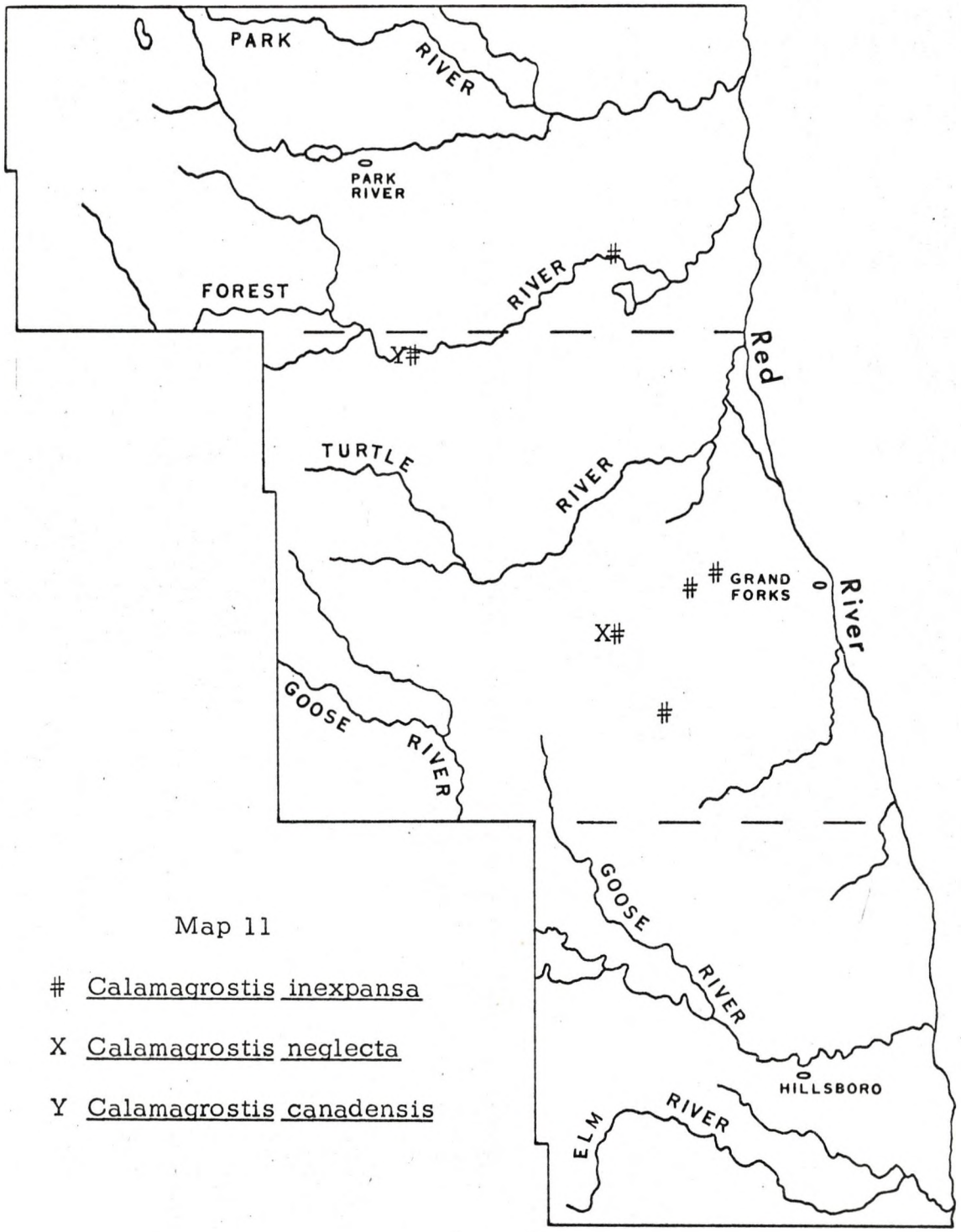


Map 10

\# Phragmites communis

X Elymus virginicus

Y Deschampsia cespitosa

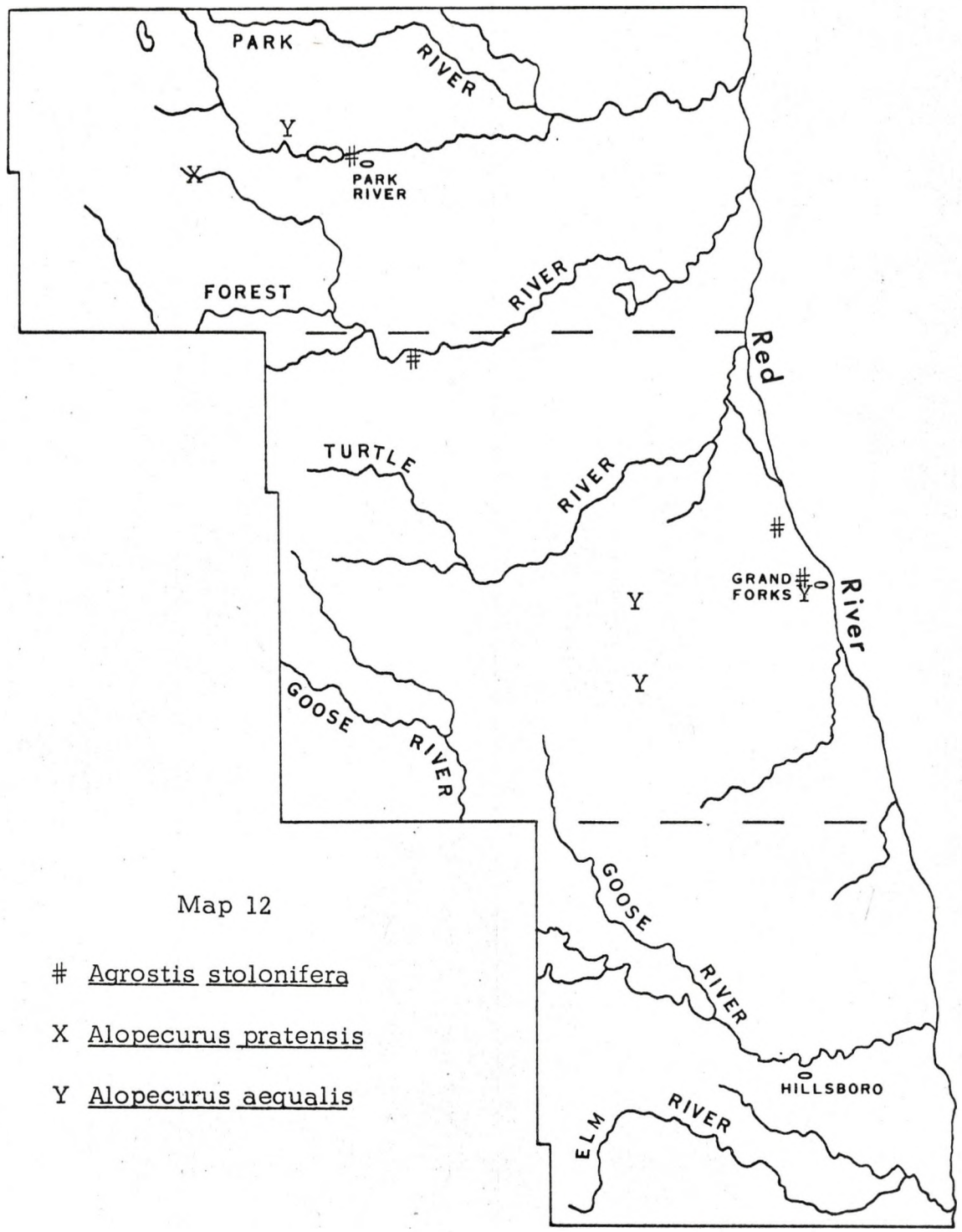


Map 11

\# Calamagrostis inexpansa

X Calamagrostis neglecta

Y Calamagrostis canadensis

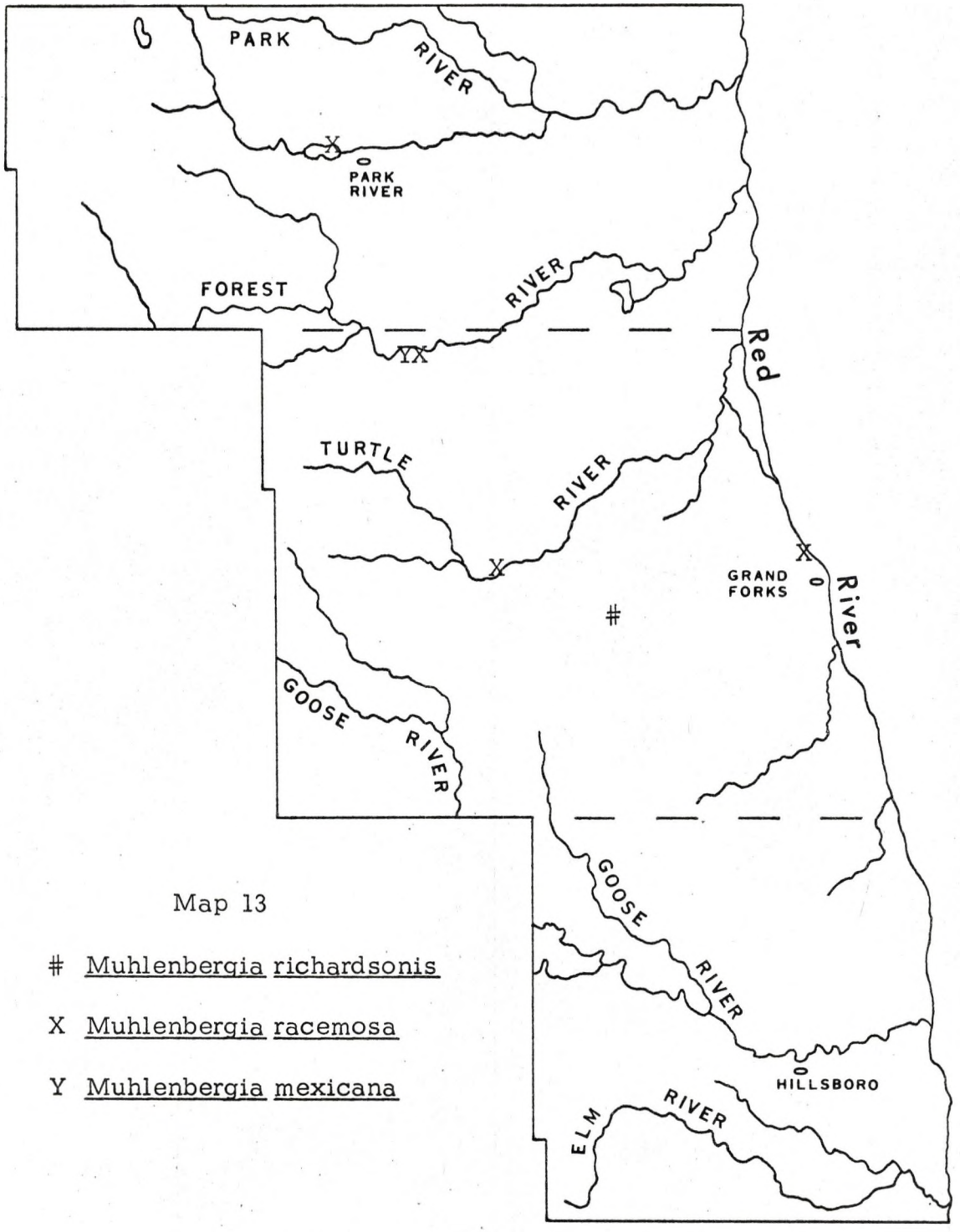


Map 12

\# Agrostis stolonifera

X Alopecurus pratensis

Y Alopecurus aequalis

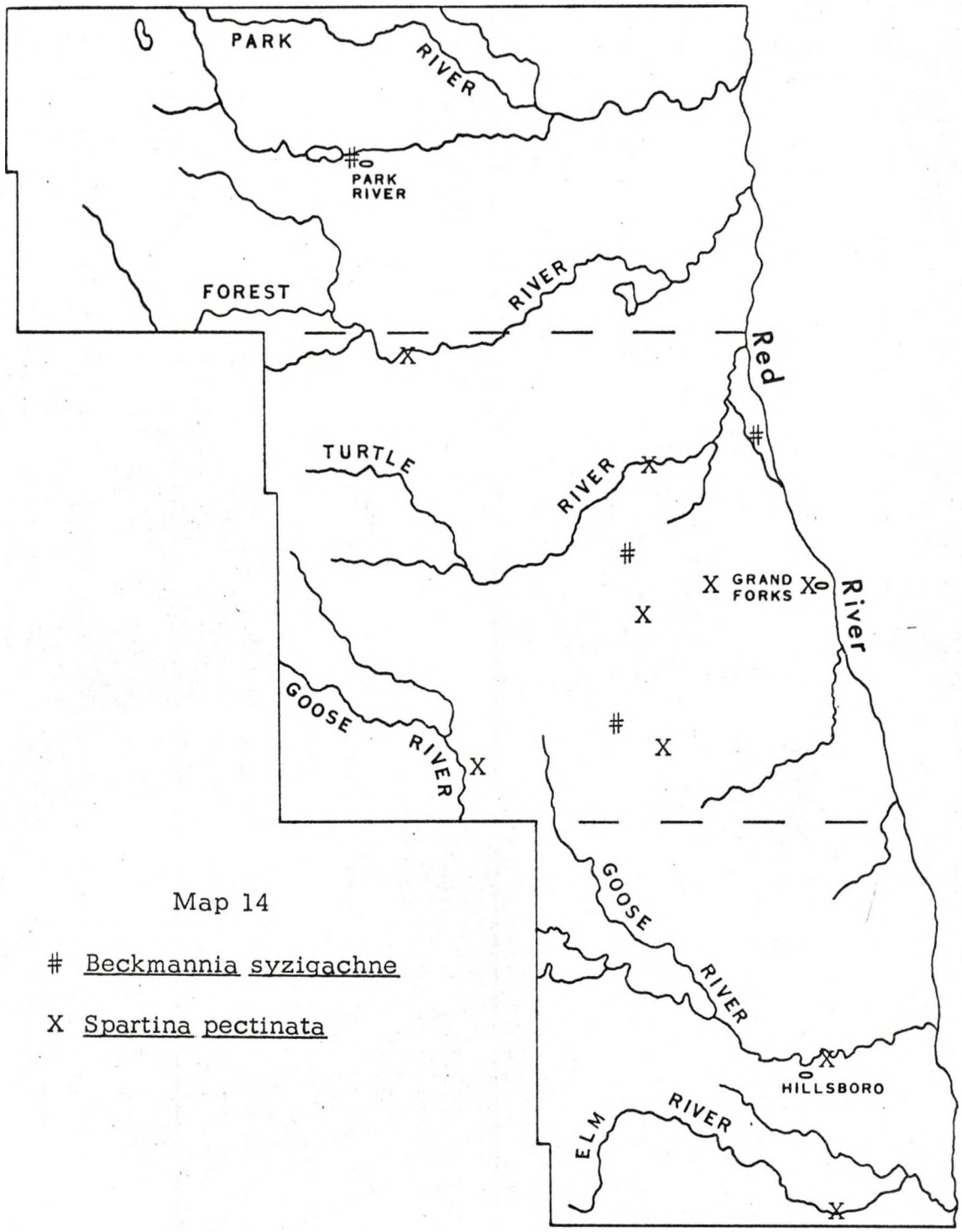


Map 13

\# Muhlenbergia richardsonis

X Muhlenbergia racemosa

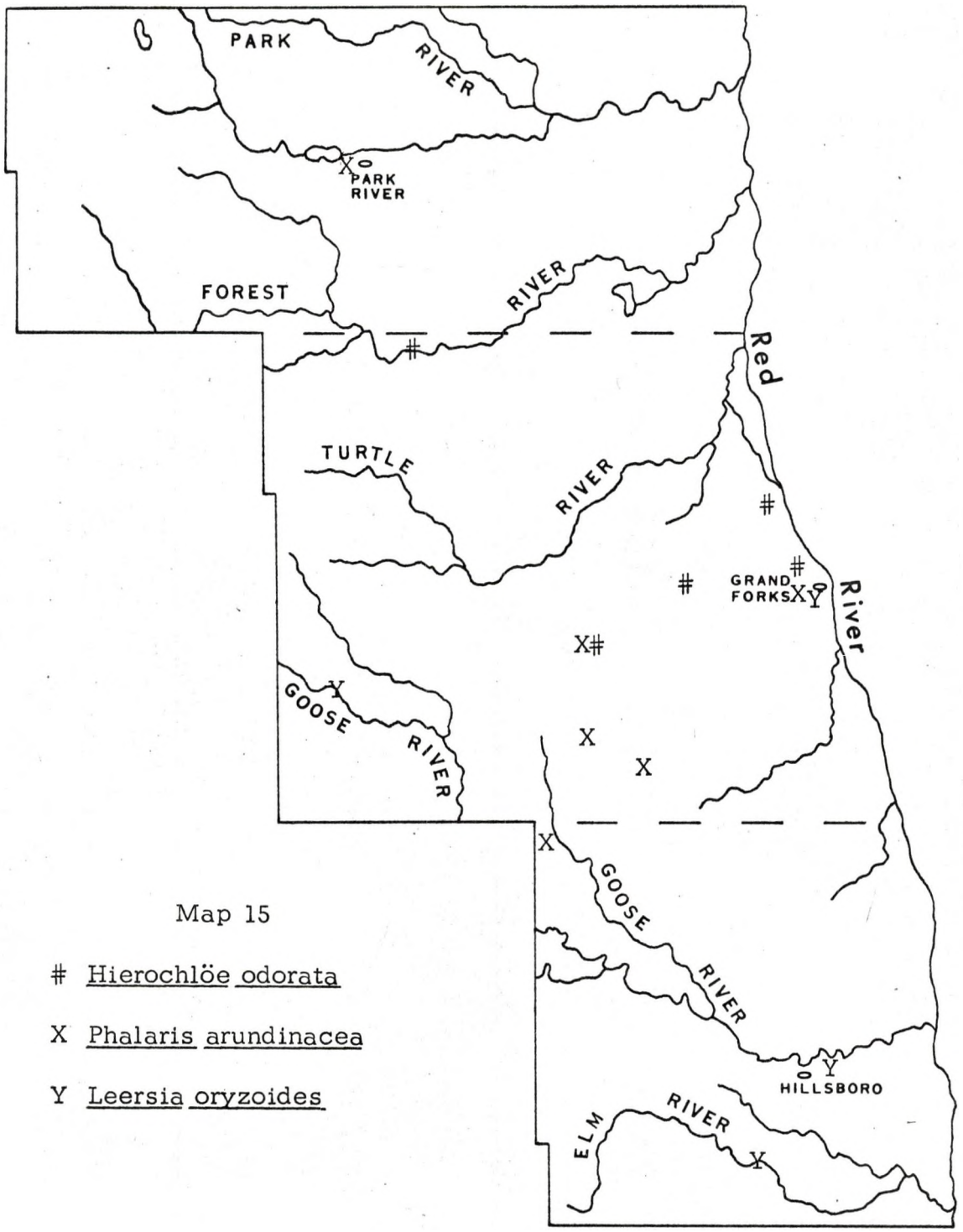
Y Muhlenbergia mexicana



Map 14

\# Beckmannia syzigachne

X Spartina pectinata

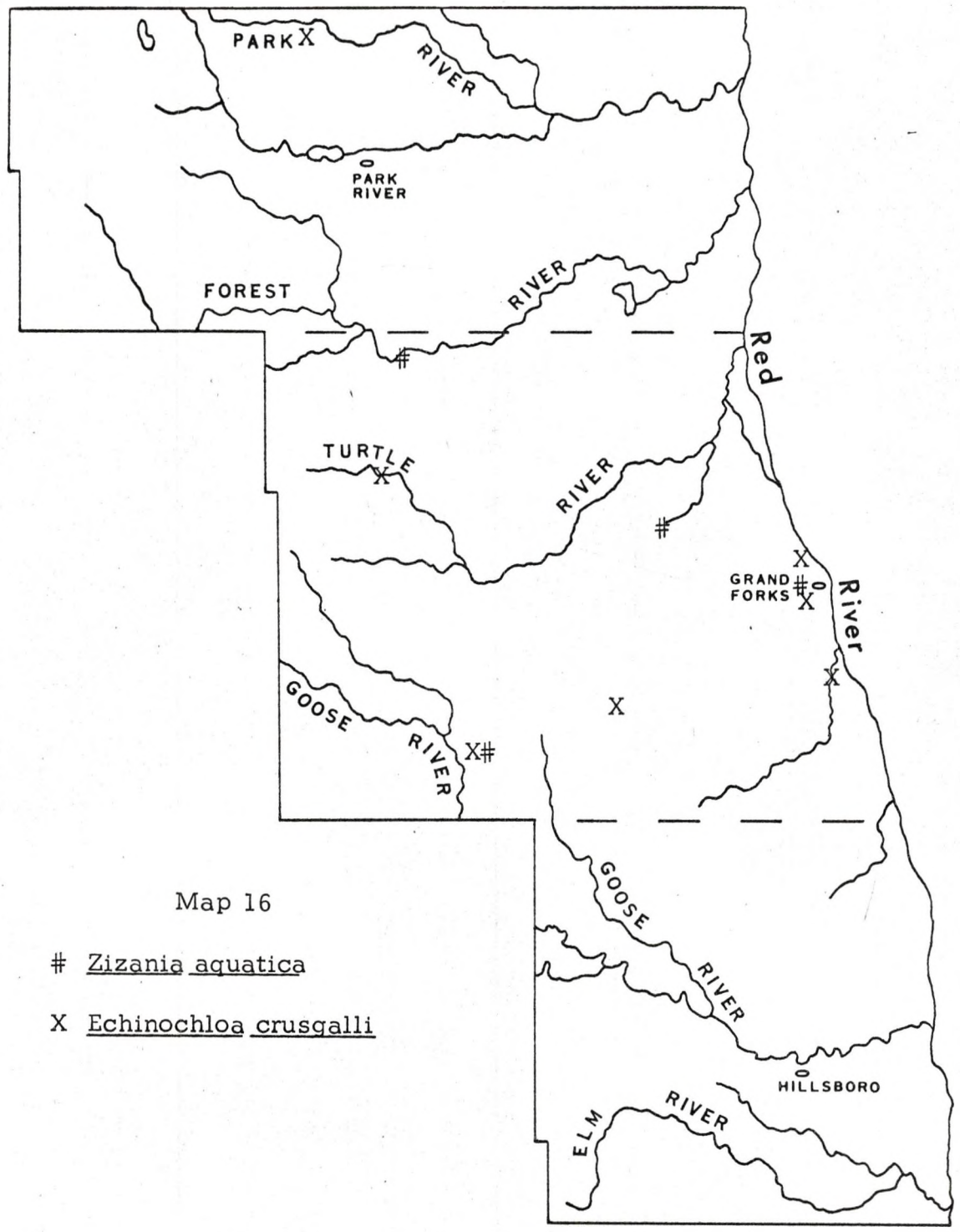


Map 15

Hierochlöe odorata

X Phalaris arundinacea

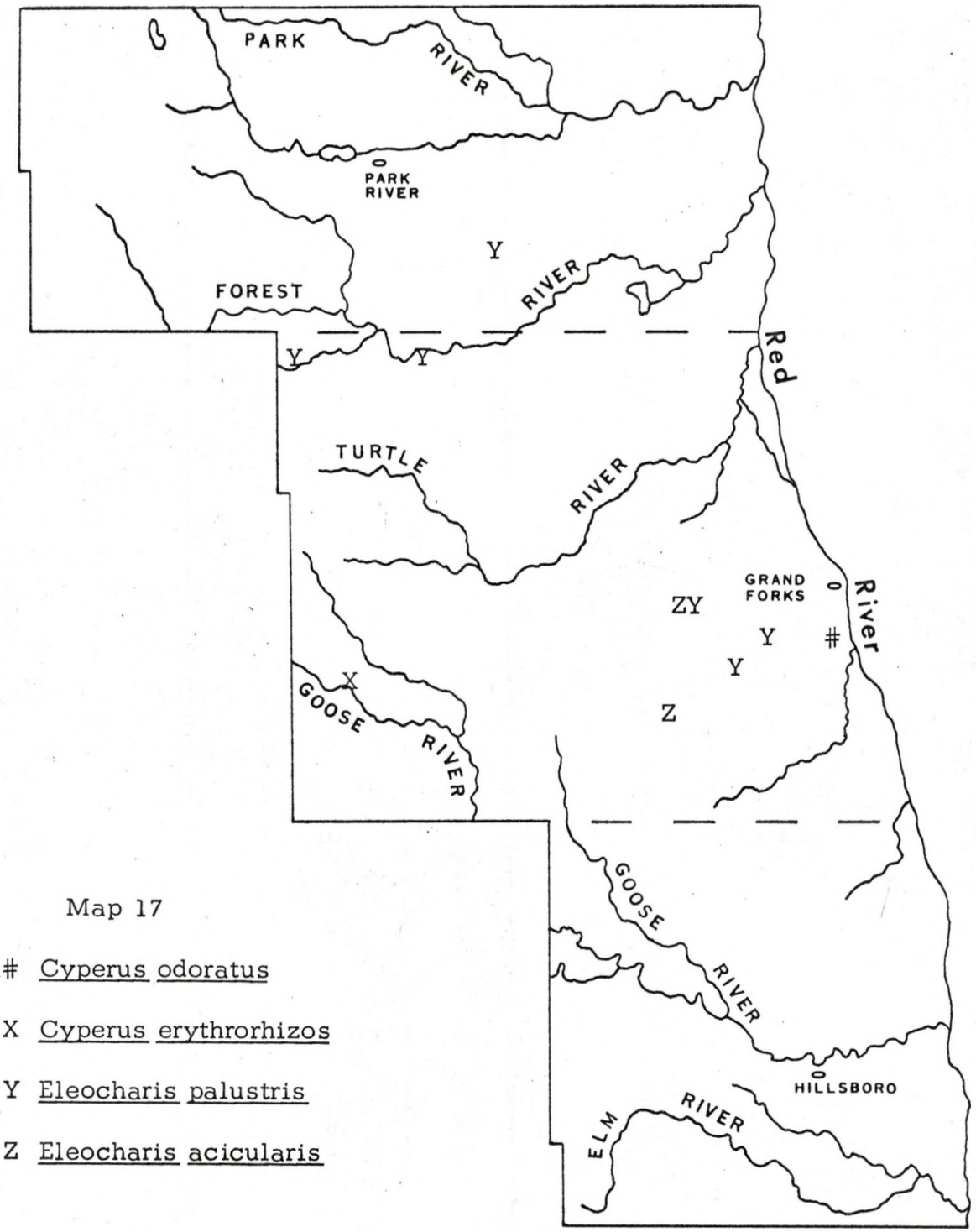
Y Leersia oryzoides



Map 16

\# Zizania aquatica

X Echinochloa crusgalli



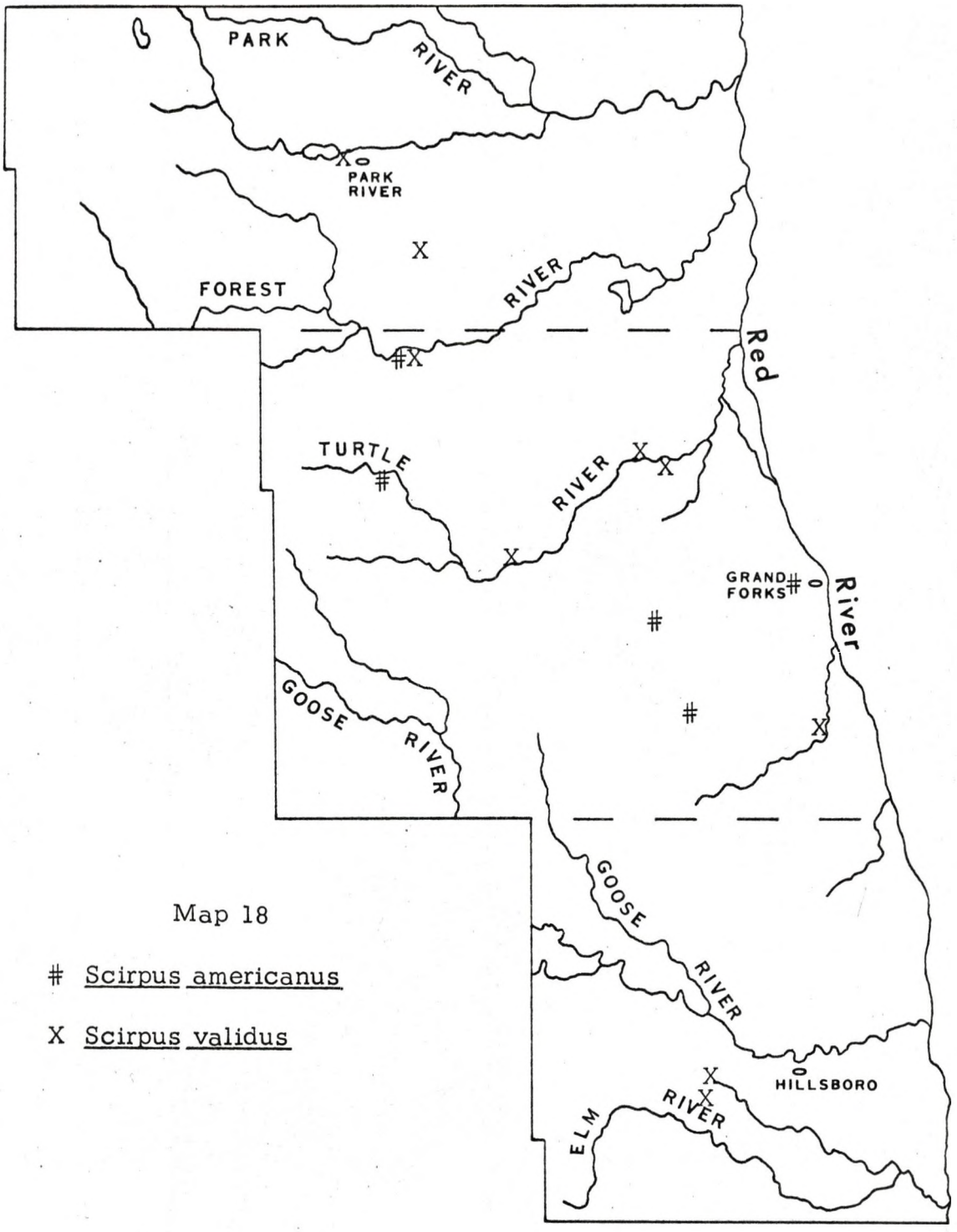
Map 17

\# Cyperus odoratus

X Cyperus erythrorhizos

Y Eleocharis palustris

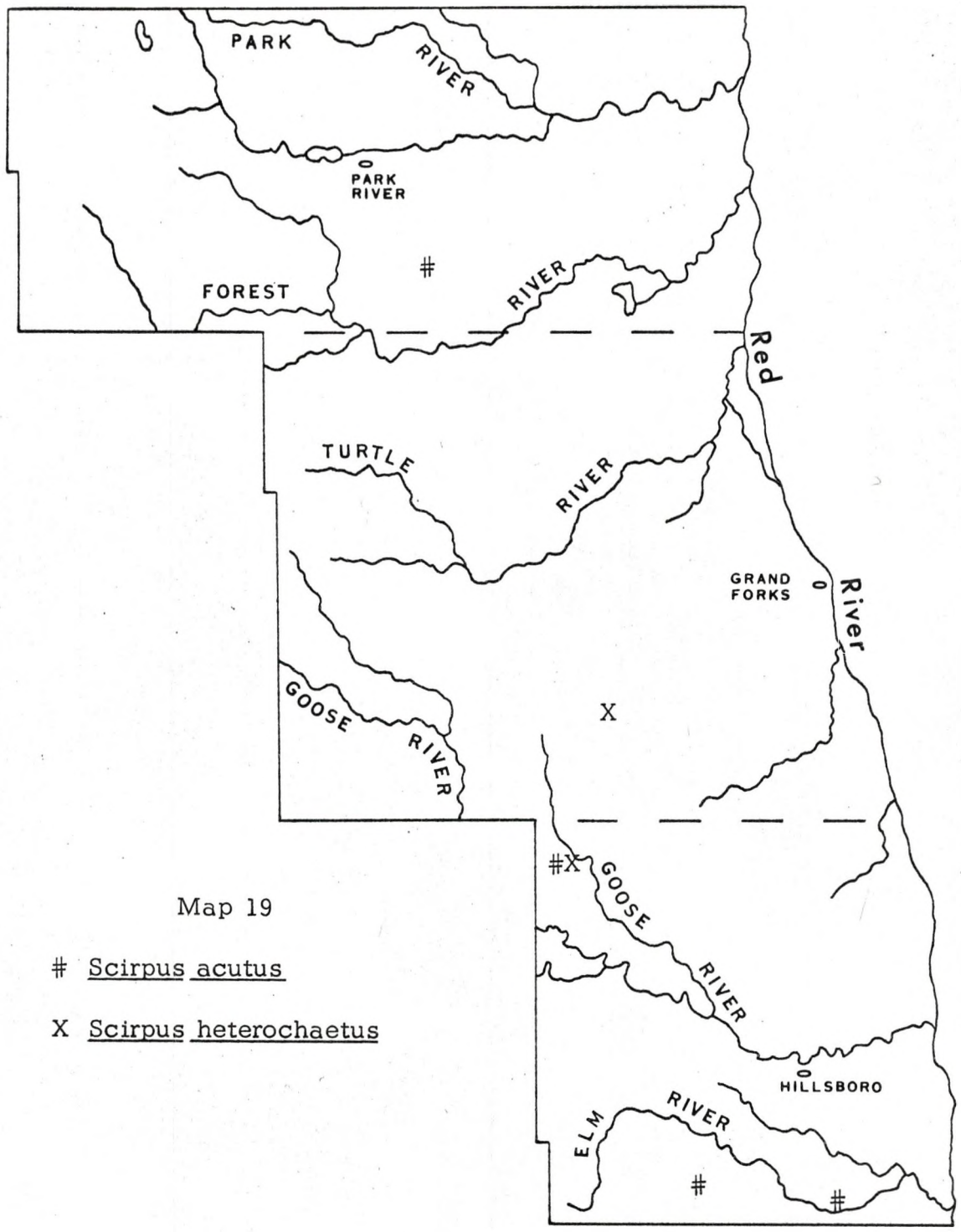
Z Eleocharis acicularis



Map 18

\# Scirpus americanus

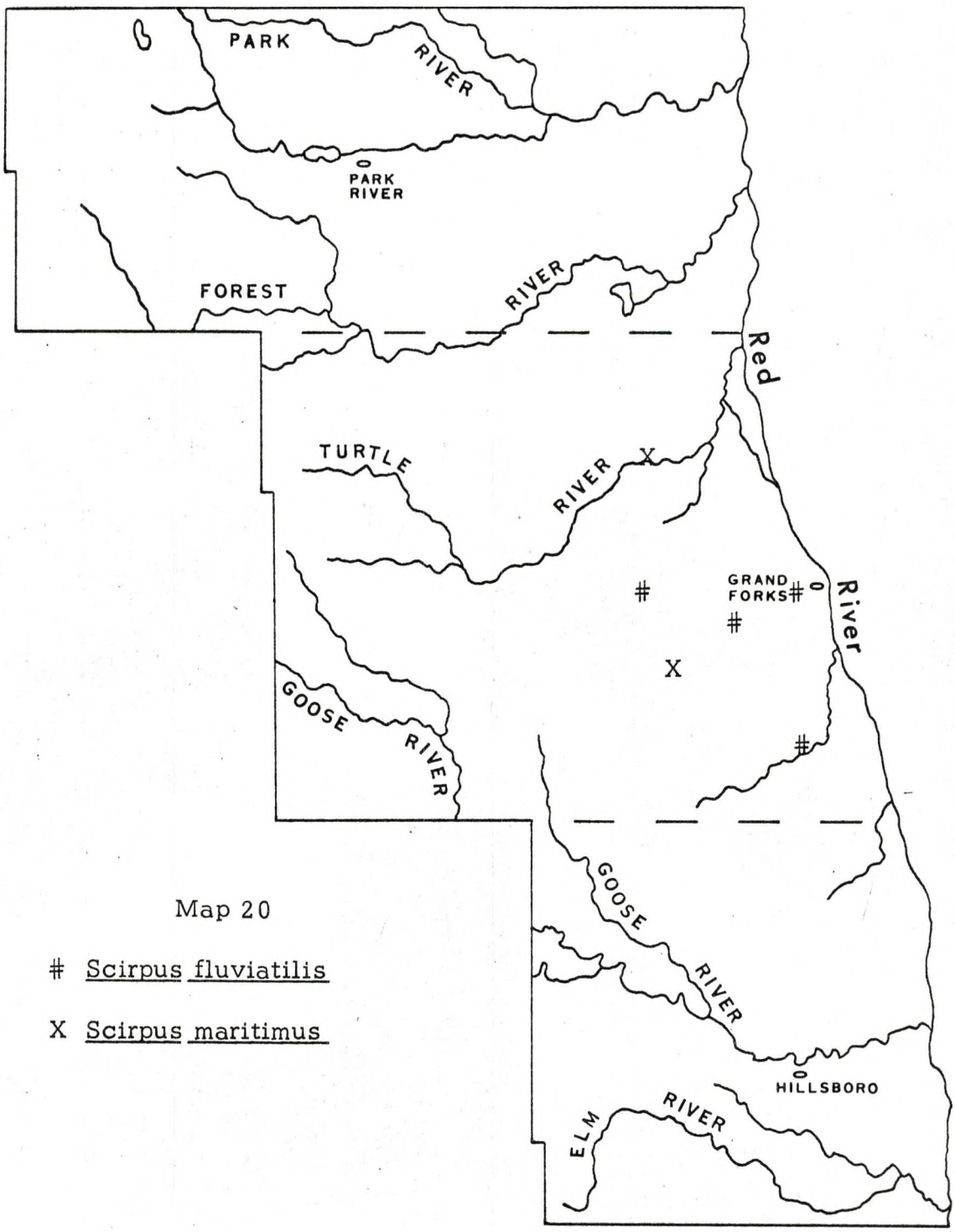
X Scirpus validus



Map 19

Scirpus acutus

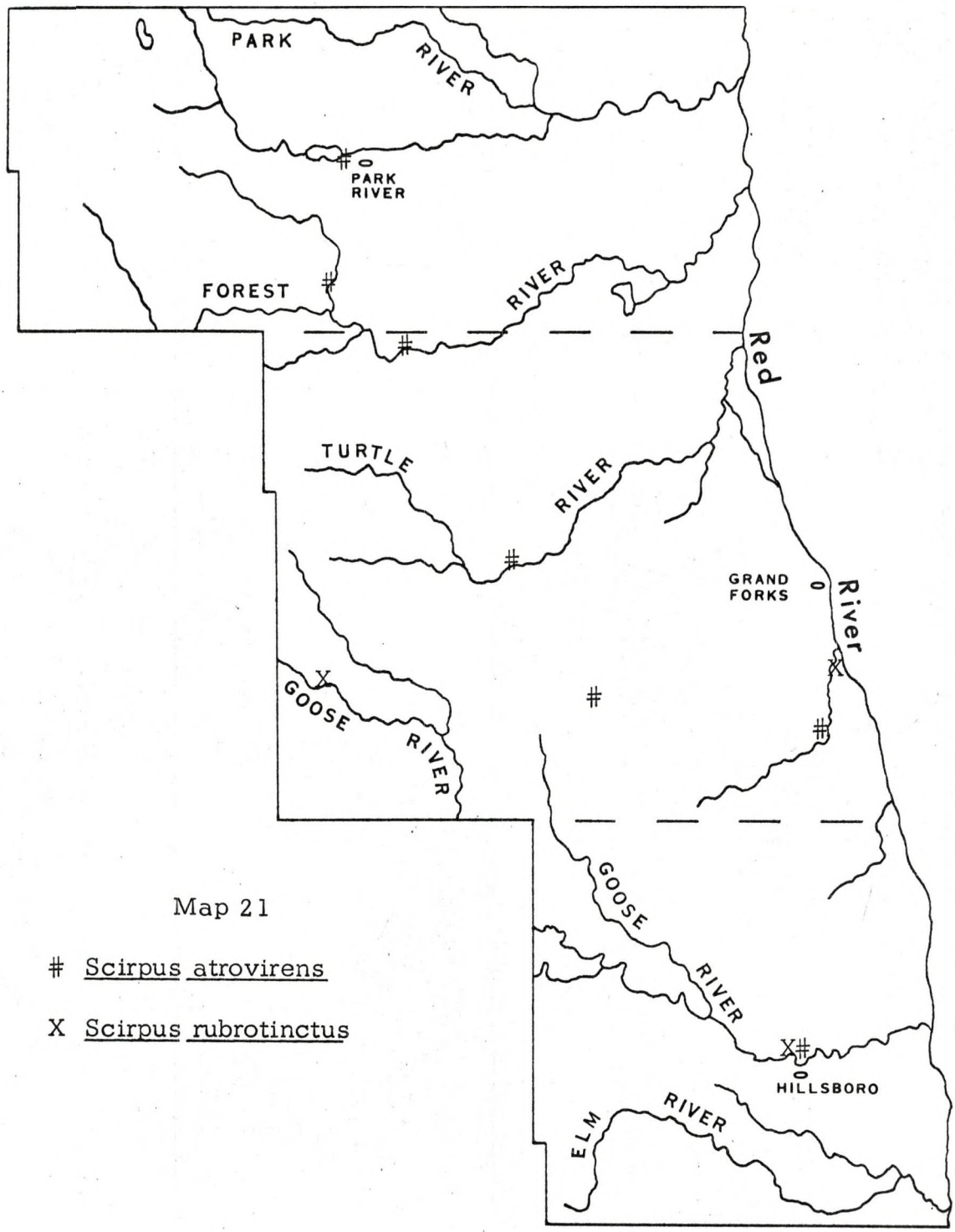
X Scirpus heterochaetus



Map 20

Scirpus fluviatilis

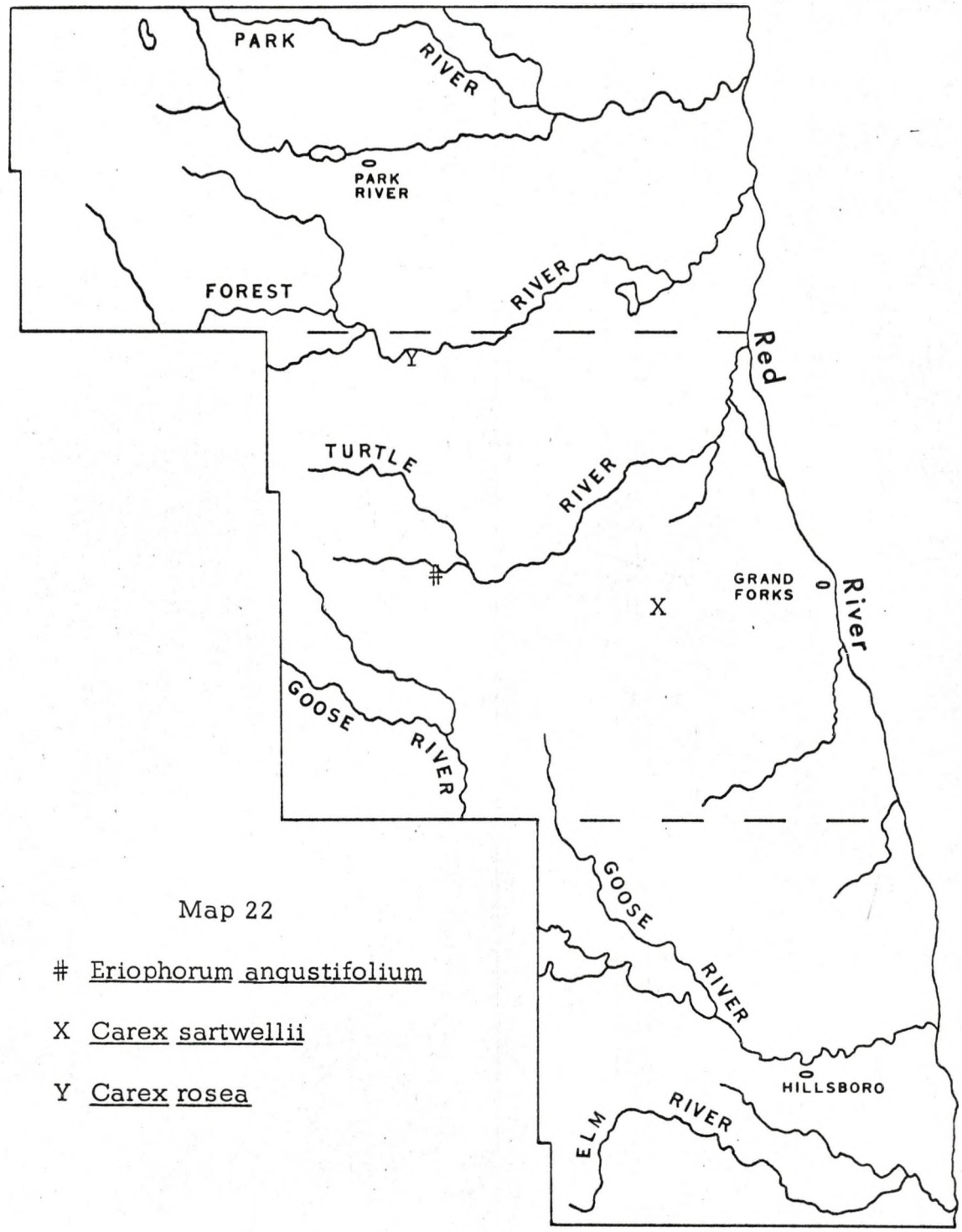
X Scirpus maritimus



Map 21

Scirpus atrovirens

X Scirpus rubrotinctus

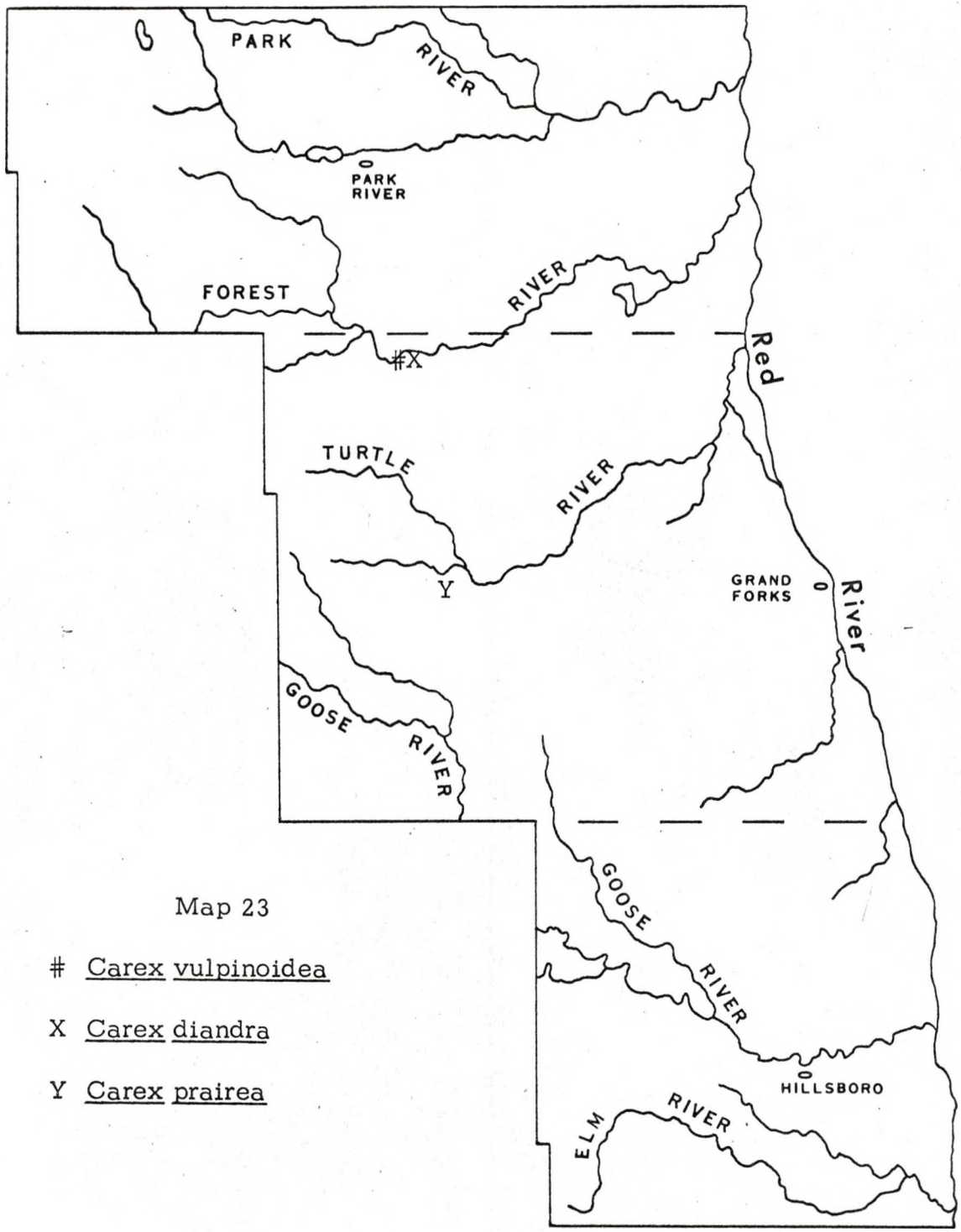


Map 22

\# Eriophorum angustifolium

X Carex sartwellii

Y Carex rosea

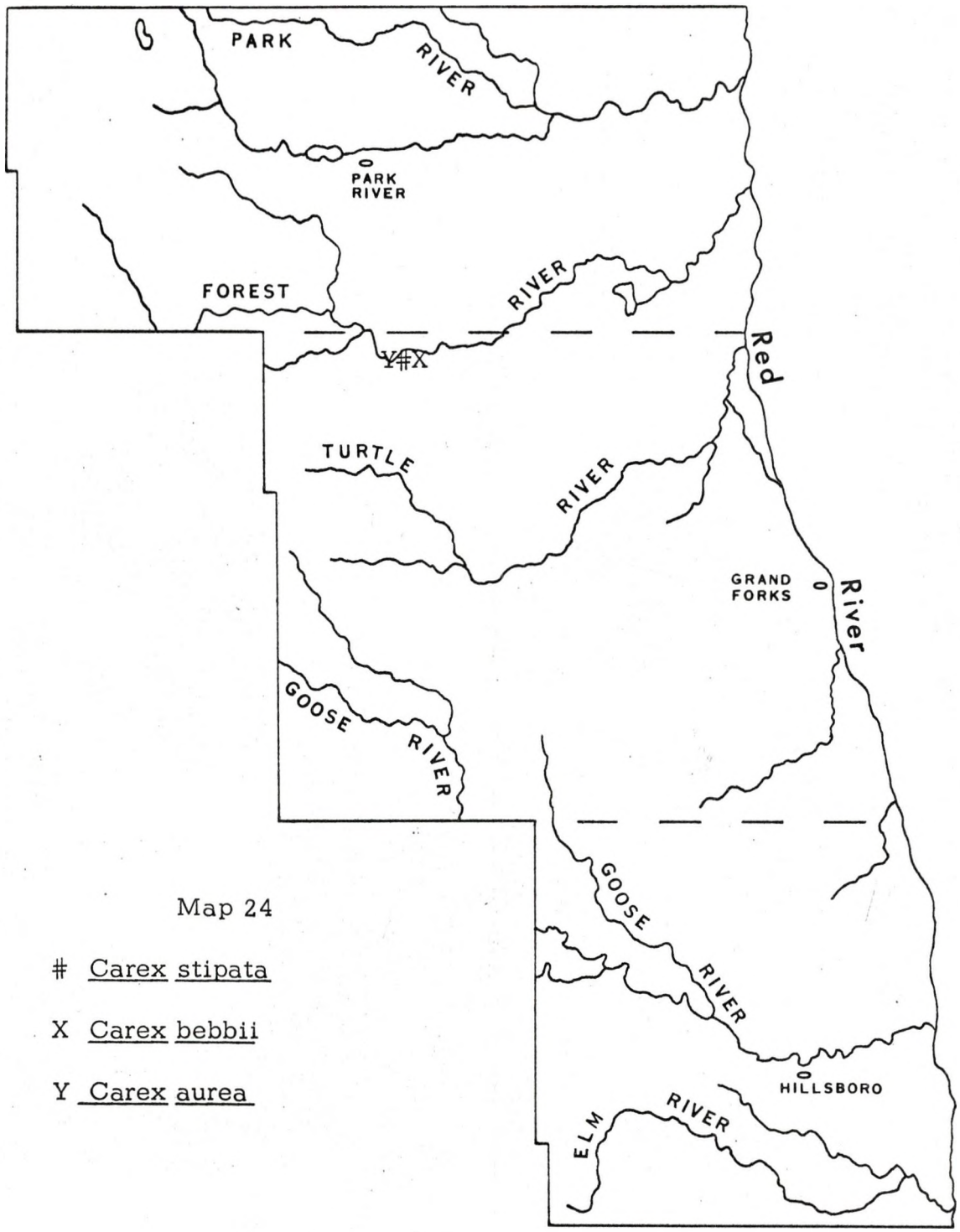


Map 23

\# Carex vulpinoidea

X Carex diandra

Y Carex prairea

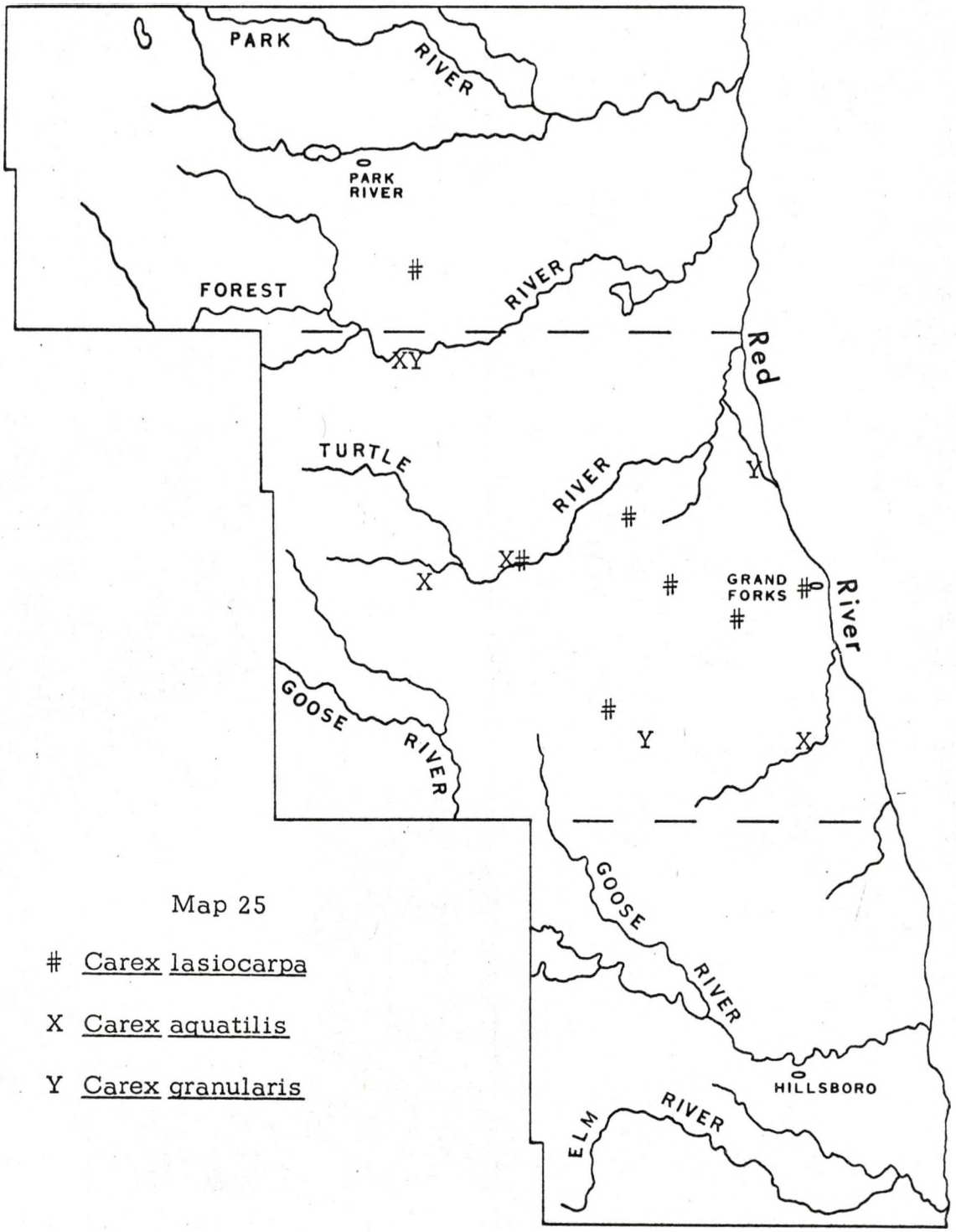


Map 24

\# Carex stipata

X Carex bebbii

Y Carex aurea

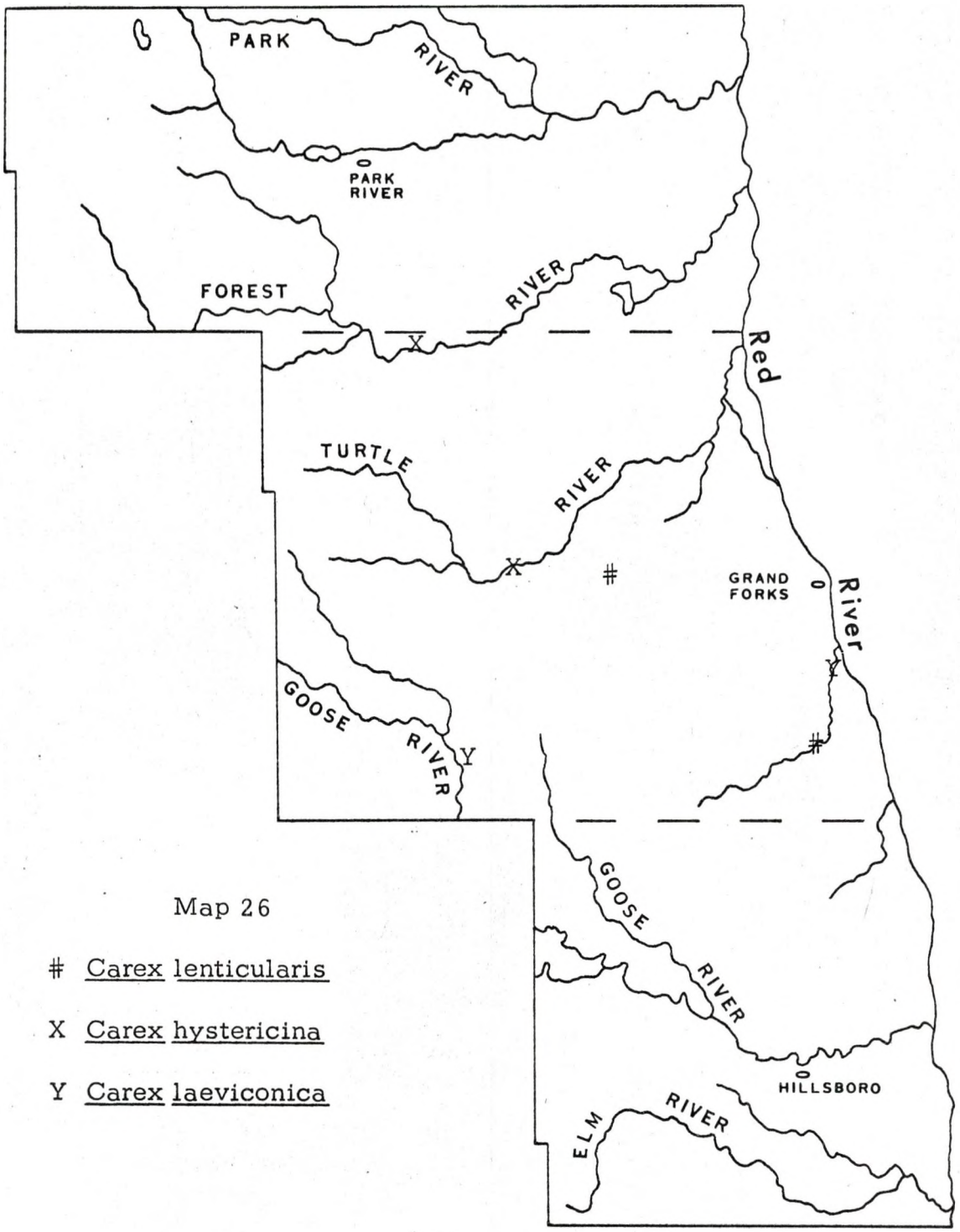


Map 25

\# Carex lasiocarpa

X Carex aquatilis

Y Carex granularis

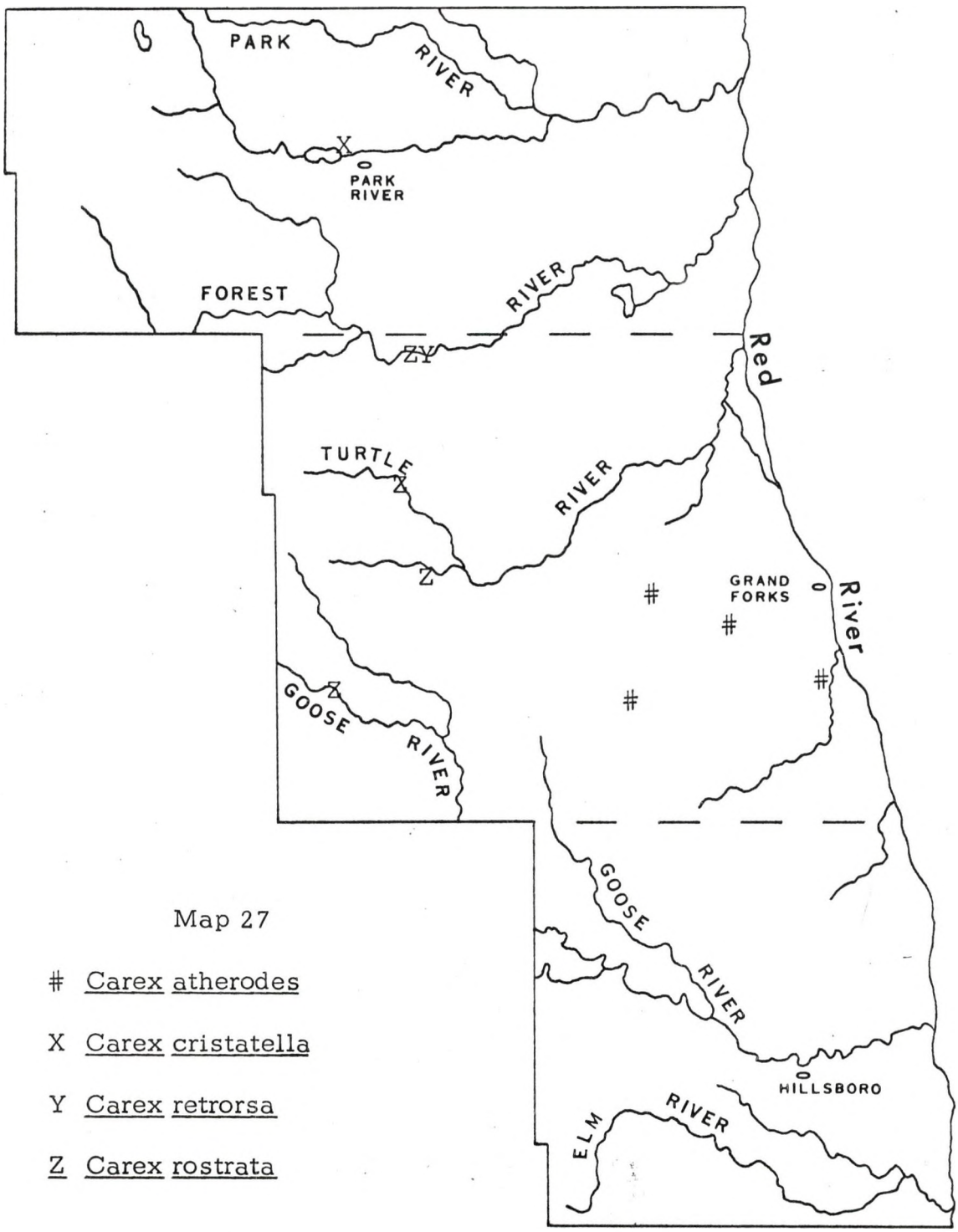


Map 26

\# Carex lenticularis

X Carex hystericina

Y Carex laeviconica



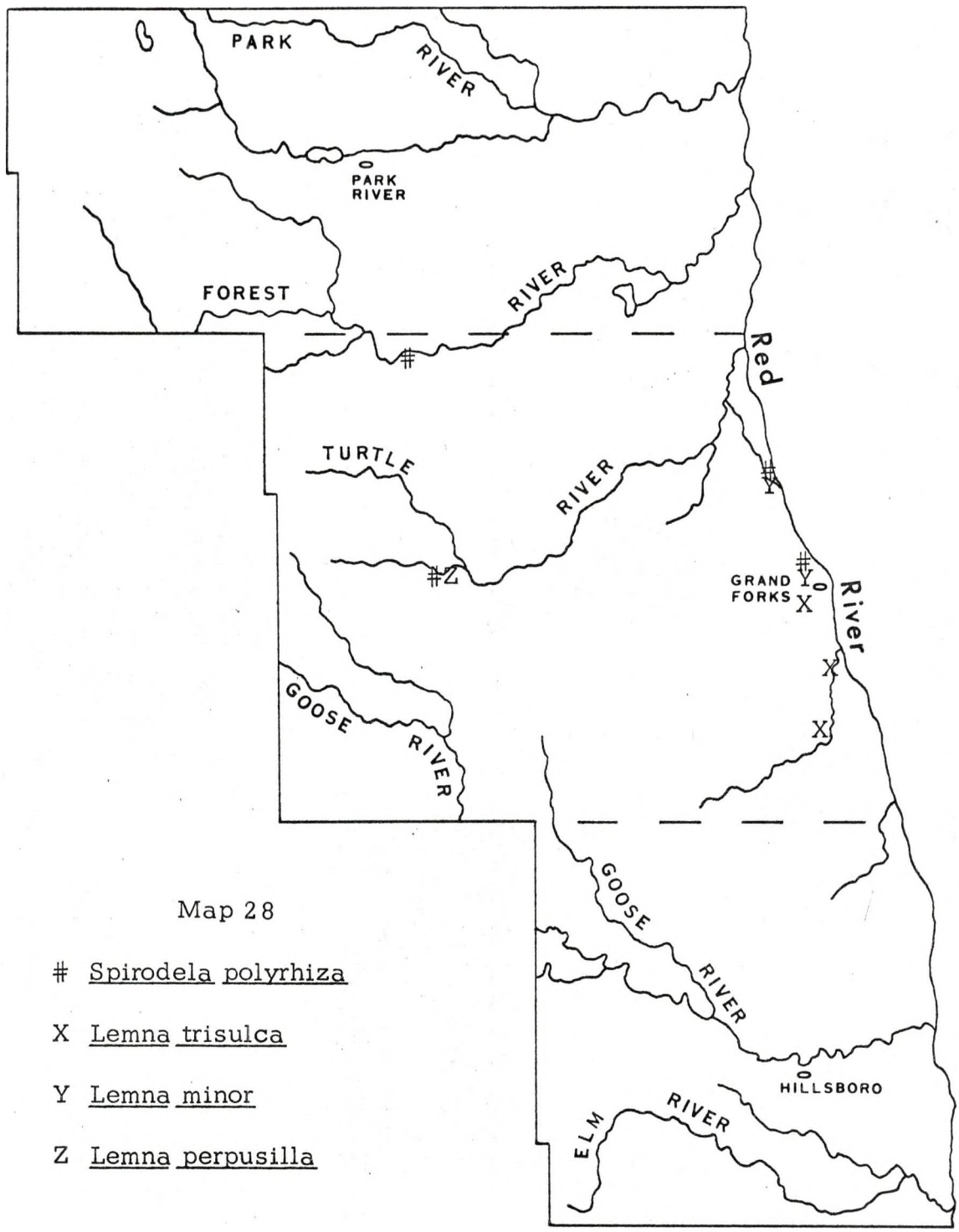
Map 27

\# Carex atherodes

X Carex cristatella

Y Carex retrorsa

Z Carex rostrata



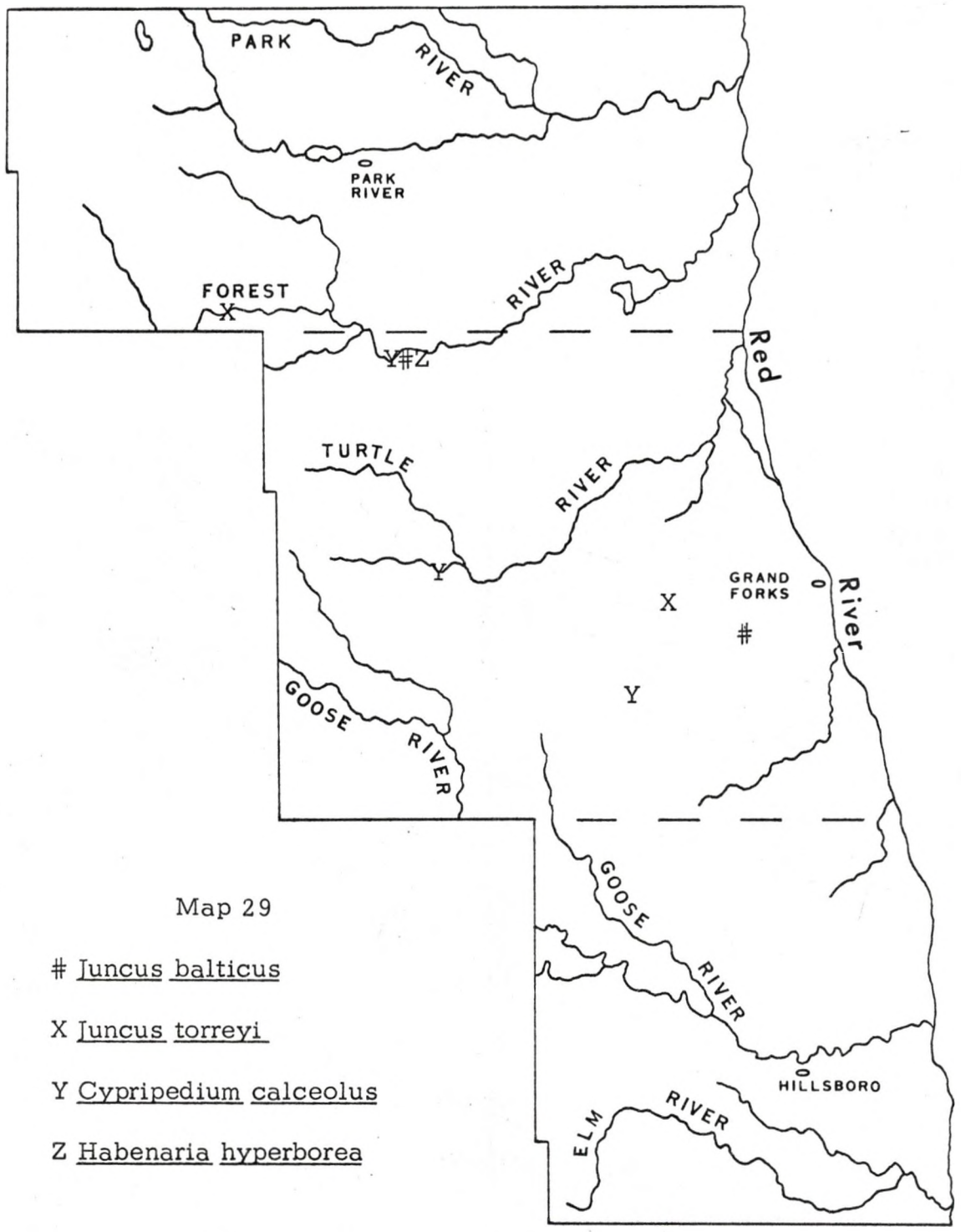
Map 28

\# Spirodela polyrhiza

X Lemna trisulca

Y Lemna minor

Z Lemna perpusilla



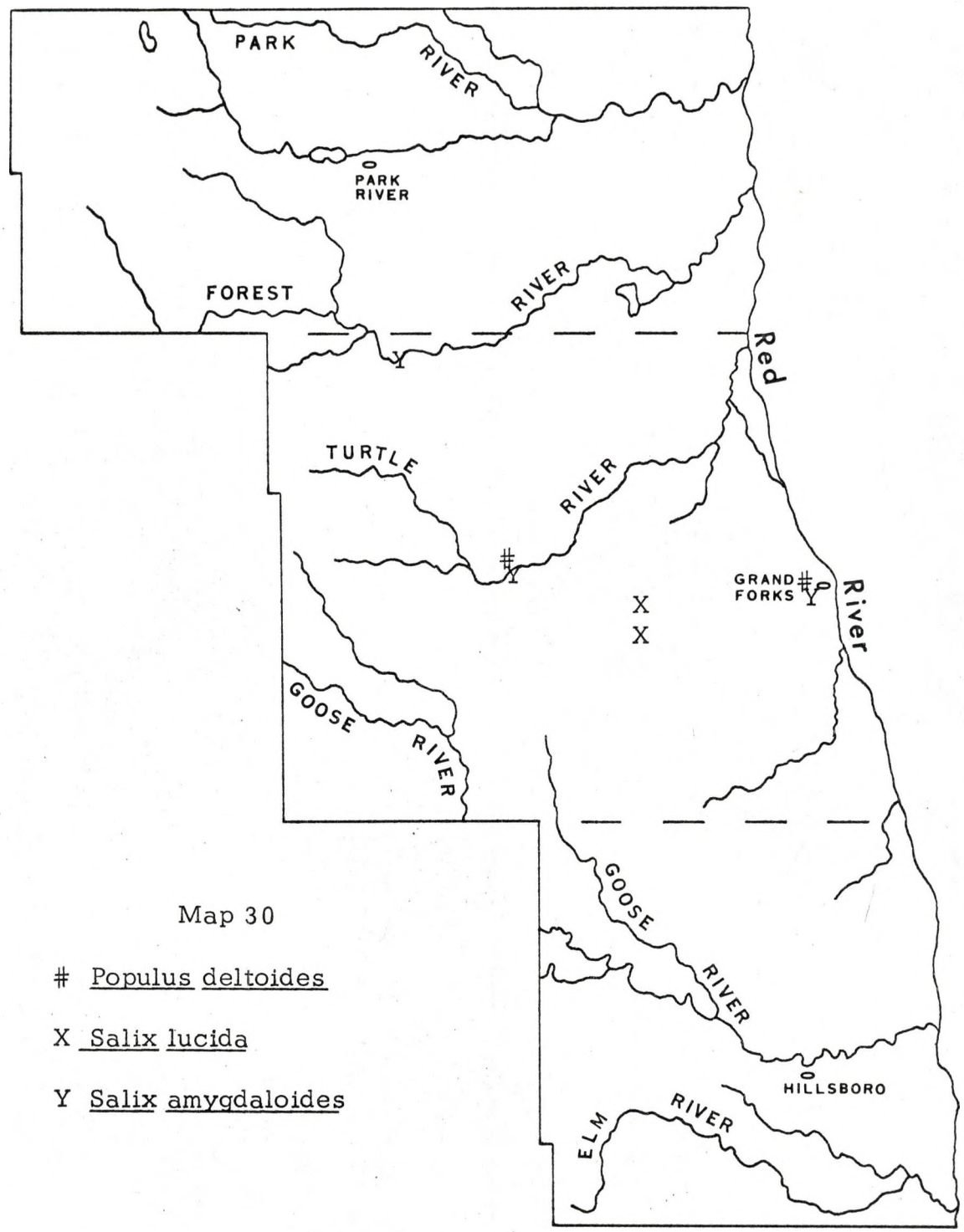
Map 29

Juncus balticus

X Juncus torreyi

Y Cypripedium calceolus

Z Habenaria hyperborea

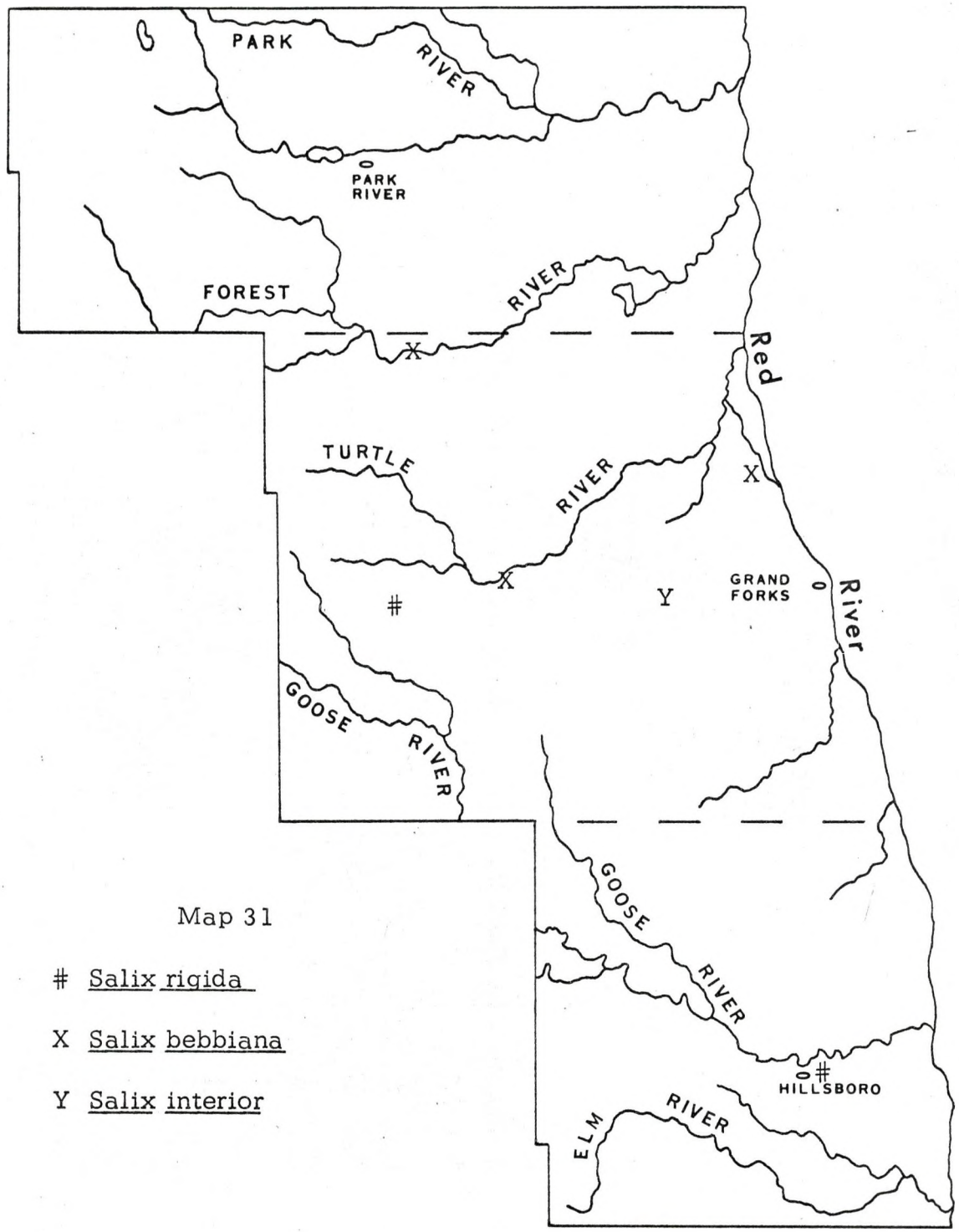


Map 30

\# Populus deltoides

X Salix lucida

Y Salix amygdaloides

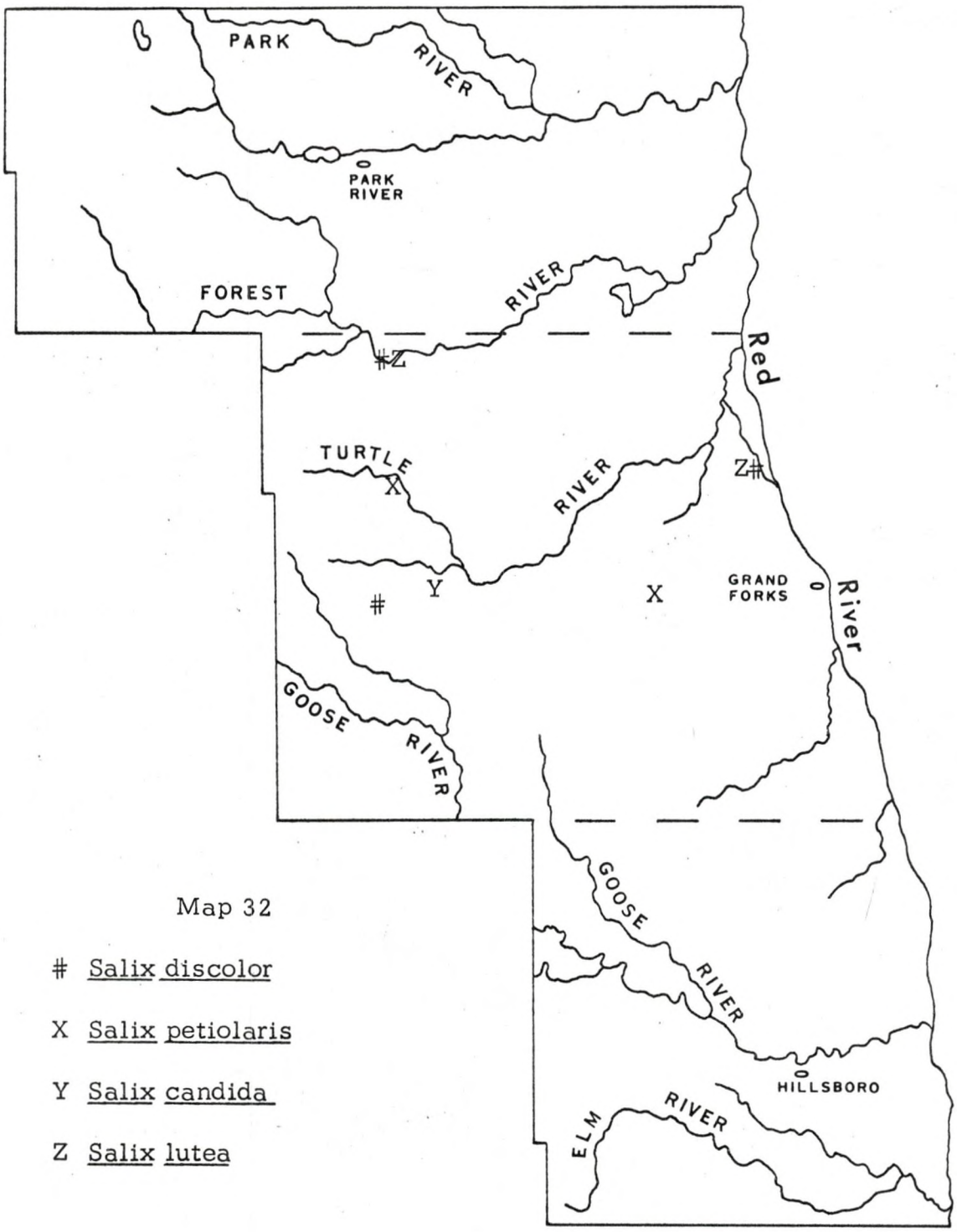


Map 31

\# Salix rigida

X Salix bebbiana

Y Salix interior



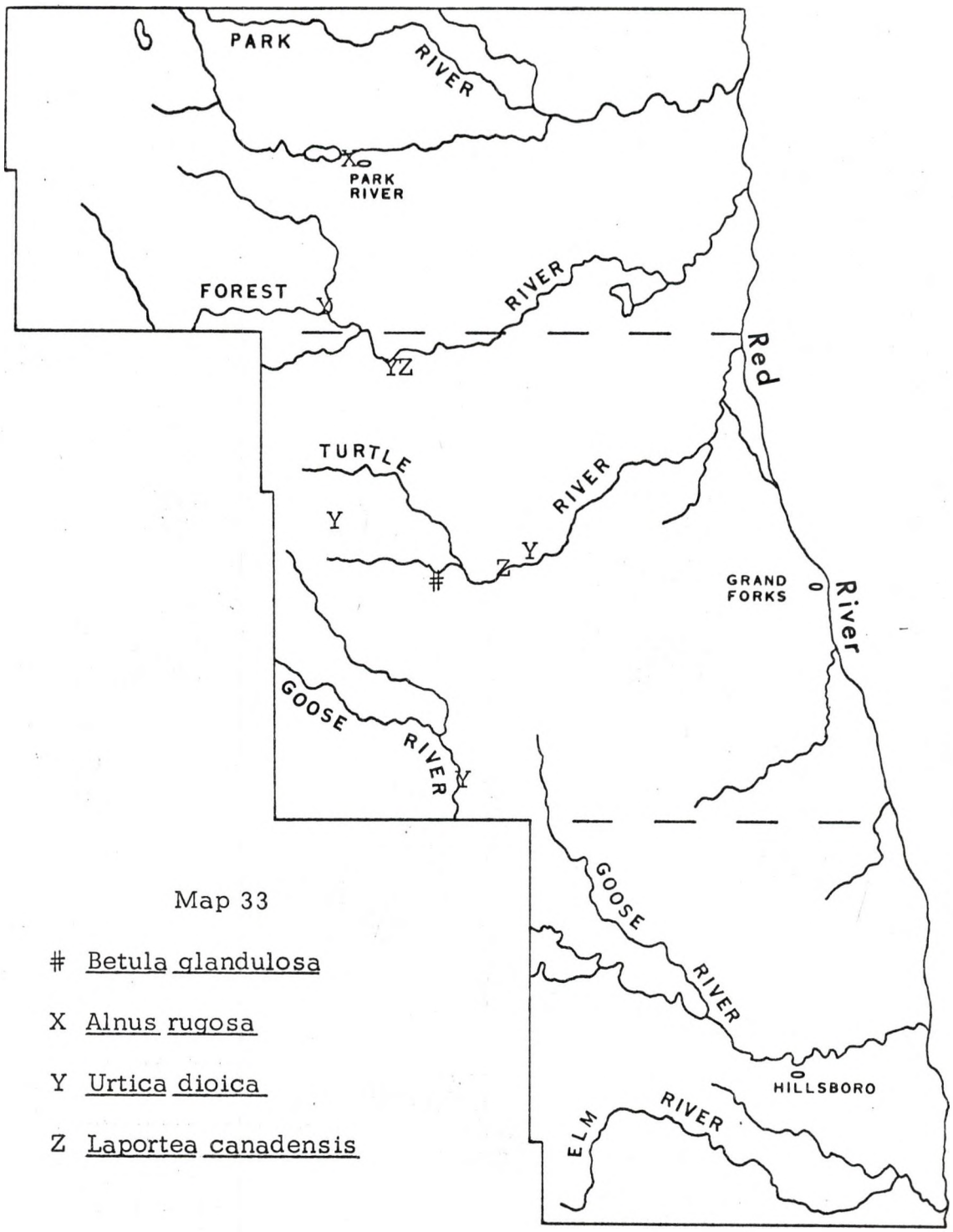
Map 32

\# Salix discolor

X Salix petiolaris

Y Salix candida

Z Salix lutea



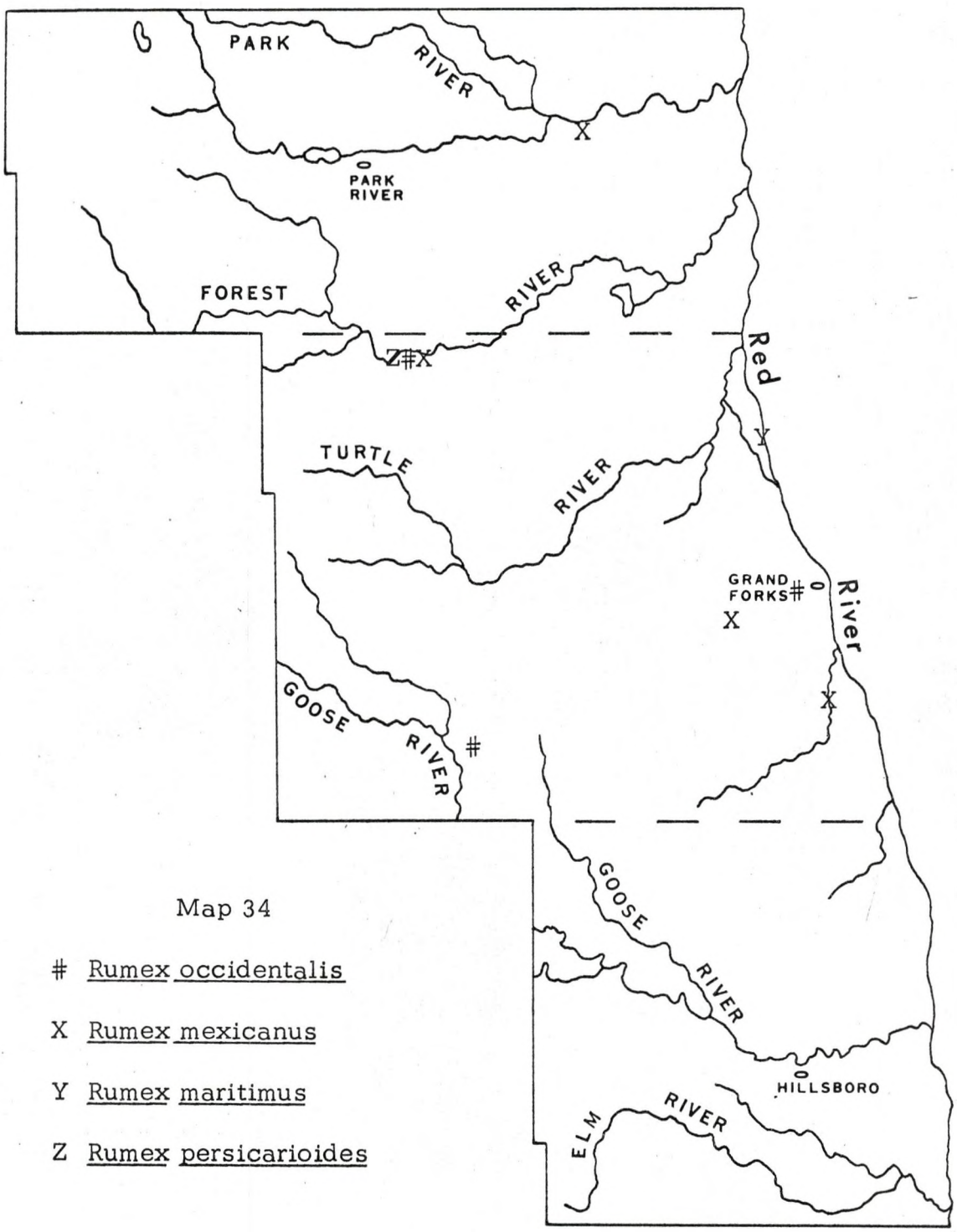
Map 33

\# Betula glandulosa

X Alnus rugosa

Y Urtica dioica

Z Laportea canadensis



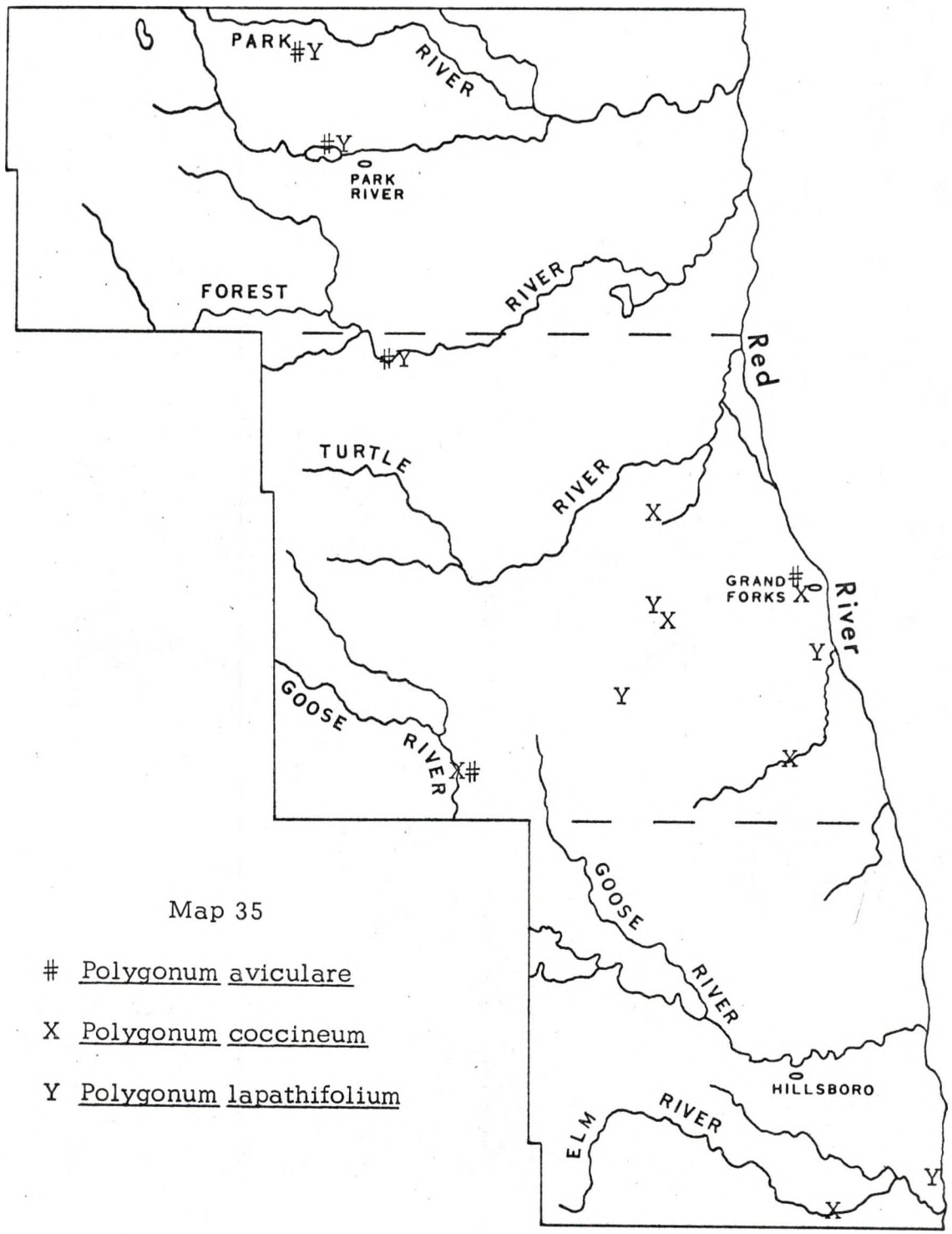
Map 34

\# Rumex occidentalis

X Rumex mexicanus

Y Rumex maritimus

Z Rumex persicarioides

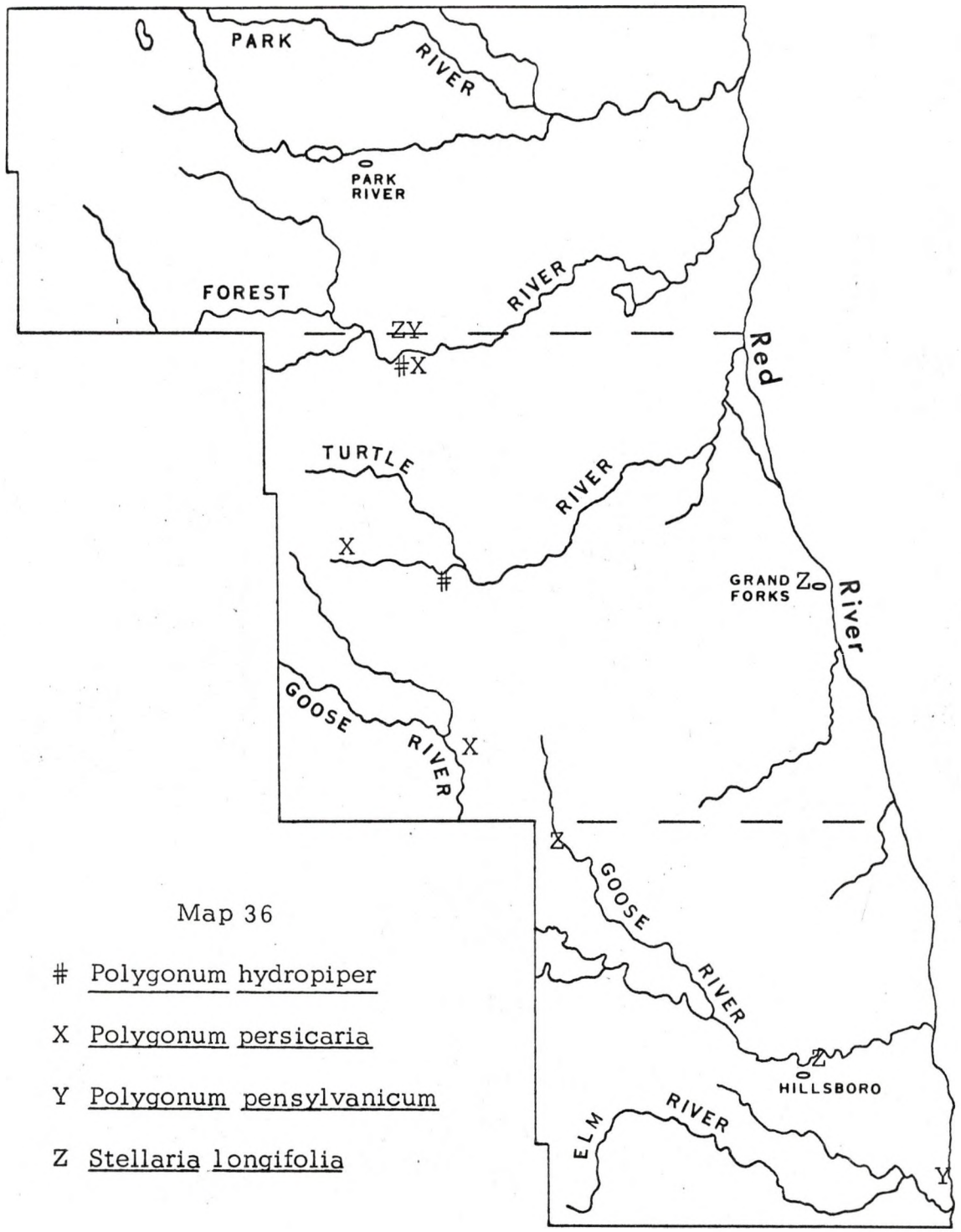


Map 35

\# Polygonum aviculare

X Polygonum coccineum

Y Polygonum lapathifolium



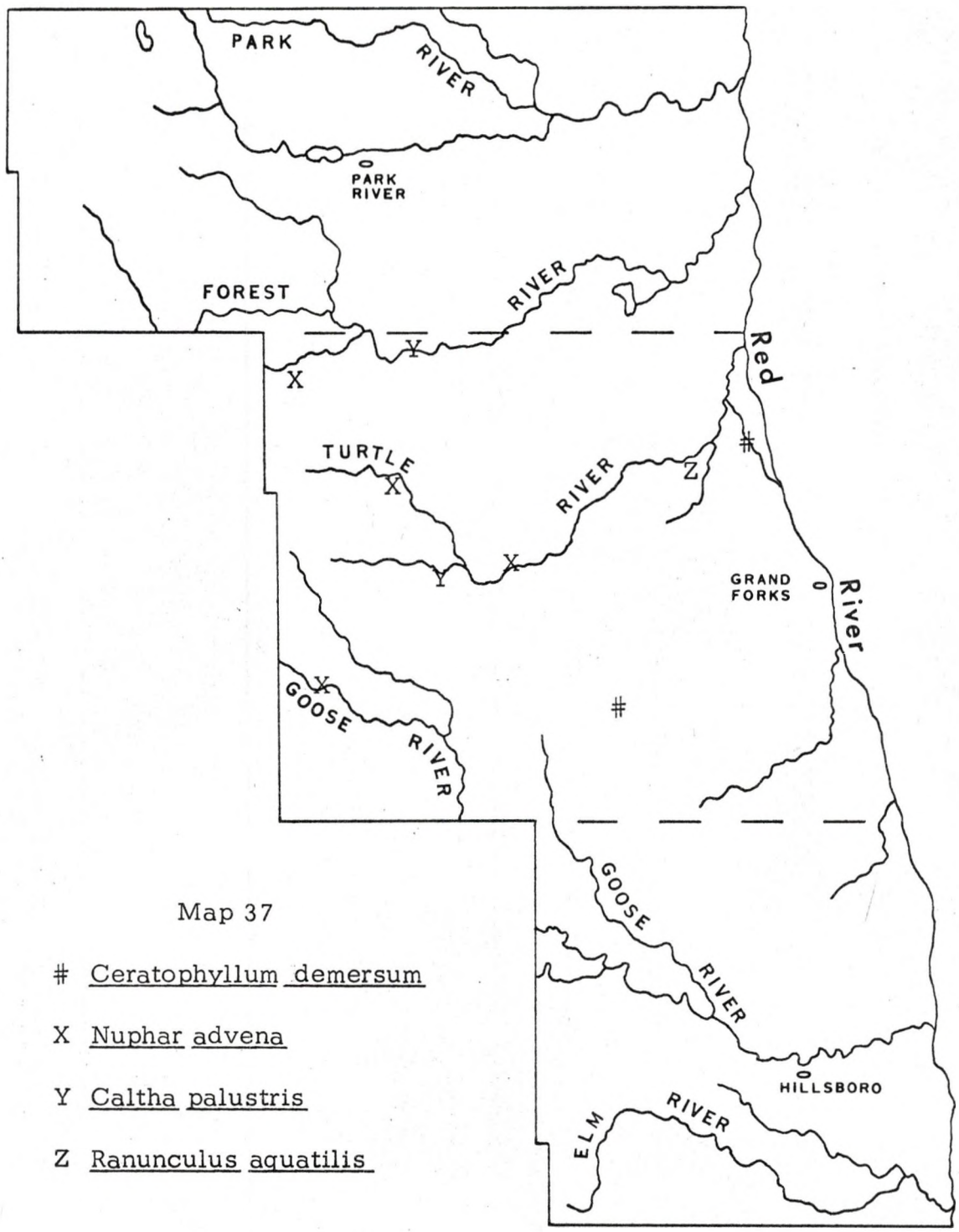
Map 36

\# Polygonum hydropiper

X Polygonum persicaria

Y Polygonum pensylvanicum

Z Stellaria longifolia



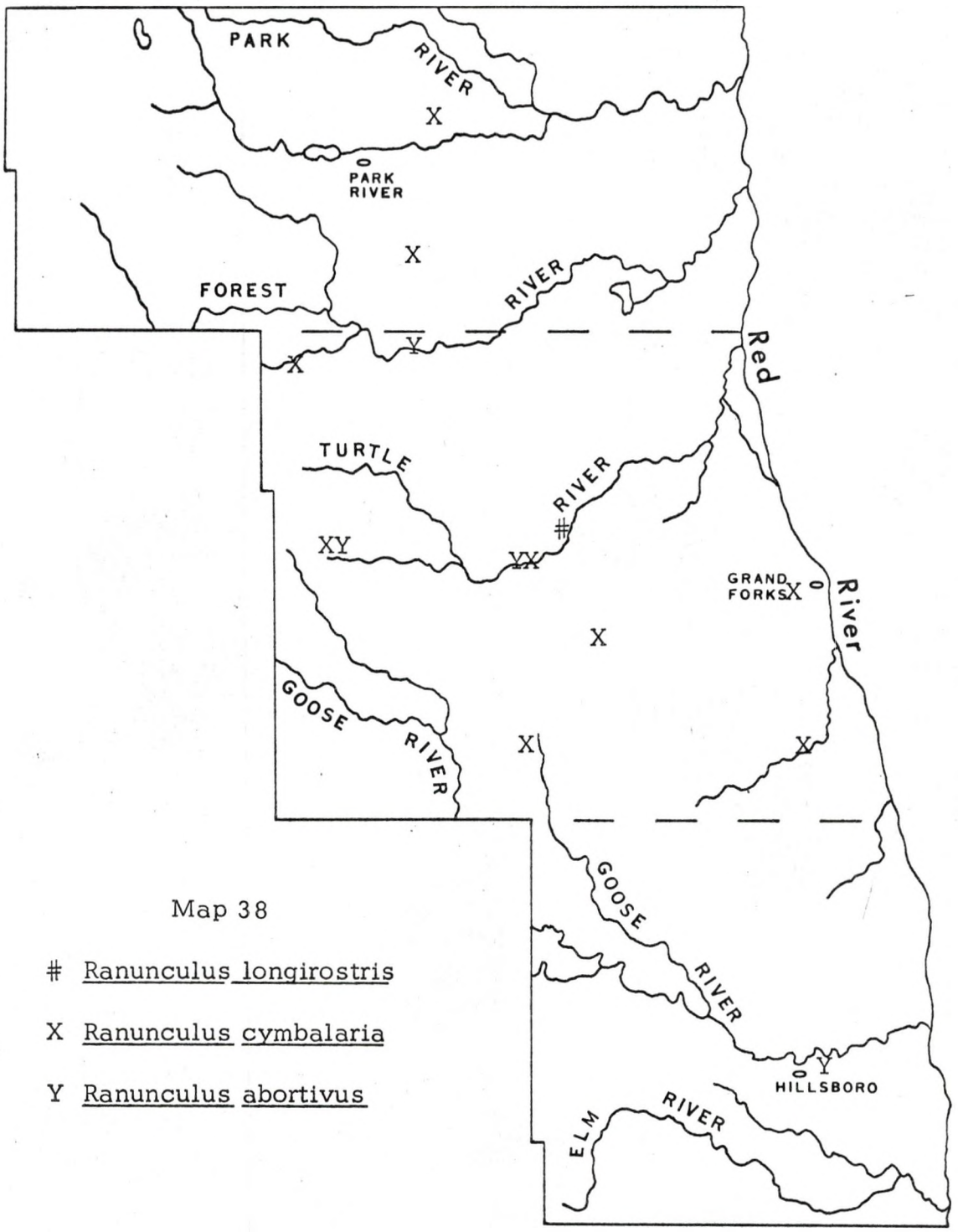
Map 37

\# Ceratophyllum demersum

X Nuphar advena

Y Caltha palustris

Z Ranunculus aquatilis

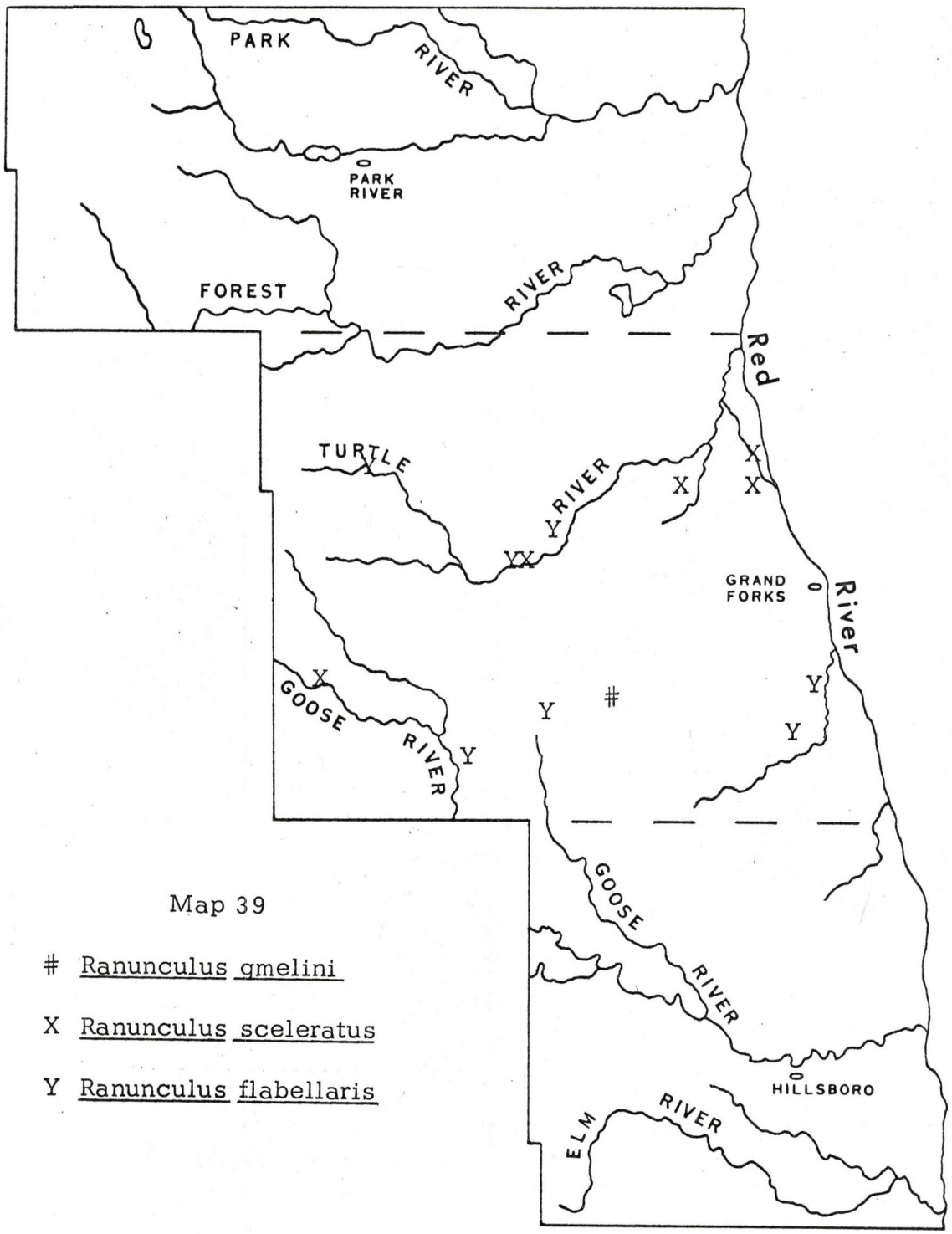


Map 38

\# Ranunculus longirostris

X Ranunculus cymbalaria

Y Ranunculus abortivus

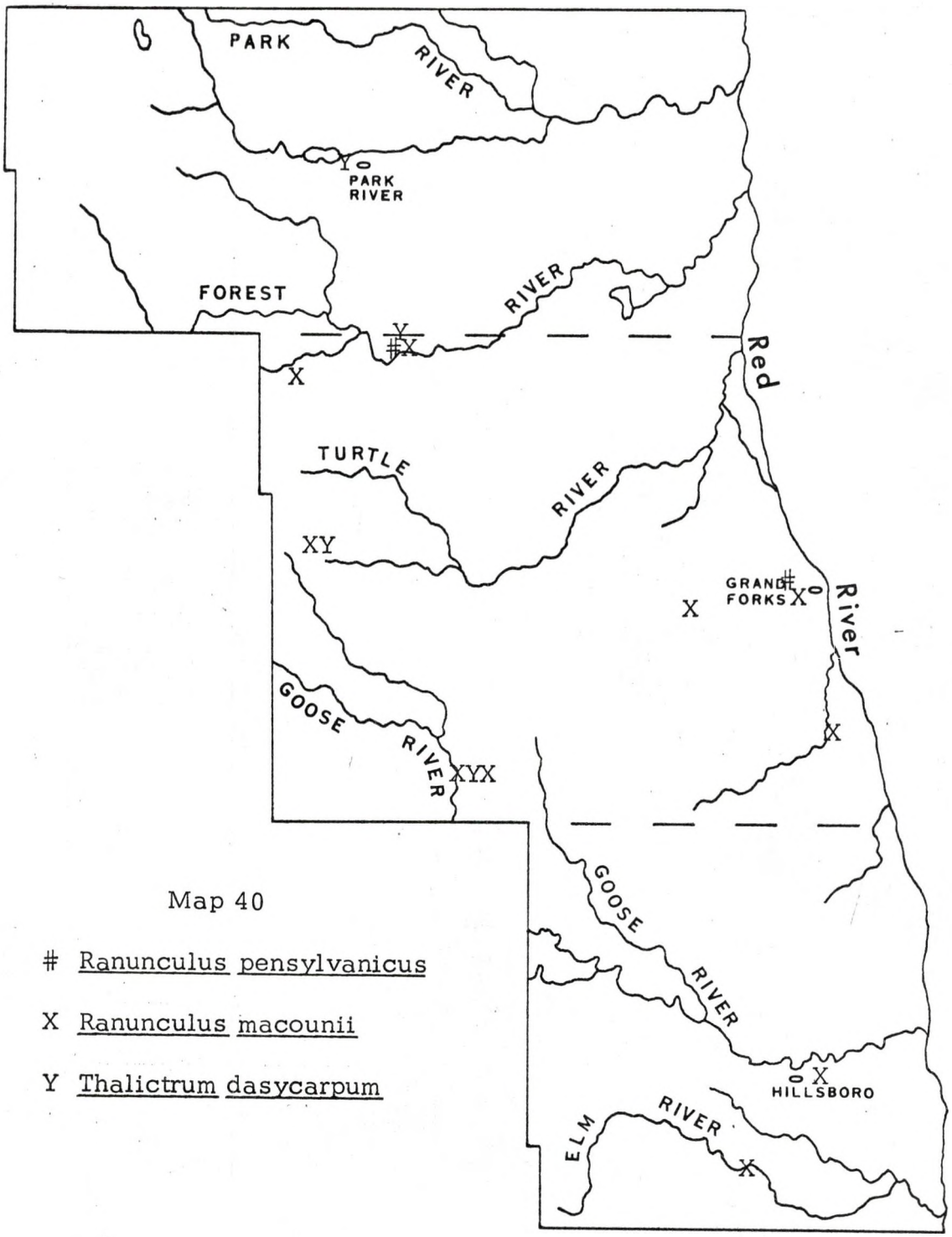


Map 39

\# Ranunculus gmelini

X Ranunculus sceleratus

Y Ranunculus flabellaris

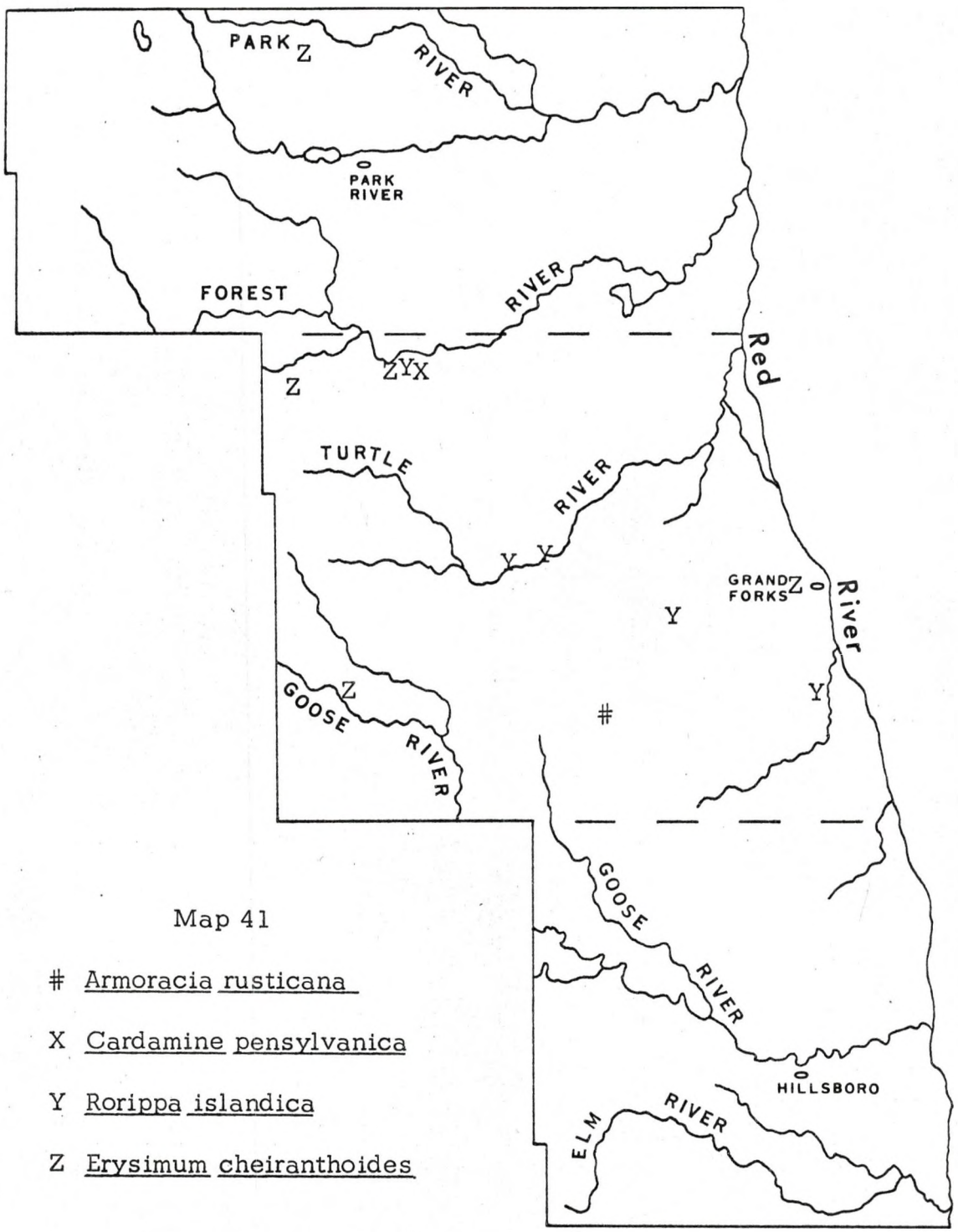


Map 40

\# Ranunculus pensylvanicus

X Ranunculus macounii

Y Thalictrum dasycarpum



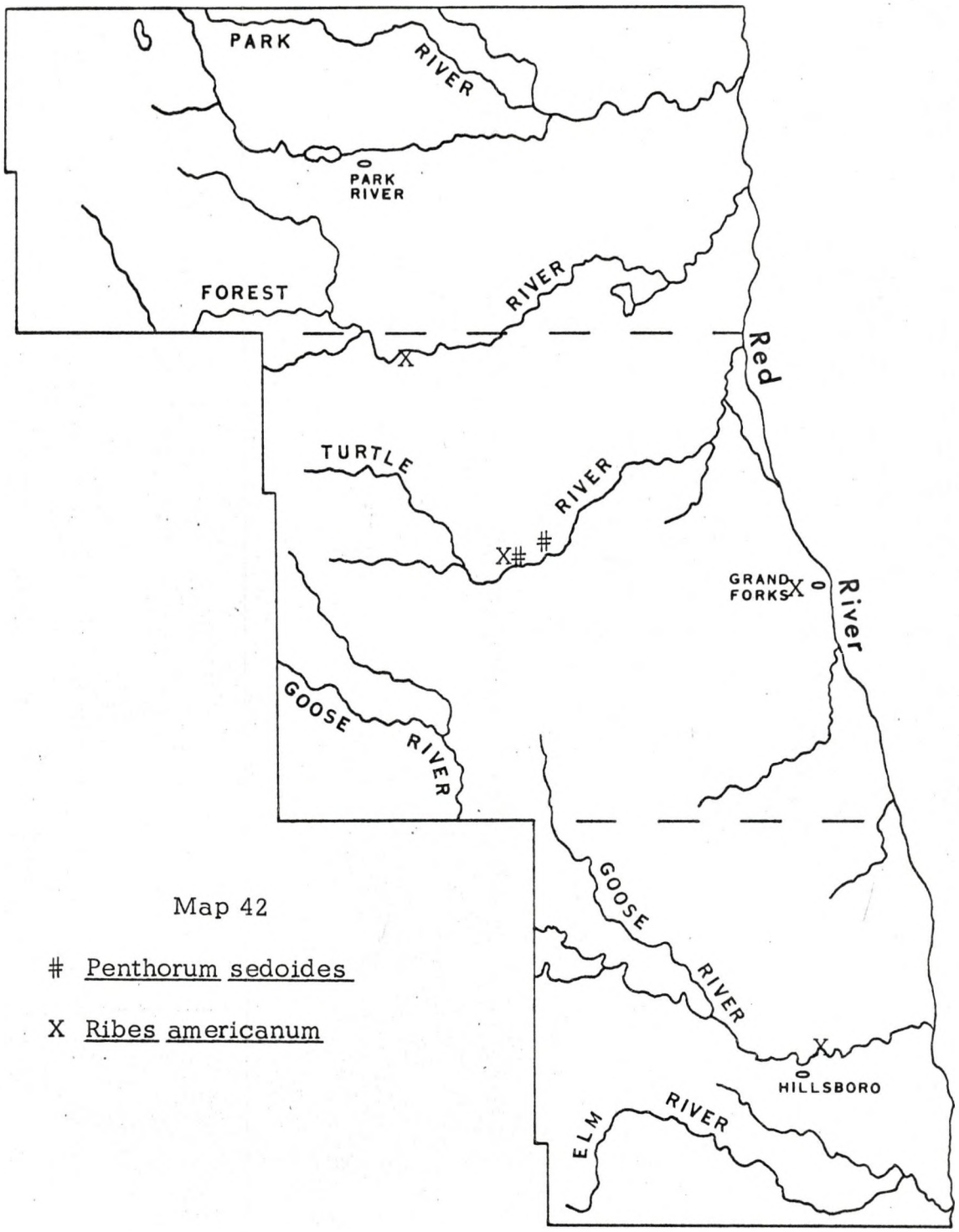
Map 41

\# Armoracia rusticana

X Cardamine pensylvanica

Y Rorippa islandica

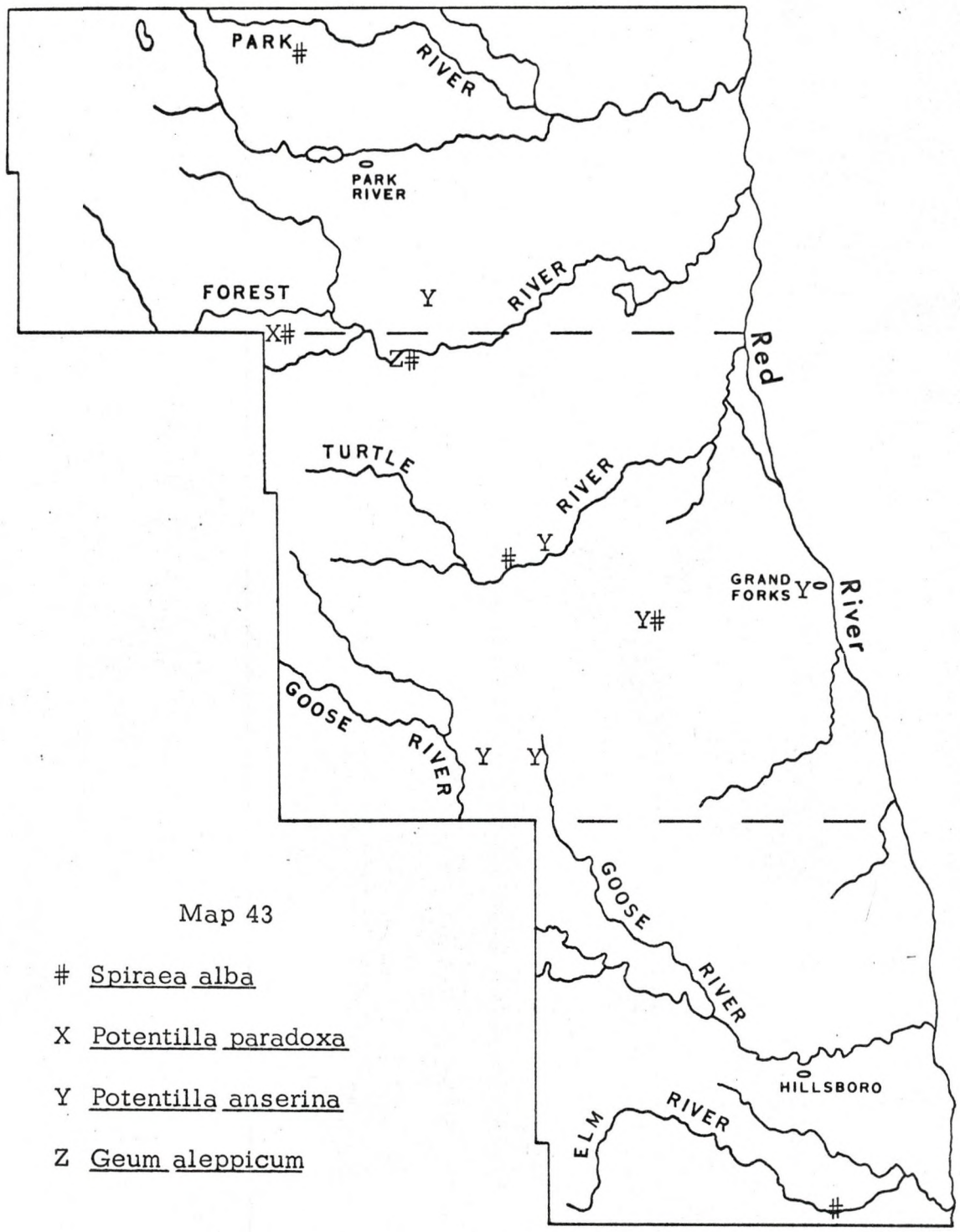
Z Erysimum cheiranthoides



Map 42

\# Penthorum sedoides

X Ribes americanum



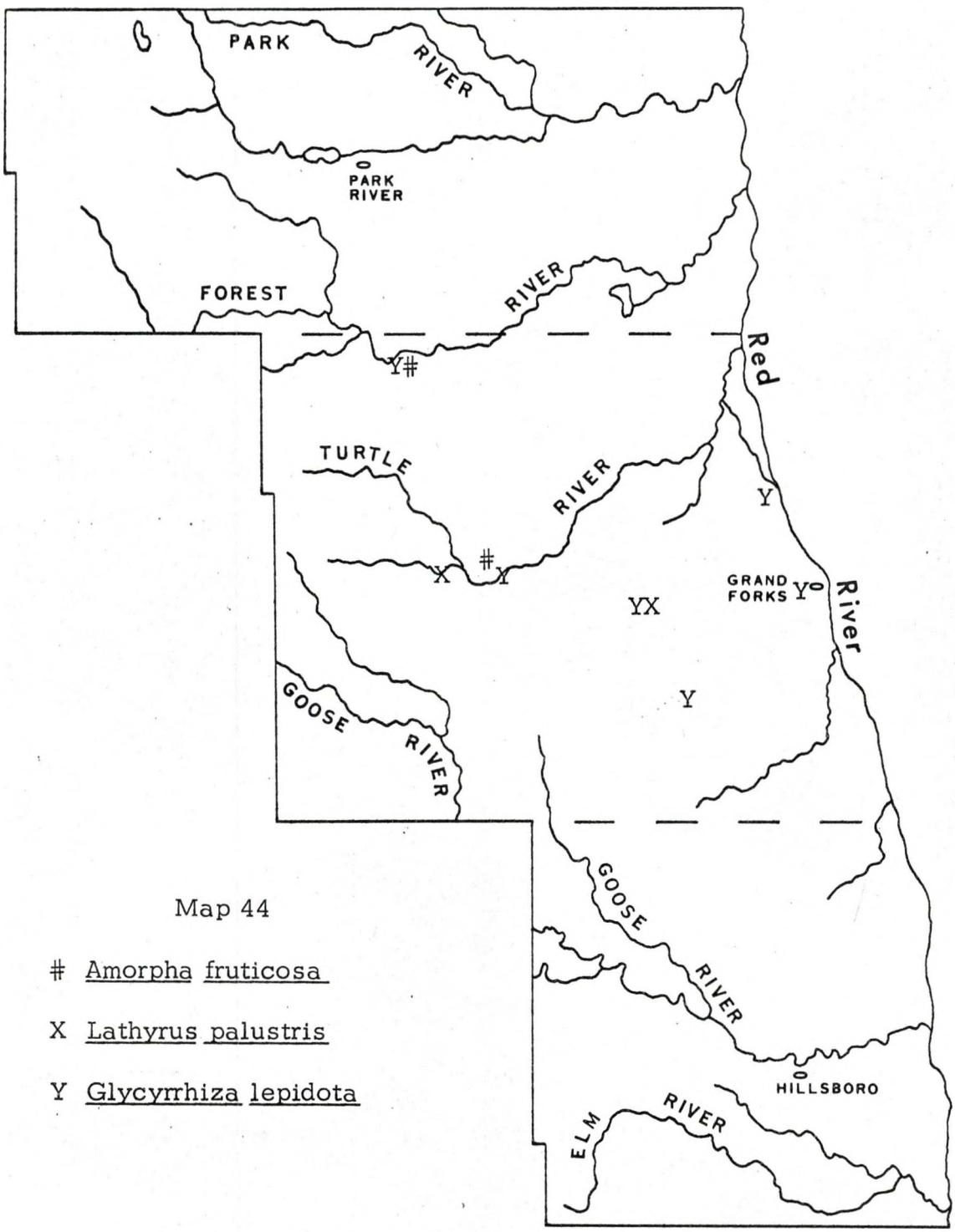
Map 43

\# Spiraea alba

X Potentilla paradoxa

Y Potentilla anserina

Z Geum aleppicum

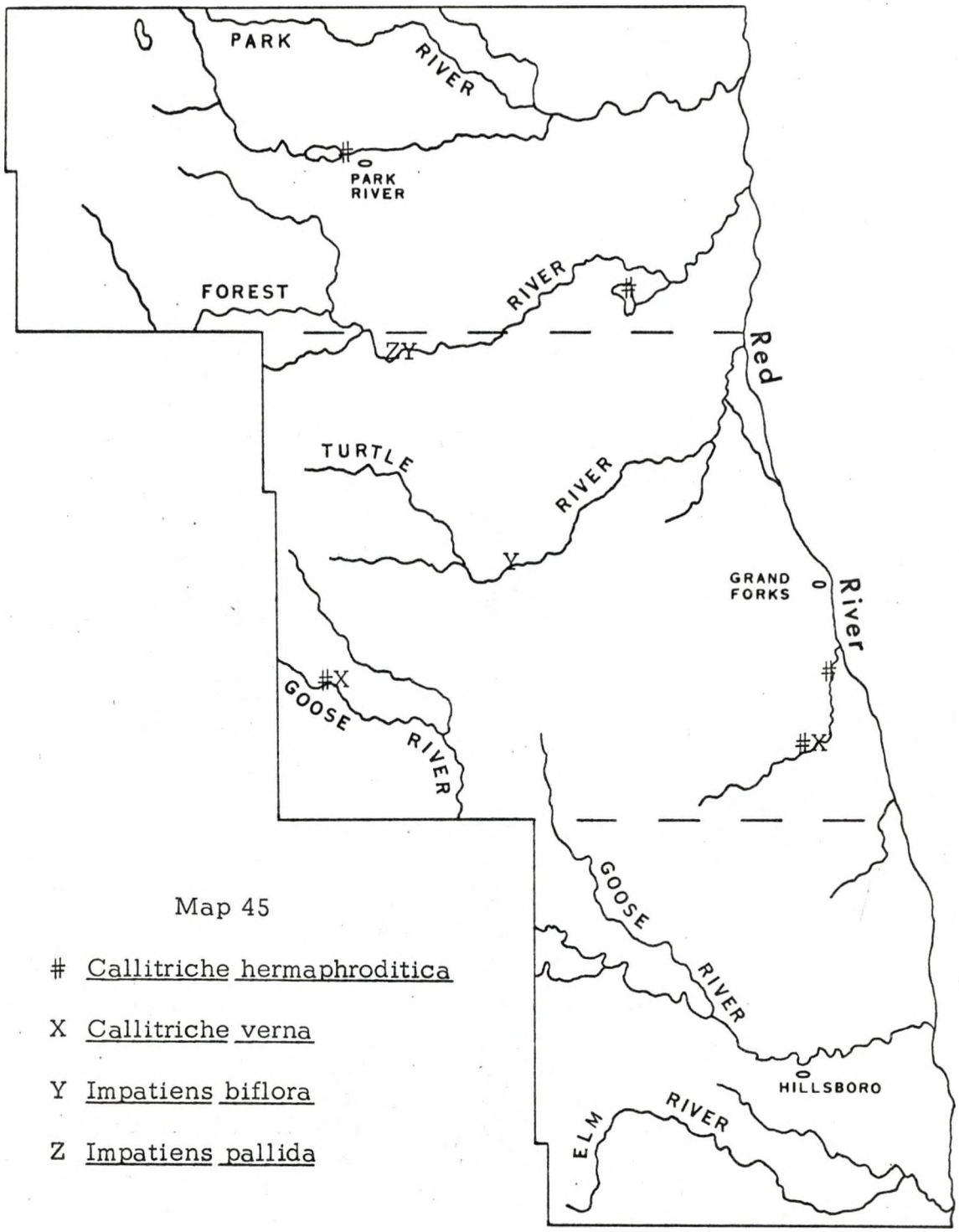


Map 44

\# Amorpha fruticosa

X Lathyrus palustris

Y Glycyrrhiza lepidota



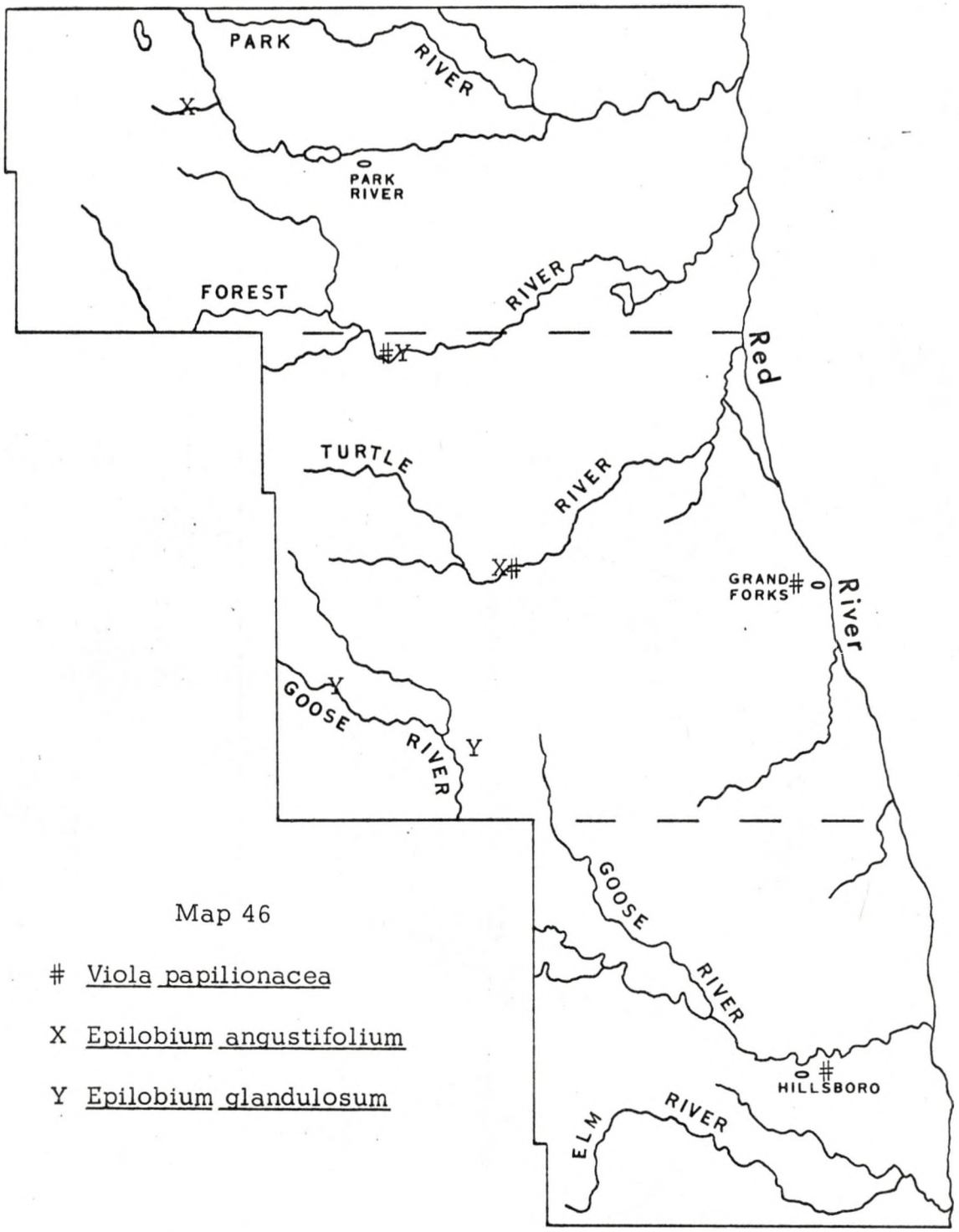
Map 45

\# Callitriche hermaphroditica

X Callitriche verna

Y Impatiens biflora

Z Impatiens pallida

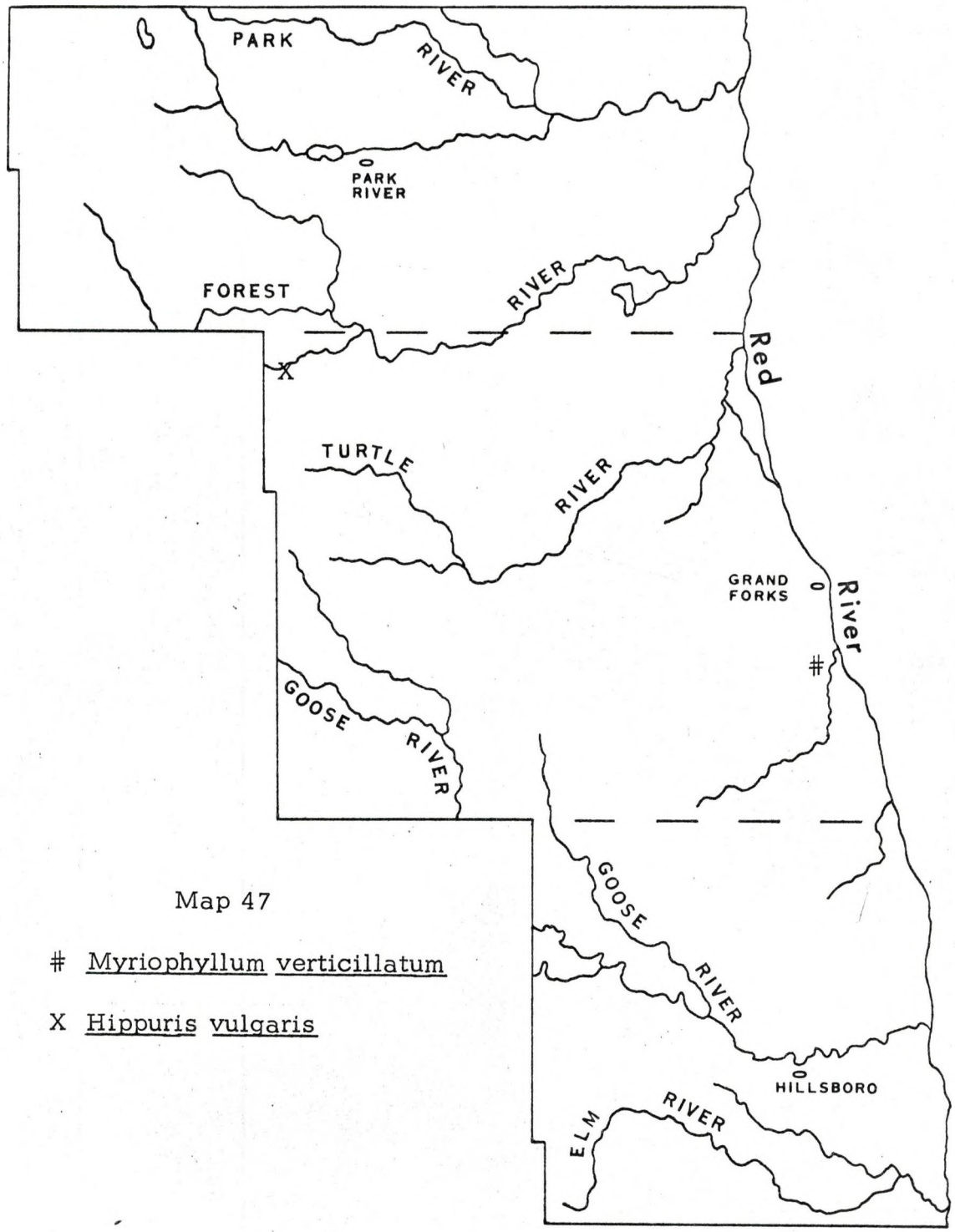


Map 46

\# Viola papilionacea

X Epilobium angustifolium

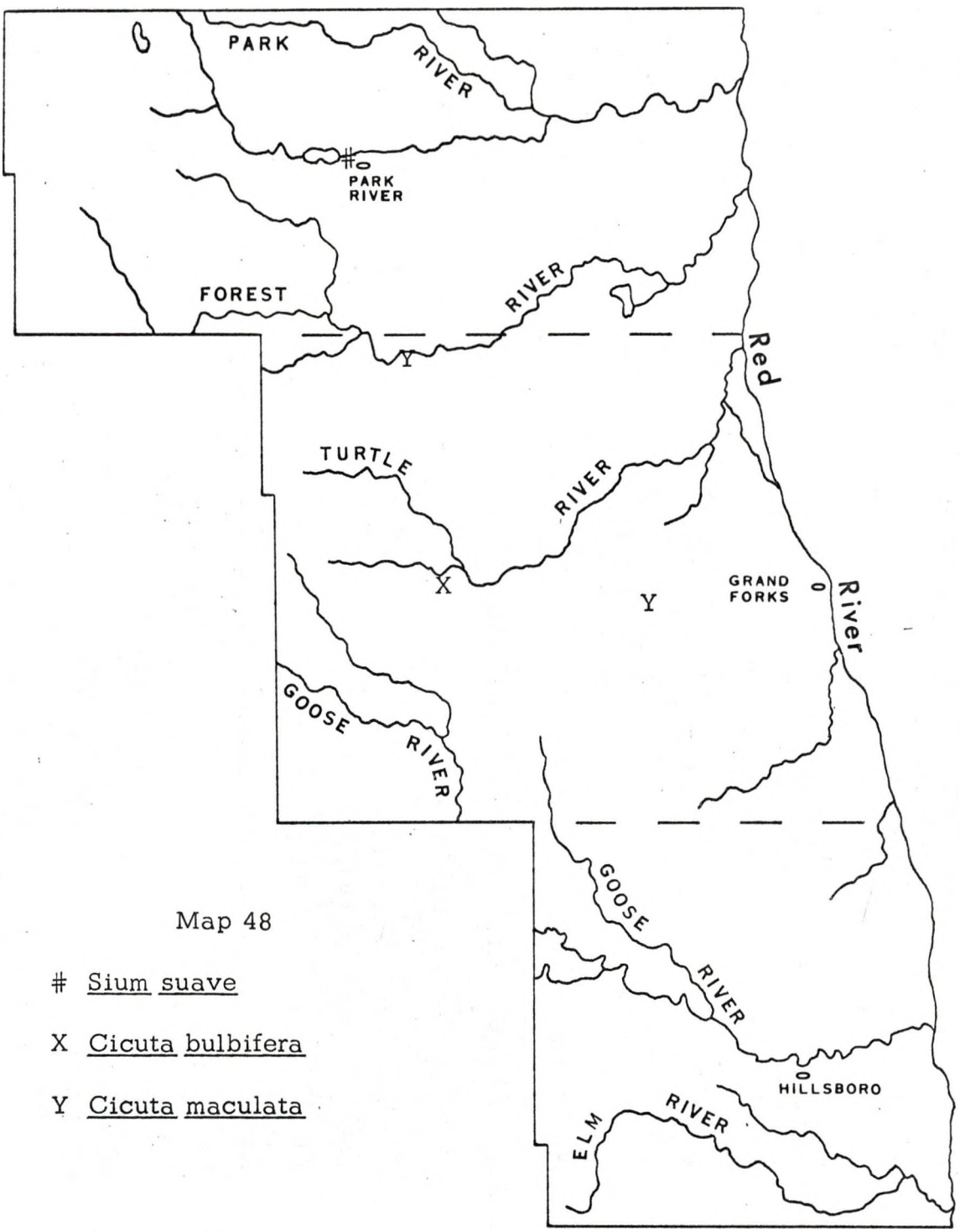
Y Epilobium glandulosum



Map 47

Myriophyllum verticillatum

X Hippuris vulgaris

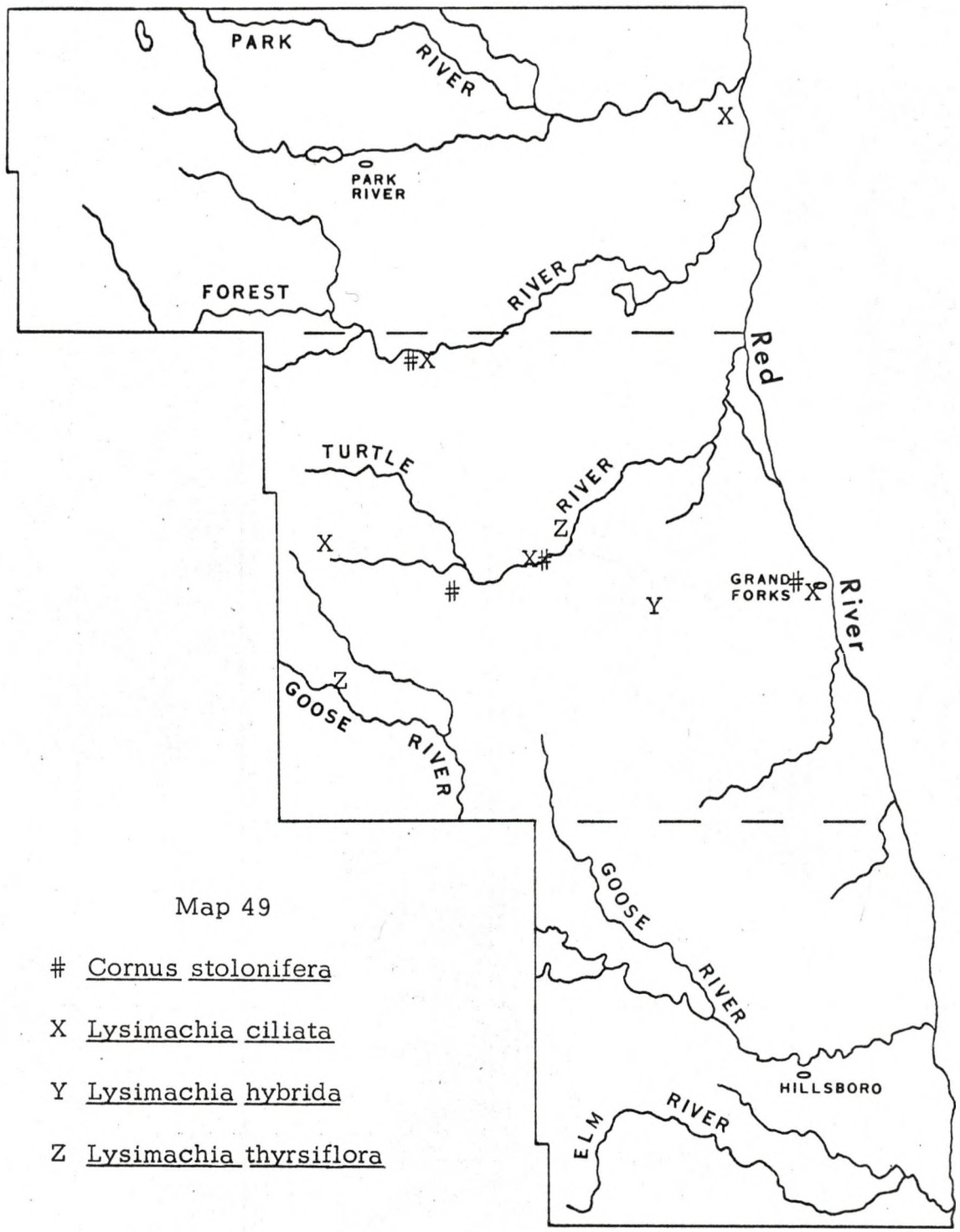


Map 48

\# Sium suave

X Cicuta bulbifera

Y Cicuta maculata



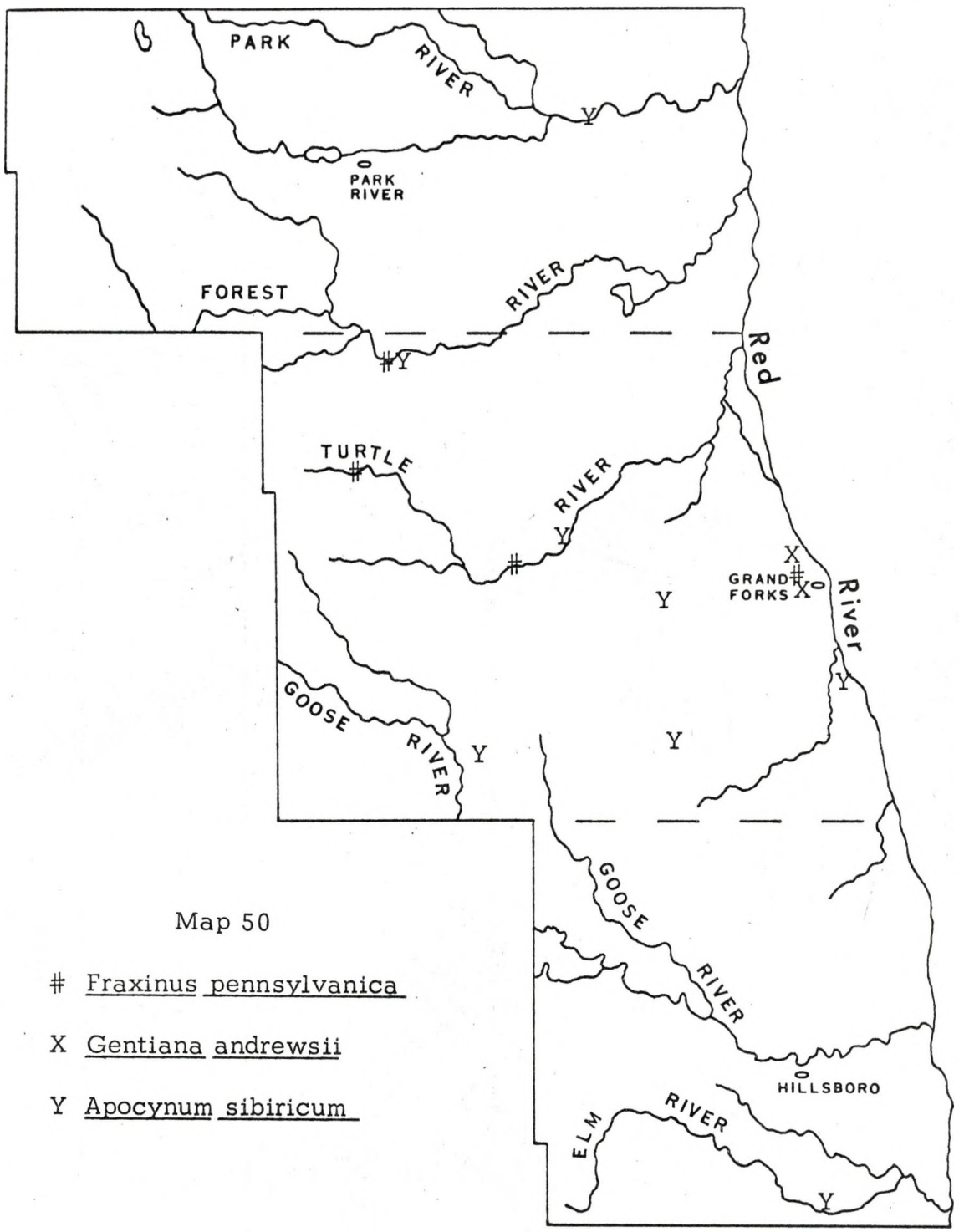
Map 49

\# Cornus stolonifera

X Lysimachia ciliata

Y Lysimachia hybrida

Z Lysimachia thyrsiflora

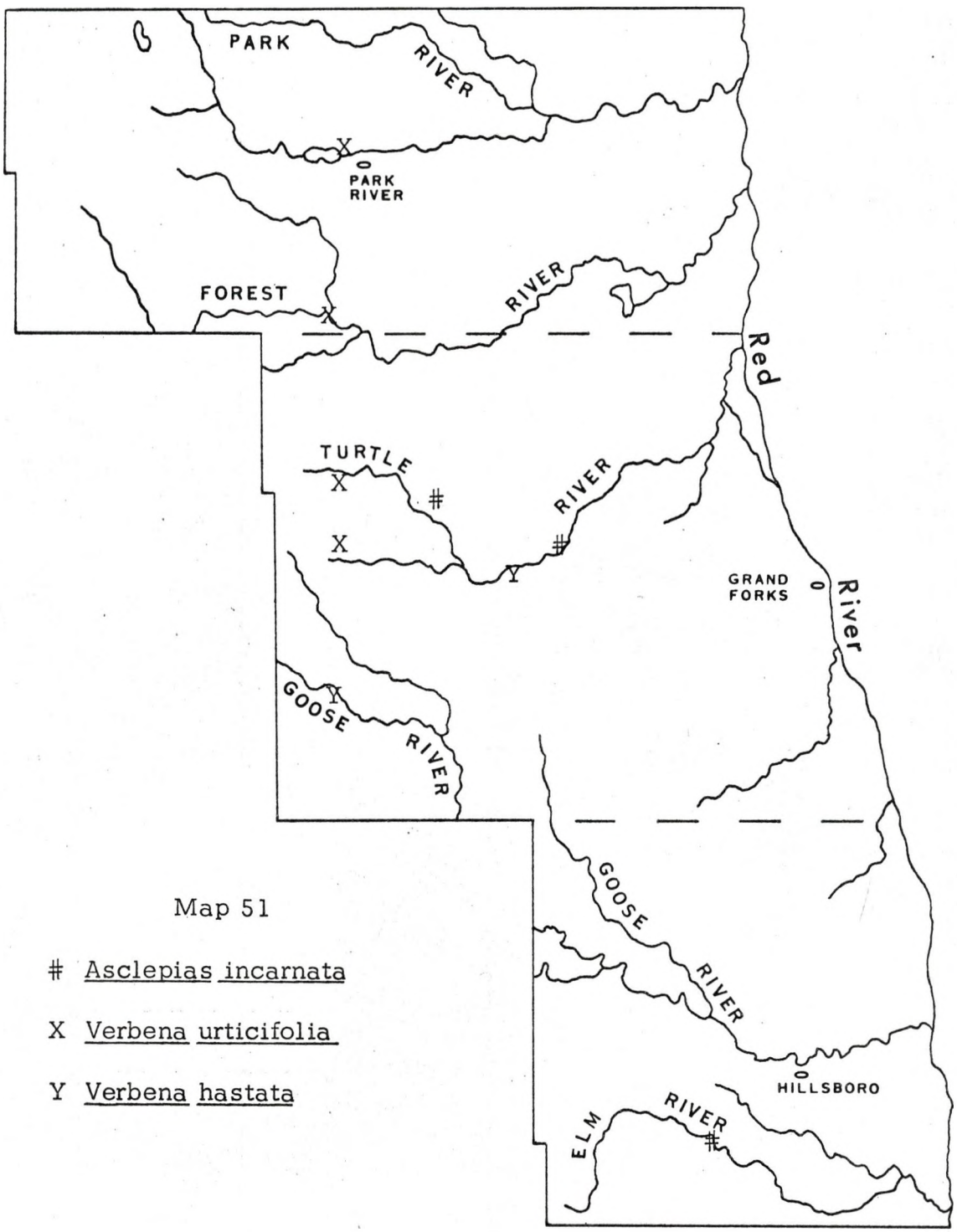


Map 50

Fraxinus pennsylvanica

X Gentiana andrewsii

Y Apocynum sibiricum

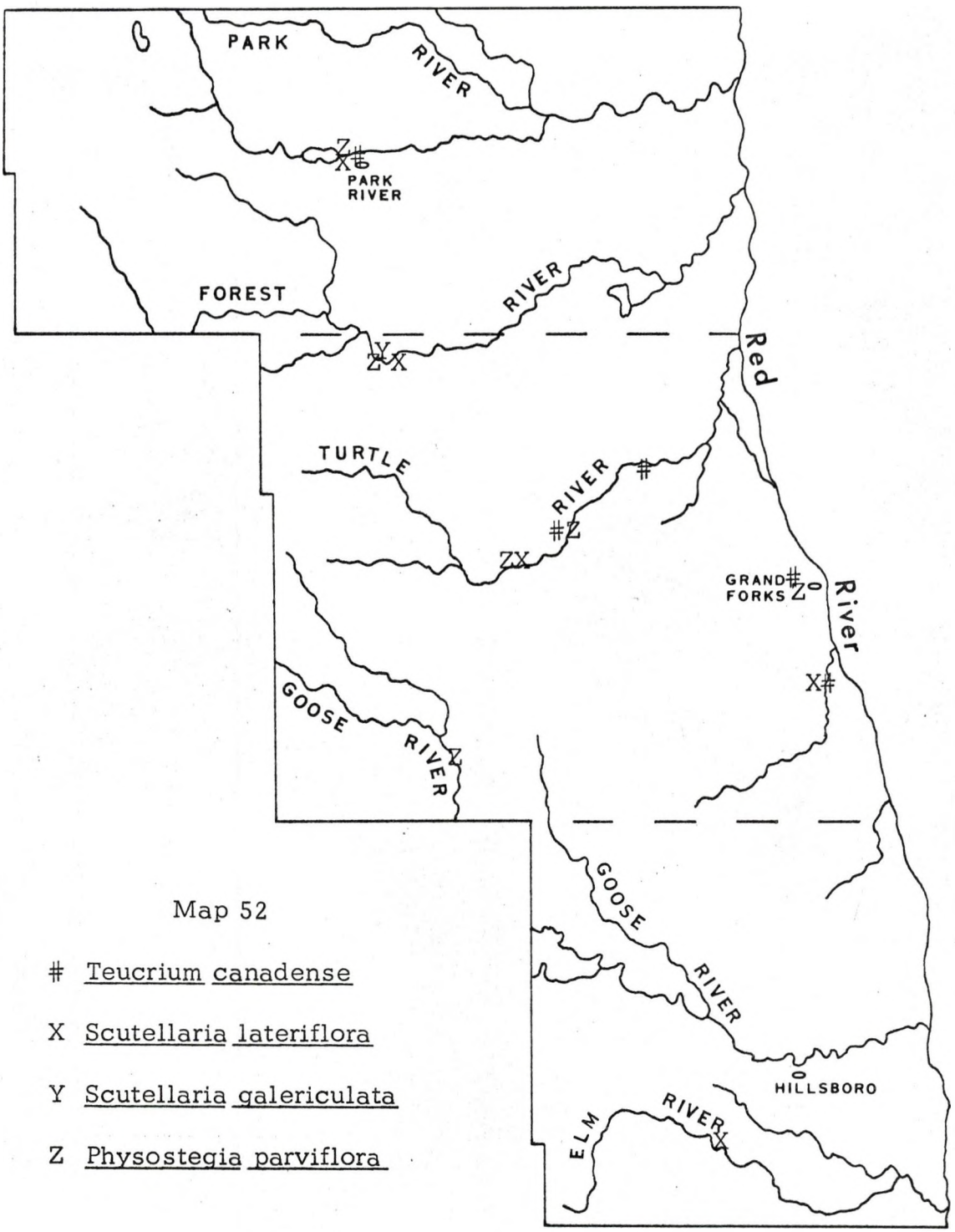


Map 51

\# Asclepias incarnata

X Verbena urticifolia

Y Verbena hastata



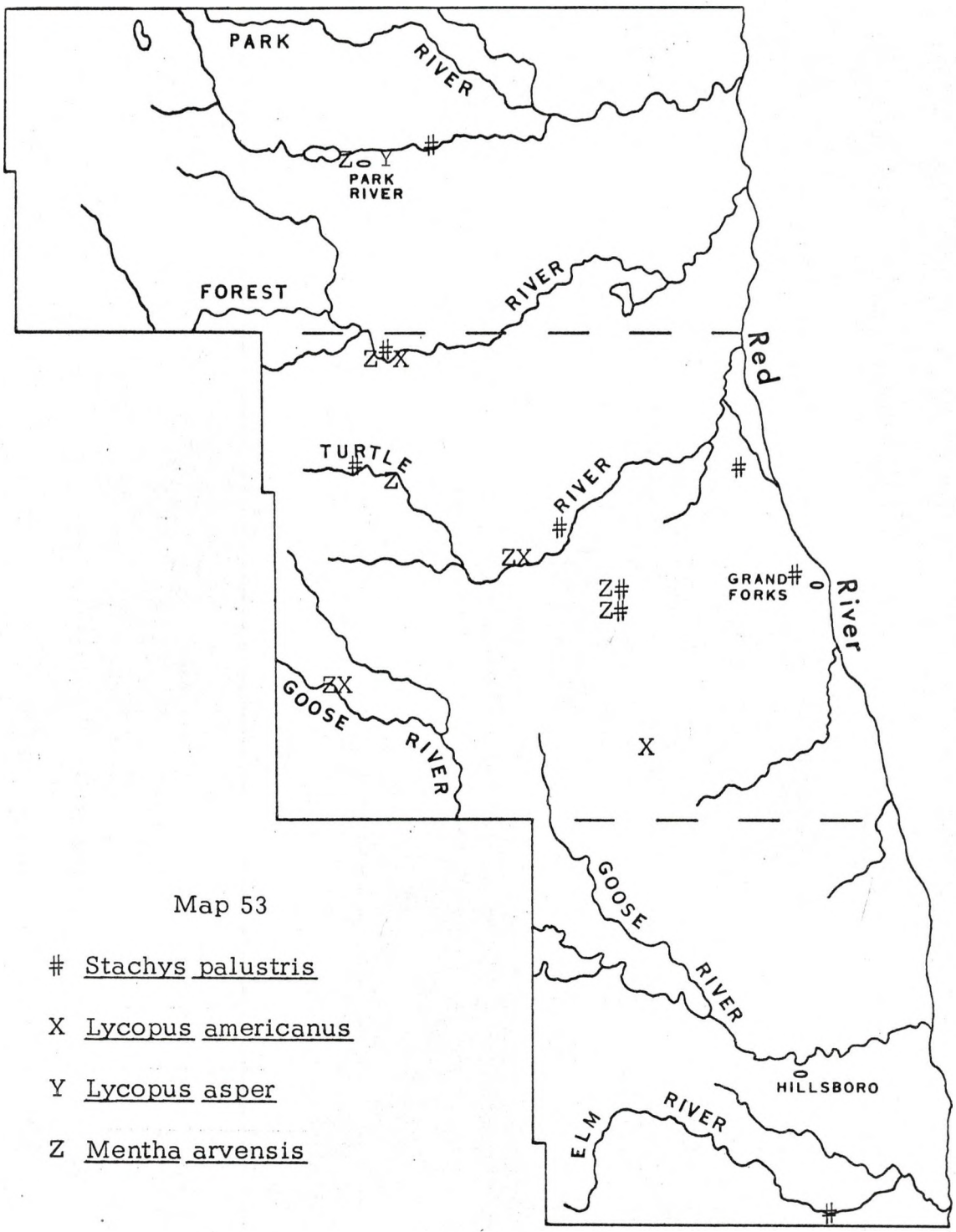
Map 52

\# Teucrium canadense

X Scutellaria lateriflora

Y Scutellaria galericulata

Z Physostegia parviflora



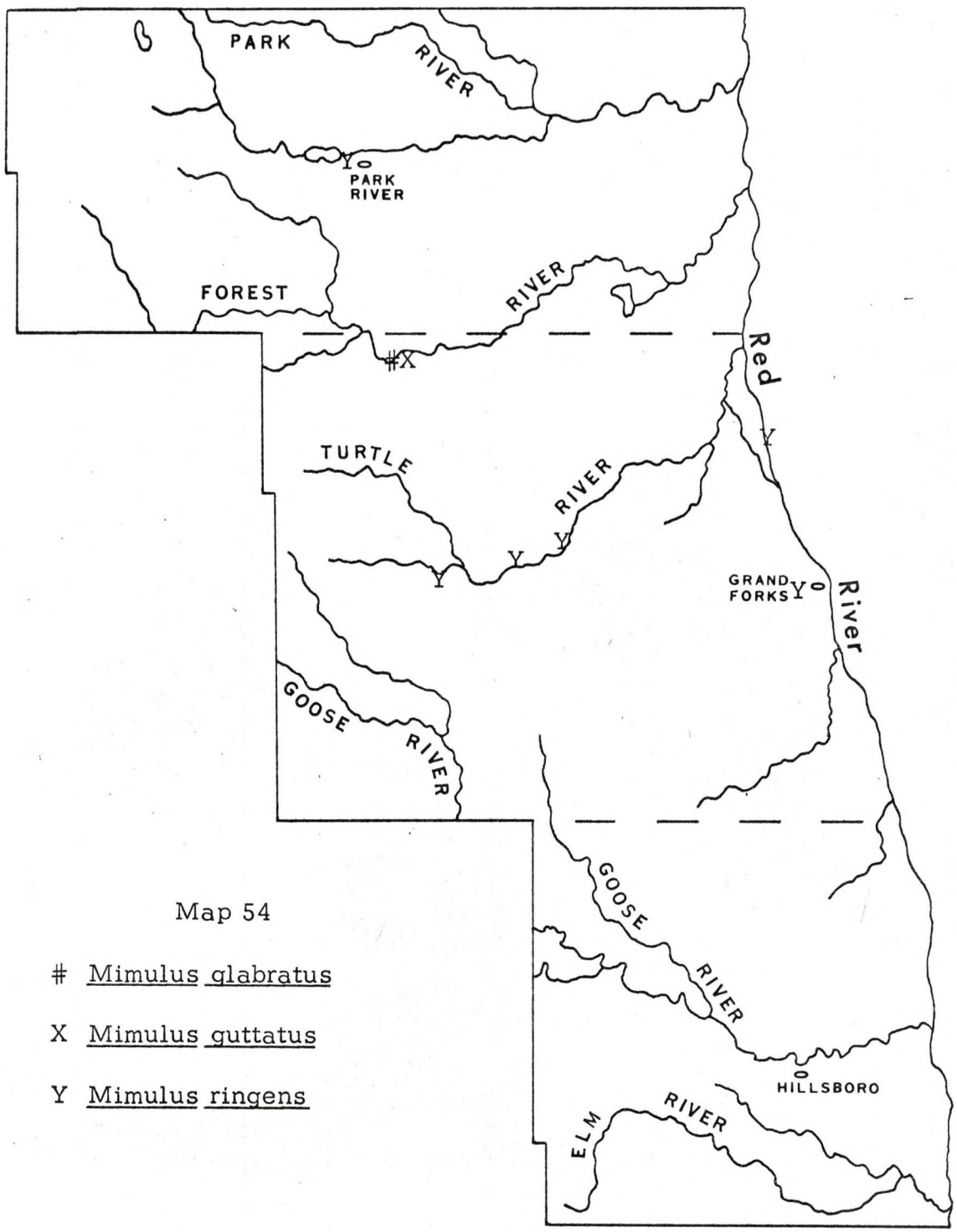
Map 53

\# Stachys palustris

X Lycopus americanus

Y Lycopus asper

Z Mentha arvensis

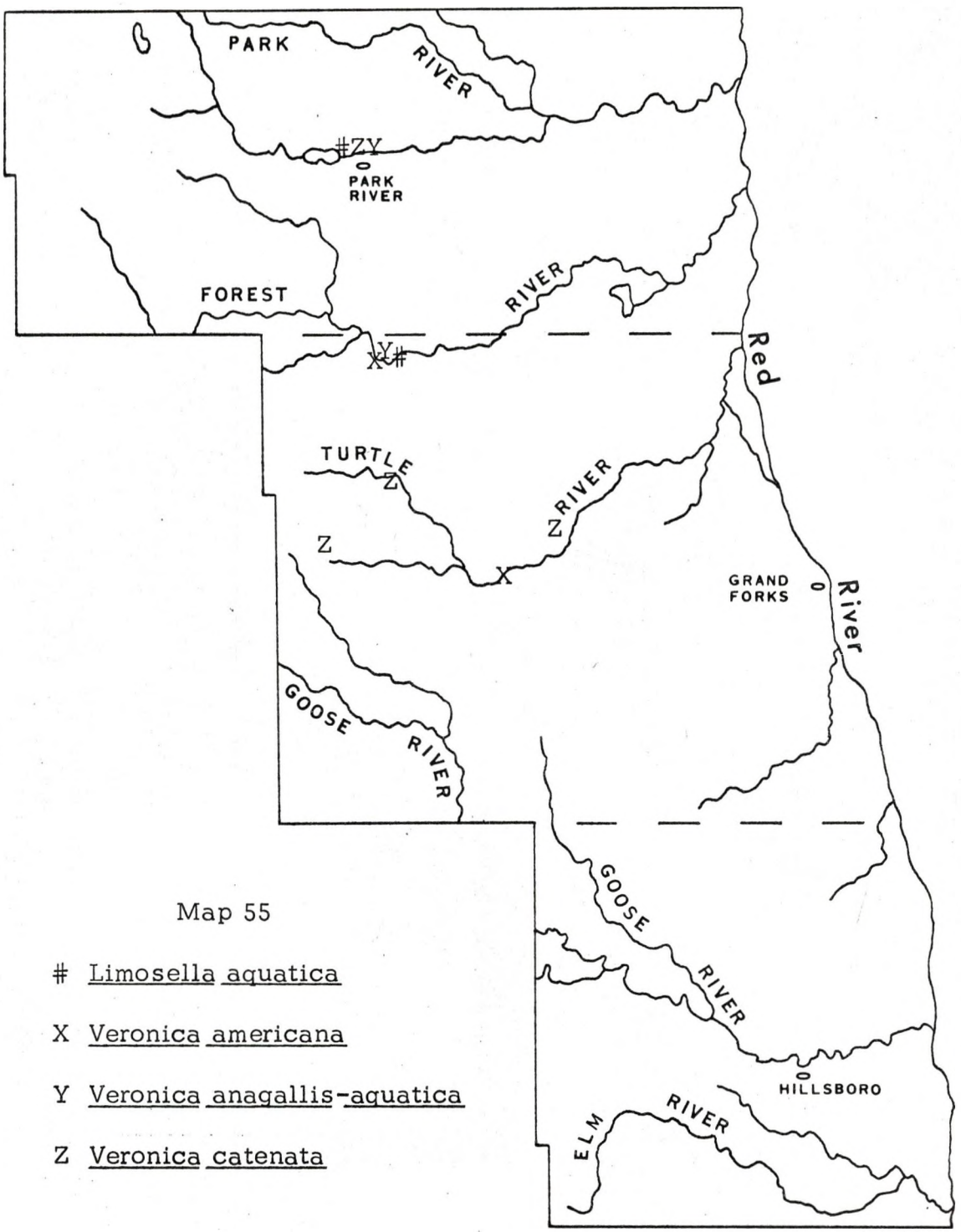


Map 54

\# Mimulus glabratus

X Mimulus guttatus

Y Mimulus ringens



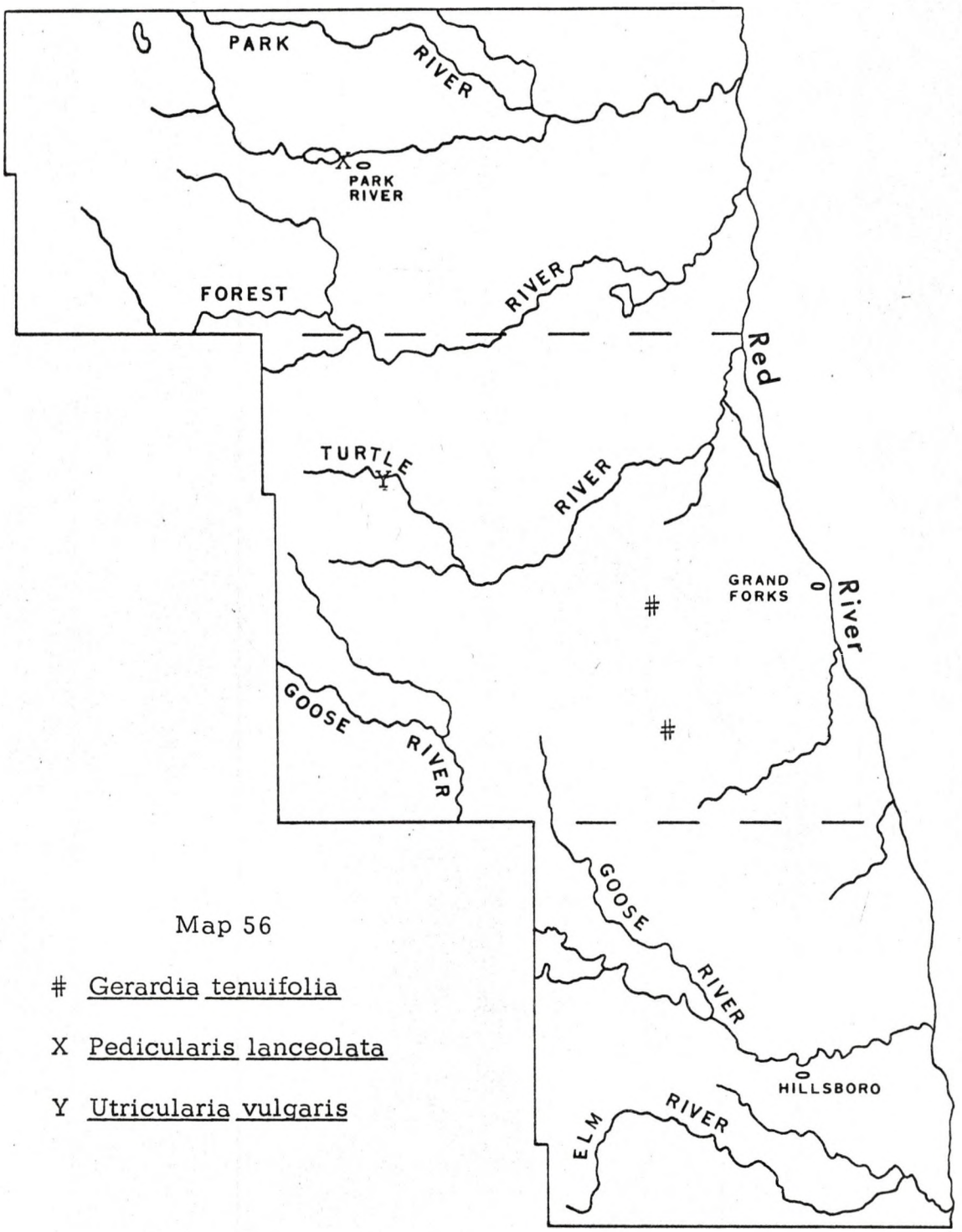
Map 55

\# Limosella aquatica

X Veronica americana

Y Veronica anagallis-aquatica

Z Veronica catenata

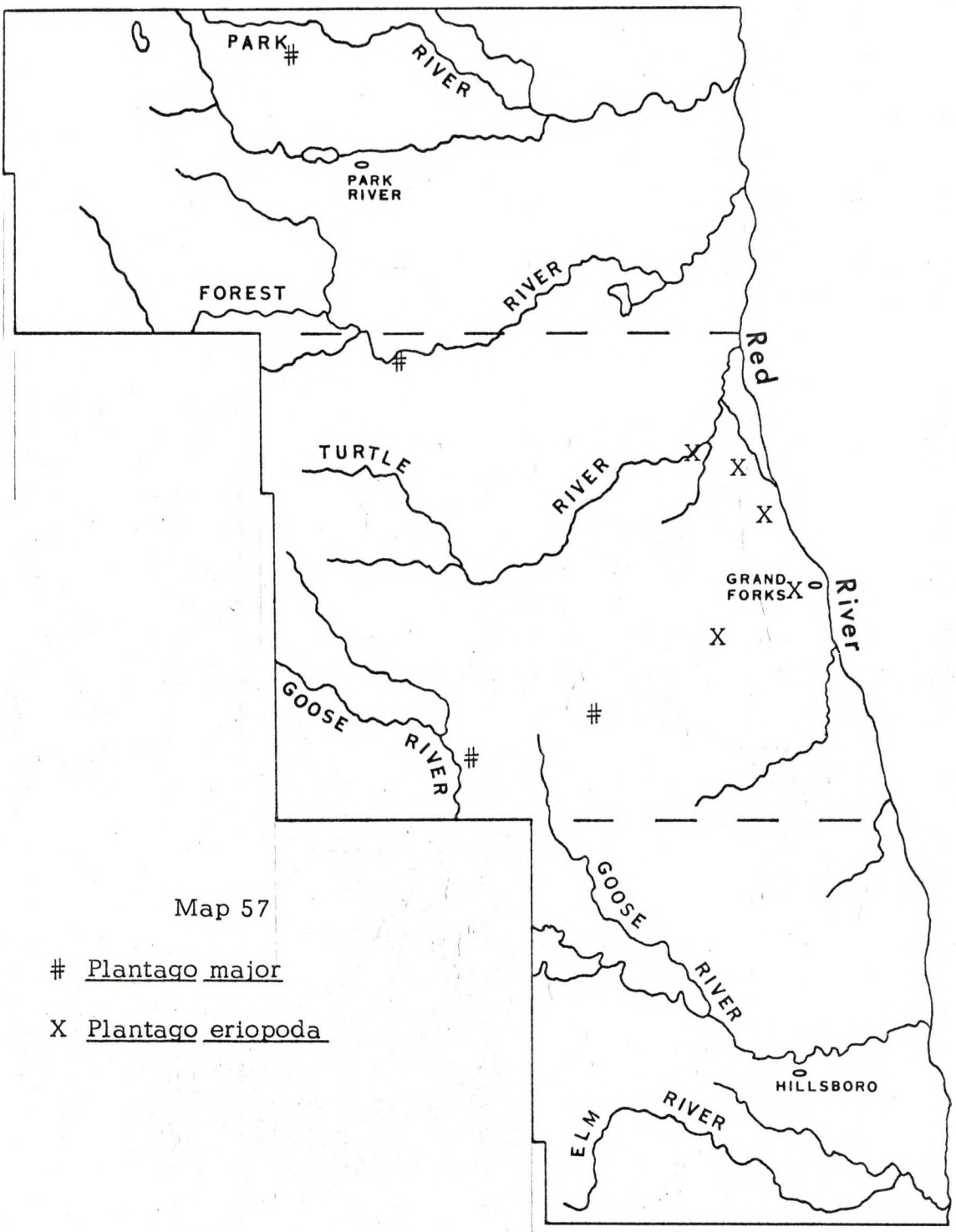


Map 56

\# Gerardia tenuifolia

X Pedicularis lanceolata

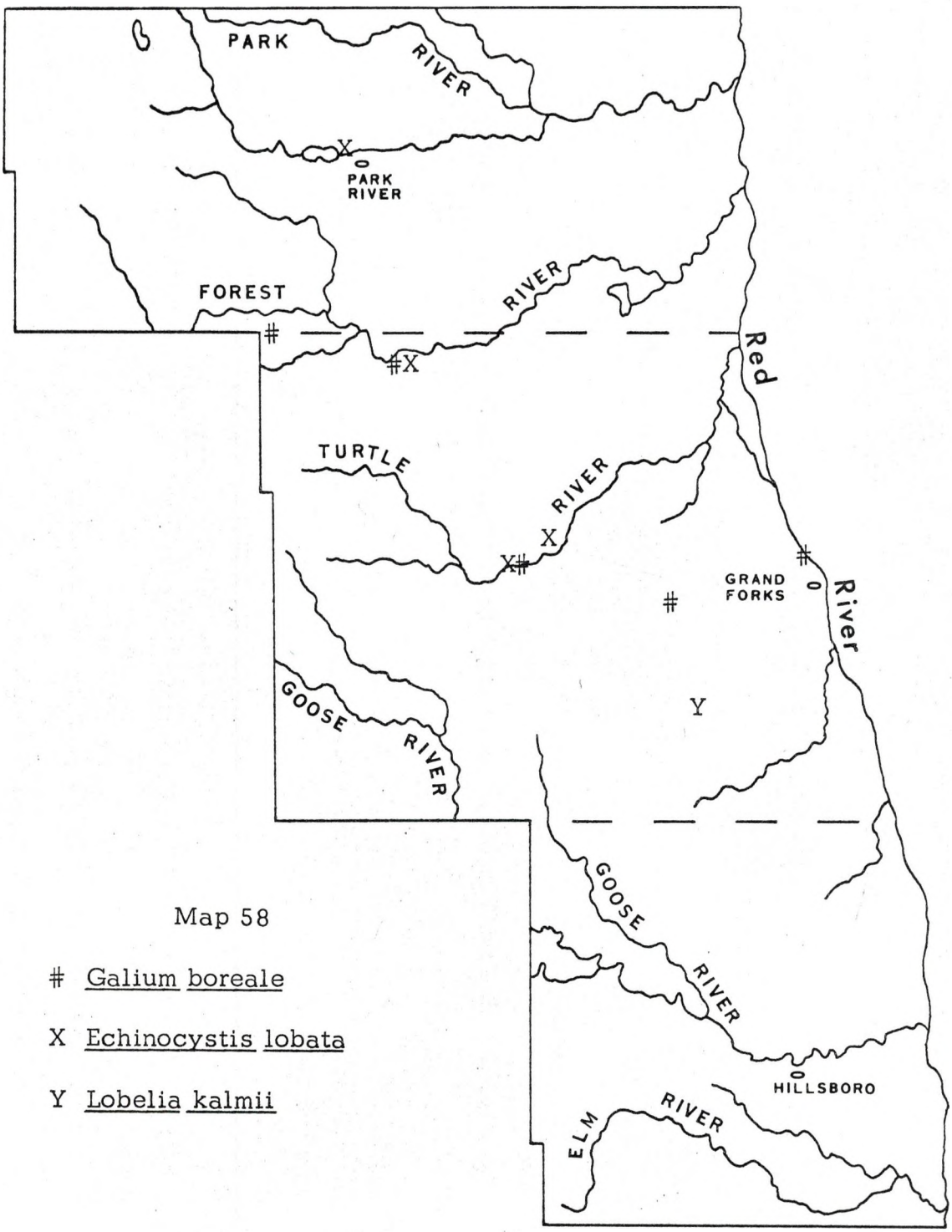
Y Utricularia vulgaris



Map 57

\# Plantago major

X Plantago eriopoda

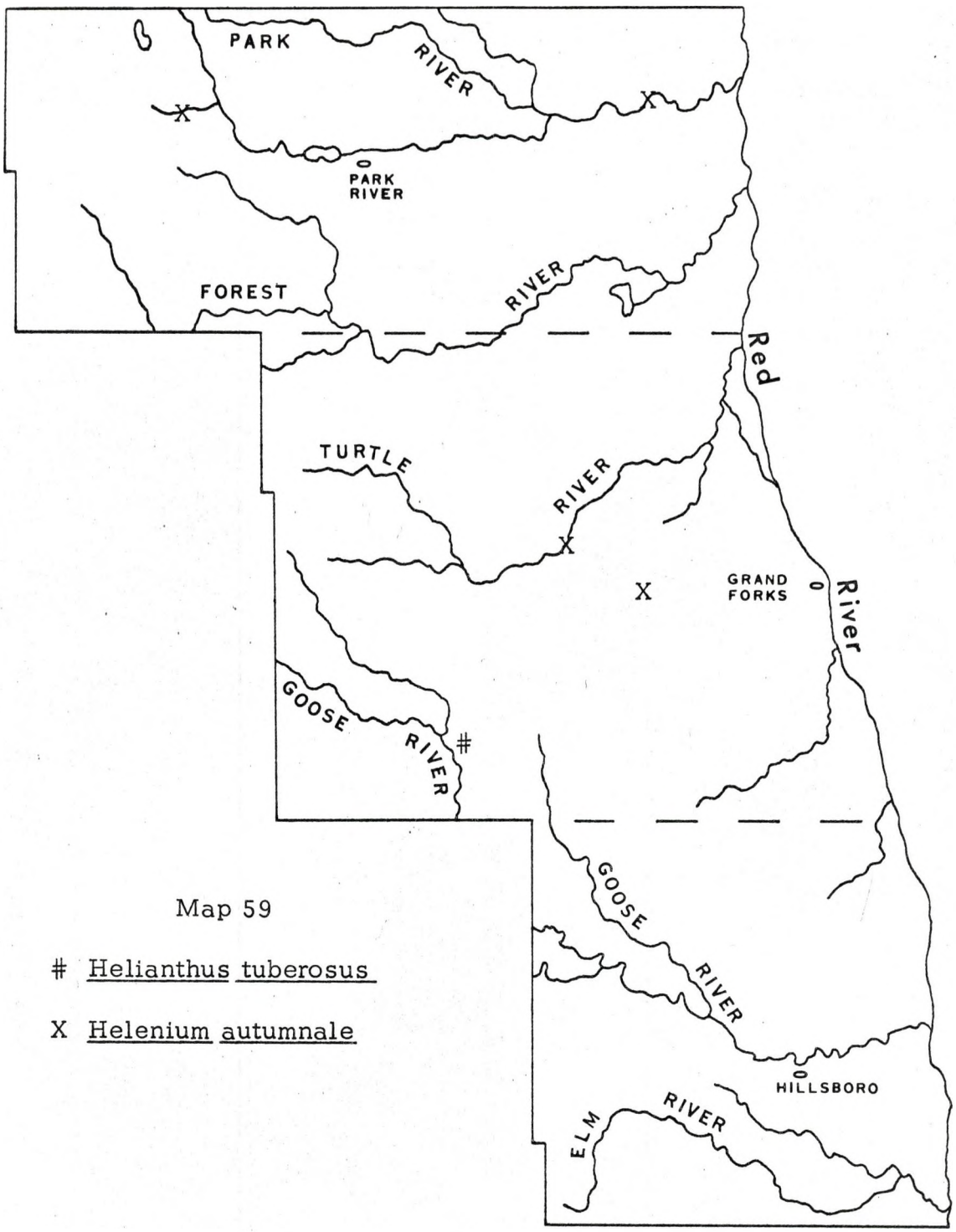


Map 58

\# Galium boreale

X Echinocystis lobata

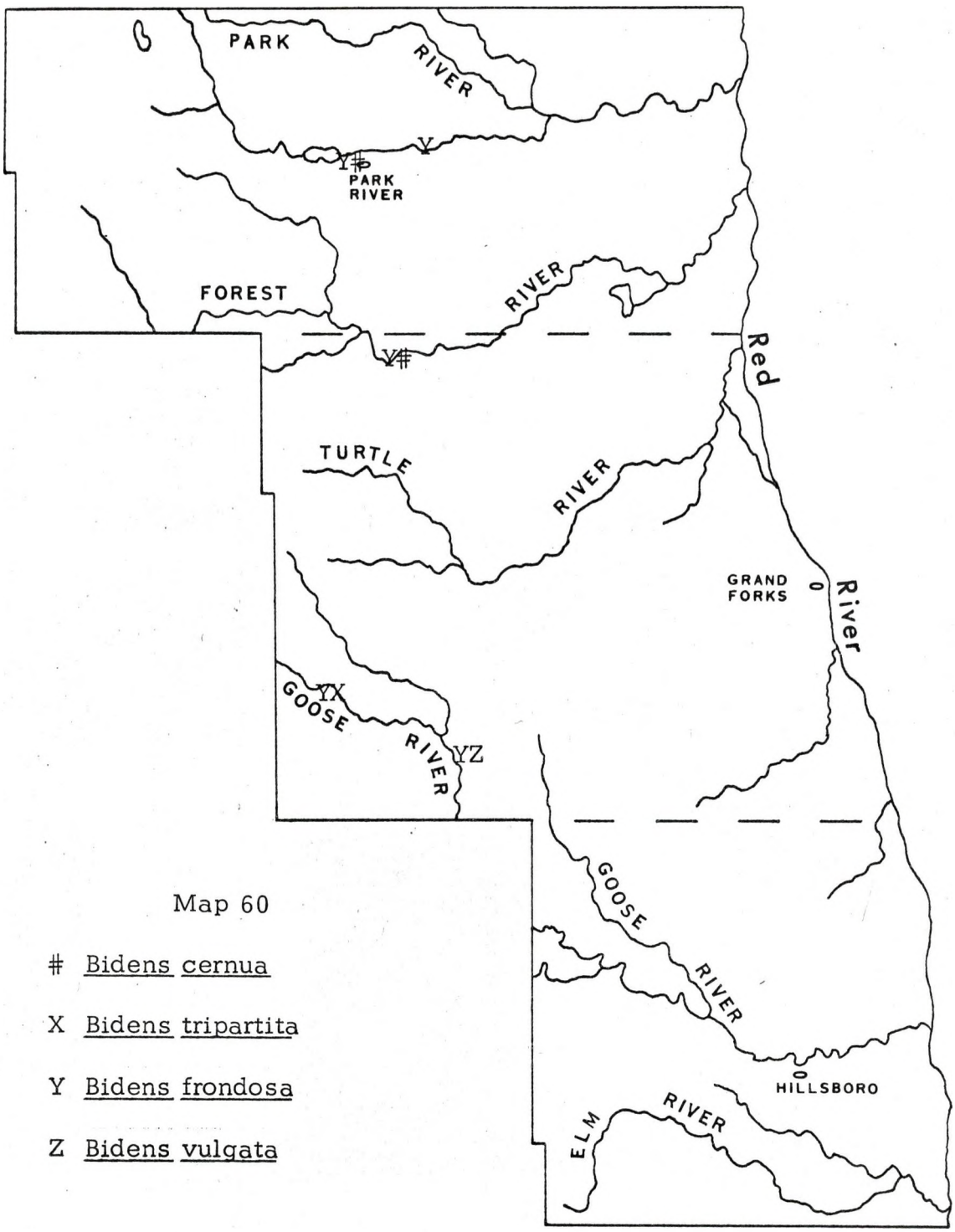
Y Lobelia kalmii



Map 59

Helianthus tuberosus

X Helenium autumnale



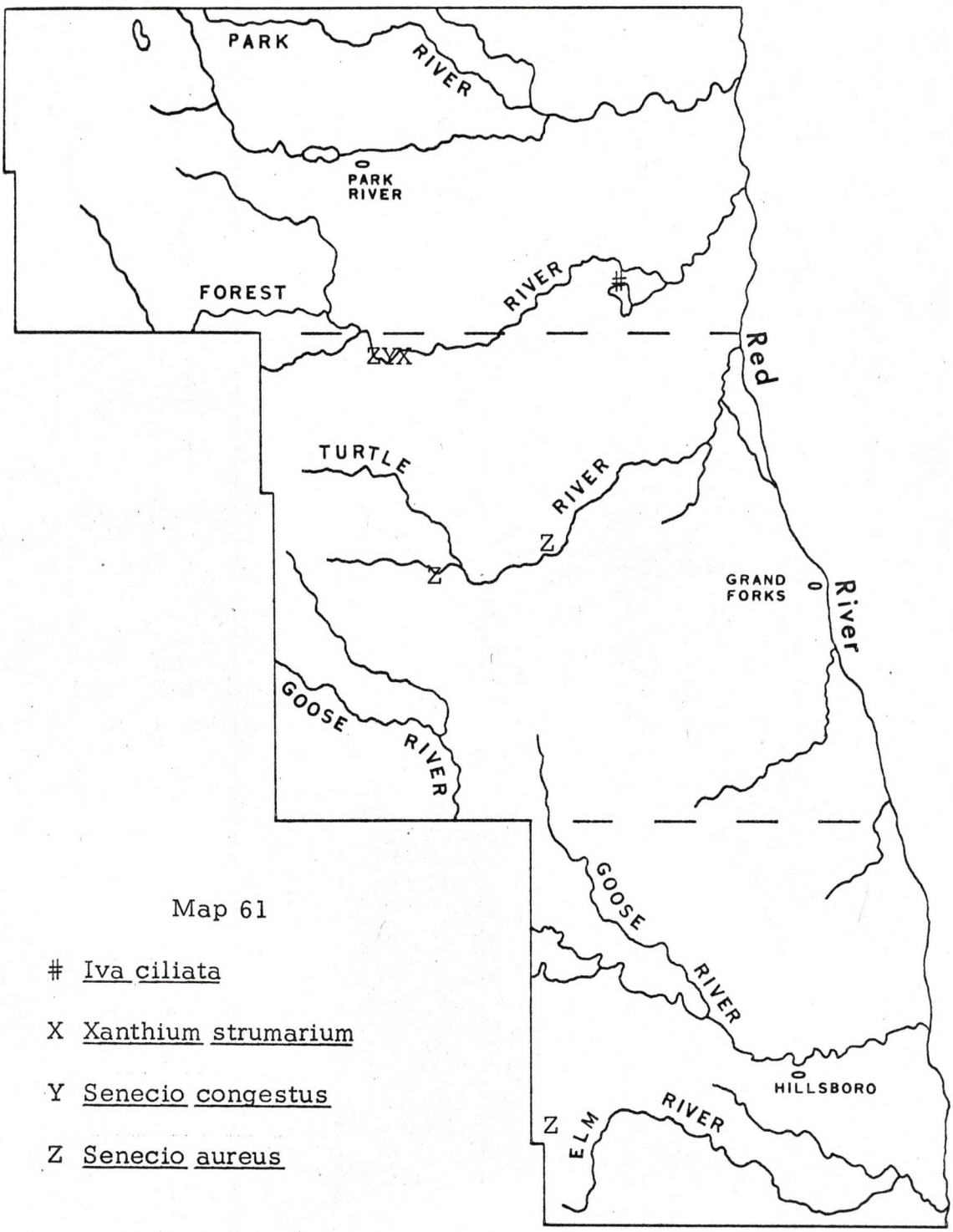
Map 60

\# Bidens cernua

X Bidens tripartita

Y Bidens frondosa

Z Bidens vulgata



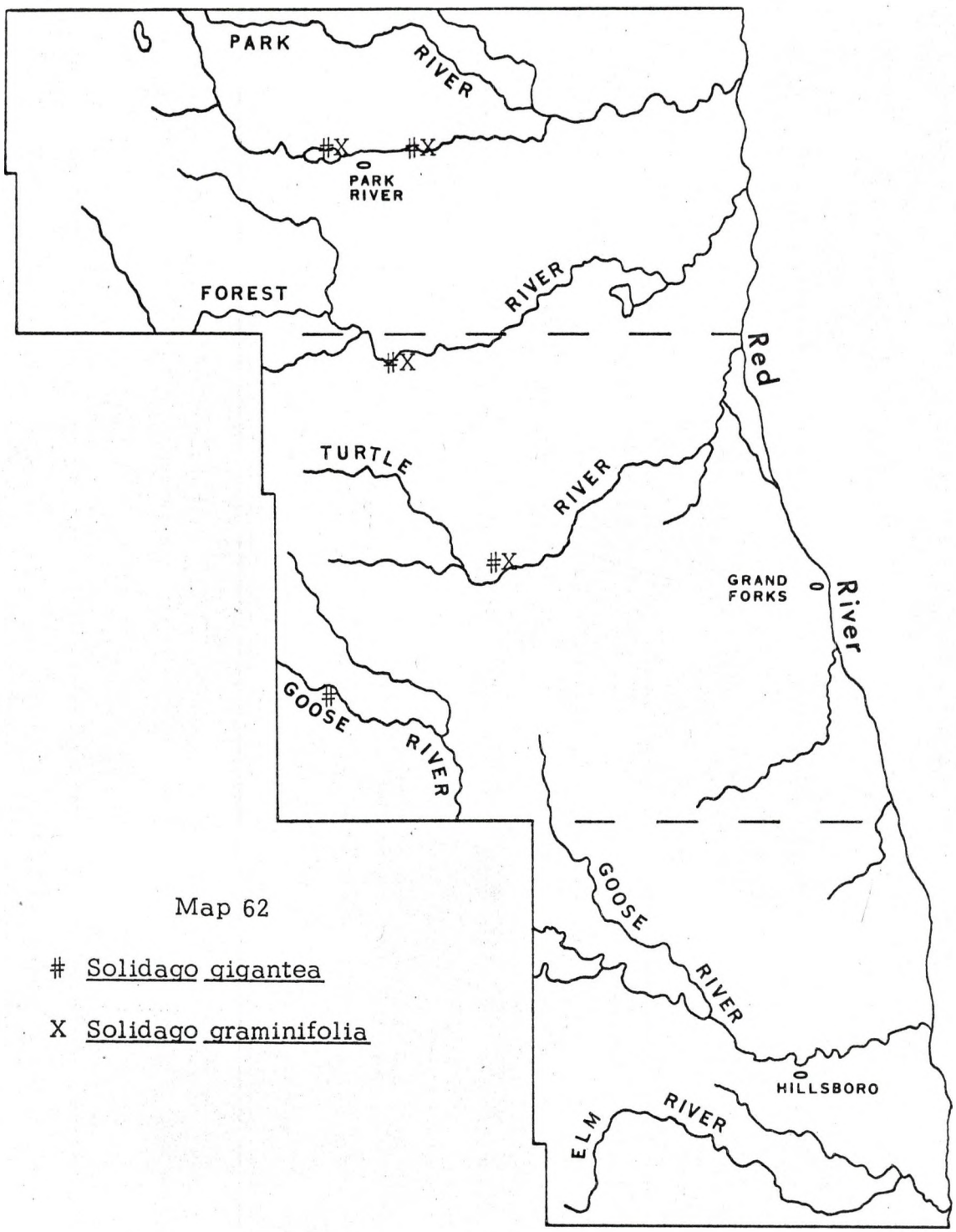
Map 61

\# Iva ciliata

X Xanthium strumarium

Y Senecio congestus

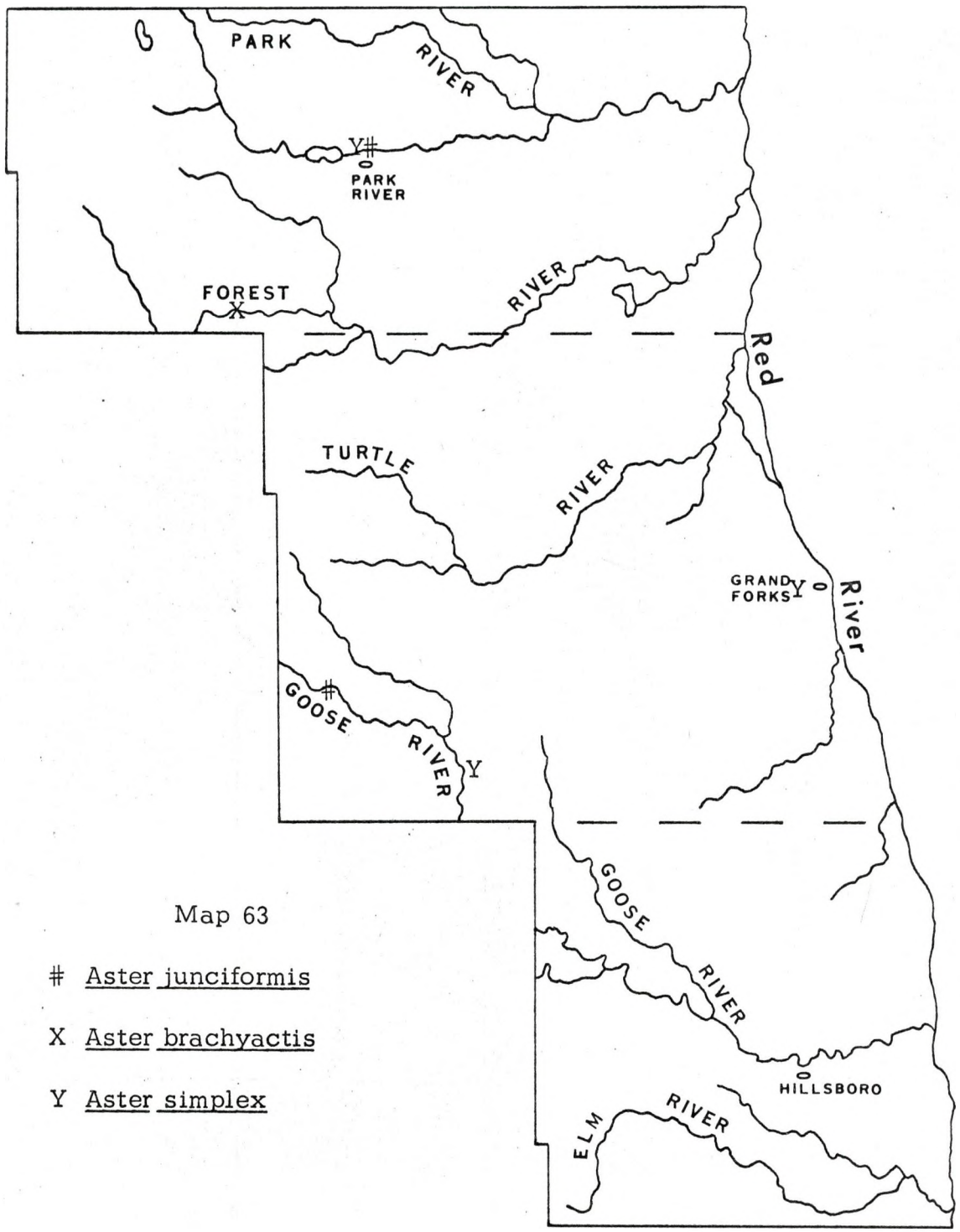
Z Senecio aureus



Map 62

\# Solidago gigantea

X Solidago graminifolia

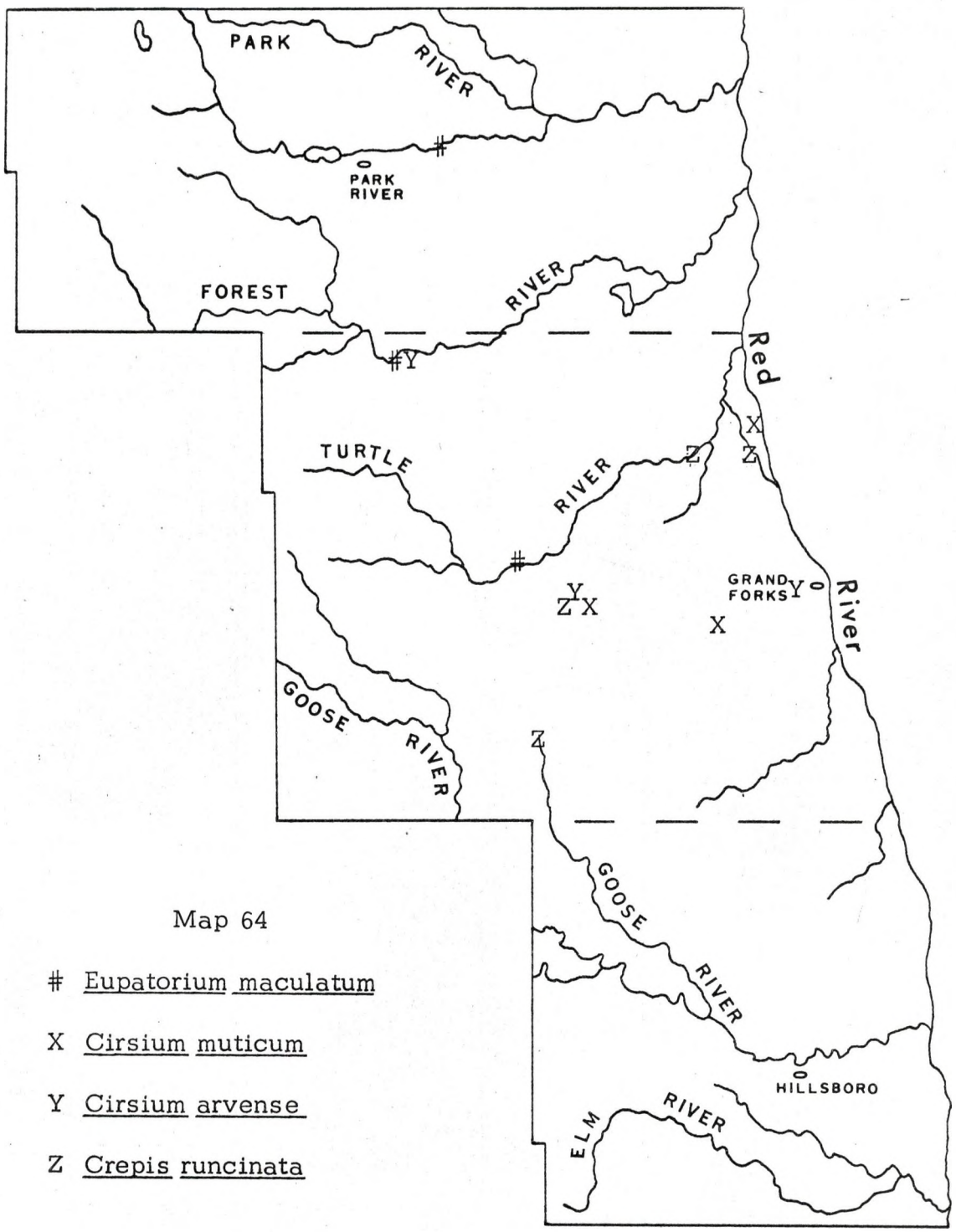


Map 63

\# Aster junciformis

X Aster brachyactis

Y Aster simplex



Map 64

\# Eupatorium maculatum

X Cirsium muticum

Y Cirsium arvense

Z Crepis runcinata

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