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January 13, 2000

Mr. David Boergers, Secretary
Federal Energy Regulatory Commission
888 1st Street, NE
Washington, D.C. 20426

Re: Purple Loosestrife Monitoring Report for Shawano Hydro Project No.710 -025

Dear Secretary Boergers:

Enclosed are four (4) copies of the Purple Loosestrife Monitoring Report for the Shawano Hydro Project in Shawano, Wisconsin. The report describes the purple loosestrife monitoring and removal work conducted in 1999 within the reservoir between the Shawano dam and the bridge in Keshena. The report is being submitted to you in accordance with the FERC Order Modifying and Approving Purple Loosestrife Monitoring Plan, issued May 3, 1999.

On November 17, 1999, copies of the report were submitted to staff from the Fish & Wildlife Service, Menominee Indian Tribe of Wisconsin, and the Wisconsin Department of Natural Resources. No comments have been received regarding the report.

If you have questions or comments regarding the enclosed report, please contact me at (608) 252-0592.

Sincerely,


Linda Lynch

Cc: (no enclosures)
Linda Hinseth - Alliant Energy
Jim Fossum - Fish & Wildlife Service
Doug Cox - Menominee Indian Tribe of Wisconsin
Charmaine Robaidek - Wisconsin Department of Natural Resources

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**Purple Loosestrife Monitoring Report
Shawano Hydroelectric Project
FERC Project No. 710-003**

Prepared for:

**Alliant Energy
Shawano, Wisconsin**

Prepared by:

**MEAD
HUNT** ENGINEERS
ARCHITECTS
SCIENTISTS
PLANNERS

October 1999

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Purple Loosestrife Monitoring Project

Shawano Hydroelectric Project

FERC Project No. 710-003

1. Survey Methods

The Shawano Hydroelectric Project on the Wolf River was surveyed for purple loosestrife (*Lythrum salicaria*) on July 14, 1999, in the company of Menominee tribal staff. The purpose of the visit was to monitor and document the existence of purple loosestrife as directed under the Federal Energy Regulatory Commission (FERC) license for the project. The survey team included a wetland ecologist and a water quality specialist from Mead & Hunt, Inc., and a representative from Alliant Power. The wetland ecologist had also participated in the August 1991 terrestrial vegetation and macrophyte survey, a licensing study that first mapped purple loosestrife at the project (see *Appendix A*). During the 1999 survey, loosestrife plants were in full bloom and easily recognized by the survey team. The entire shoreline of the project upstream of the dam was surveyed by slowly motoring a boat along the shore. Downstream of the dam, the shoreline was surveyed on foot for a distance of approximately 600 feet. Plant locations were marked directly on a 1":500' (1:6000) scale map of the project (*Appendix A*). The source for the map was the 1:24000 U.S. Geological Survey digital raster graph (DRG), of the project area. The DRG files are digital versions of the USGS paper quad maps.

The areas of four large stands located during the survey were visually estimated and their relative cover measured by at least three random samples in each stand (**Table 1**). For each sample, cover was visually estimated by blindly tossing a 1-meter long angle-iron and assigning one of seven cover relevees to the sampled plot. A relevee is a visually-detectable class of plant cover, on a percentage basis, that is used to estimate total herbaceous plant cover within a sample plot. The total number of plants and stems in each plot was counted and notes were taken on other vegetation within the plot. For comparative purposes, one spot occurrence of loosestrife was also sampled by this method, in order to document the typical cover characteristics of a single mature plant.

**Purple Loosestrife
Sample Plot Data**

Location	Sample Plot	Cover Class	No. of Plants	No. of Stems	Stand Area ft ²	Plant Associates
1	A	3	1	9	N/A	Myosotis scorpioides Carex scoparia Impatiens biflora Eupatorium perfoliatum
2	A	4	4	55		Oenothera biennis Asclepias incarnata Typha latifolia
	B	2	1	6	1,250	Helenium autumnale Carex spp. I. biflora
	C	1	1	2		Carex spp.

Location	Sample Plot	Cover Class	No. of Plants	No. of Stems	Stand Area ft ²	Plant Associates
3	A	4	18	35	12,000	Leersia oryzoides E. perfoliatum
	B	1	1	1		Urtica dioica Carex spp.
	C	4	1	16		U. dioica Boehmeria cylindrica I. biflora Sagittaria latifolia Carex comosa
	D	6	8	51		Carex sp. I. biflora
4	A	4	4	14	15,000	B. cylindrica Scirpus cyperinus Carex sp.
	B	3	3	22		S. cyperinus B. cylindrica
	C	5	8	45		B. cylindrica
5	A	2	3	7	8,000	U. dioica
	B	4	15	38		L. oryzoides
	C	6	3	43		I. biflora U. dioica

Cover classes: 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0);
() = midpoint value 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0)

Physical removal of purple loosestrife spot populations was attempted at three locations shown on the survey map in *Appendix A*. Plants were pulled by hand, bagged in plastic and disposed of at the Dane County landfill near Madison, Wisconsin.

2. Field Observations

Purple loosestrife was relatively widespread at the project, mostly as spot occurrences below the ordinary high water mark (OHWM) which is about 1 foot above the water surface elevation established by the dam crest. Spot occurrences were considered to be discreet populations of plants less than ten feet square and occurring at least thirty feet apart. Three stands (2,3 and 4) were mapped where only spot occurrences had been noted in 1992 (*Appendix A*). Stand 5 remained unchanged from 1992 while upstream from stand 5, only spot occurrences were noted where two relatively large stands had been mapped in 1992. All stands were found in wetland habitats. The total estimated area of the four stands is 49,500 square feet or 1.14 acres. Generally, the major difference between the two surveys was the smaller number of stands and the larger number of spot occurrences noted in the 1999 survey.

The occurrence of purple loosestrife appears to be controlled by the small amount of wet soil habitat under the OHWM in the impoundment and competition from upland vegetation. In steeper shoreline areas, the low OHWM limits the area available to the plant and shading and competition from upland trees and understory vegetation become limiting factors. In these situations, purple loosestrife occurs as

spot populations with a cover value of about 20 percent on a square-meter basis. In flatter, wetland areas in the middle and upper reaches of the impoundment more loosestrife habitat is available and it is in these areas that the stands are found. Cover values of plots within the stands varied from 5 to 95 percent, with an average value for all plots of approximately 40 percent. Within plots, cover values of 40 percent or more were associated with low plant and high stem counts. This demonstrates that loosestrife coverage within the stands is discontinuous and that high cover value is due to older plants with many stems. The loosestrife plants in stands were observed growing in available spaces between wet meadow vegetation, with the most common associated species being nettles (*Urtica dioica*), or native sedges (*Carex spp.*, *Scirpus spp.*).

3. Brochure Posting

Two public boat landings were posted with the FWS purple loosestrife brochure. The boat landings are on opposite shores of the impoundment, approximately 3/4 mile upstream of the dam (*Appendix A*). At each landing, a sample brochure was encased in weather-proof plastic and posted on a 4-inch by 4-inch post of treated wood. On the post beneath the sample brochure, a supply of additional brochures is contained within a weather-proof letter box. The position of each post was optimized by placing them close to the right-hand side of the landing approach, so that a driver backing down a boat trailer would not fail to notice them.

4. Removal Measures

Physical removal of spot populations was attempted at several locations (*Appendix A*). These locations covered the range of soil conditions over which the plant occurred; namely wet, fluvial sands, mucky peat and dry, upland banks of consolidated, sandy/gravelly loams. Plants in all locations were pulled by hand and immediately bagged in black plastic garbage bags. Shovels were not used because of the high probability that the tool would cut roots off, thereby multiplying the population and negating any benefits of the control effort.

The ease and effectiveness of removal and the amount of disturbance caused varied greatly between the three conditions. In wet sands, plants were smaller and their root systems lifted out relatively easily with little attached sediments. In mucky peat, plants were much larger and when pulled out had very large root systems that retained a great deal of soil and native plant sod. In some cases, the diameter of the retained sod exceeded two feet and approached forty pounds in weight. It was necessary to wash off the native plants and soil in order to securely bag and transport the plants from the project. Removal under these conditions caused a great deal of disturbance to the native plant community and substrate. In dry, upland soils removal was very difficult due to the hard, compacted nature of the substrate. Many plants broke off at or below the surface, leaving roots intact. As these sites were on steep banks, removal with shovels would have caused a great deal of damage to the physical integrity of the bank vegetation and allowed erosion to occur.

5. Conclusions

Over the eight years since the last purple loosestrife survey the distribution of the weed changed significantly in terms of the number of spot populations. Spot populations were much more prevalent over the length of the project between the dam and the bridge upstream in Keshena. In contrast, the total area covered by stand populations decreased, with two large stands of loosestrife downstream of the

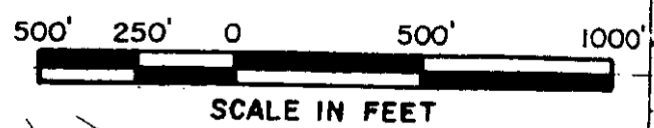
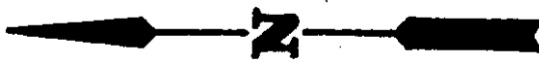
Keshena bridge disappearing while three smaller stands appeared farther downstream. The total estimated area of the four remaining stands is 36,250 square feet or approximately 0.83 acres.

All plants were found within about one foot of the headwater elevation, generally at or below the OHWM. Stand populations were all within wetland habitats. The largest plants were also found within wetlands on soils with high organic matter content. Average cover within stands was twice that within spot populations (40 percent versus 20 percent), and stands commonly had other weeds such as nettle or native sedges growing within them. Within stands, high cover values of 40 percent or more were associated with low plant and high stem counts, indicating that stand cover was maximized by increasing growth and maturation of older plants, rather than the establishment of new plants.

Overall, the amount of habitat available to loosestrife is limited by the small amount of wet soil habitat in the upper reaches of the project, the low OHWM which defines the vertical extent of any disturbed substrate, and the prevalence of steep, upland banks with competing vegetation in many areas. Near residences, lawn mowing may also be limiting the spread of loosestrife. The change in the number of spot populations over the last eight years is probably due to water transport of seed to bank upland habitats below the OHWM, since the occurrence of the plant is limited to below the OHWM even outside of residential lawns.

Mechanical control by hand pulling had limited effectiveness. While pulling plants in wet, fluvial sands was comparatively easy, pulling plants from muck disturbed a great deal of soil and native vegetation, perhaps enhancing conditions for loosestrife re-establishment. For each plant removed under these conditions, we estimate that over two square feet of substrate is disturbed. Plants on upland banks were very difficult to pull and often left roots behind. As mucky soils or upland banks comprise a large proportion of the total loosestrife population at the project, further efforts at hand removal is not recommended.

Appendix A. 1991 and 1999 Survey Maps



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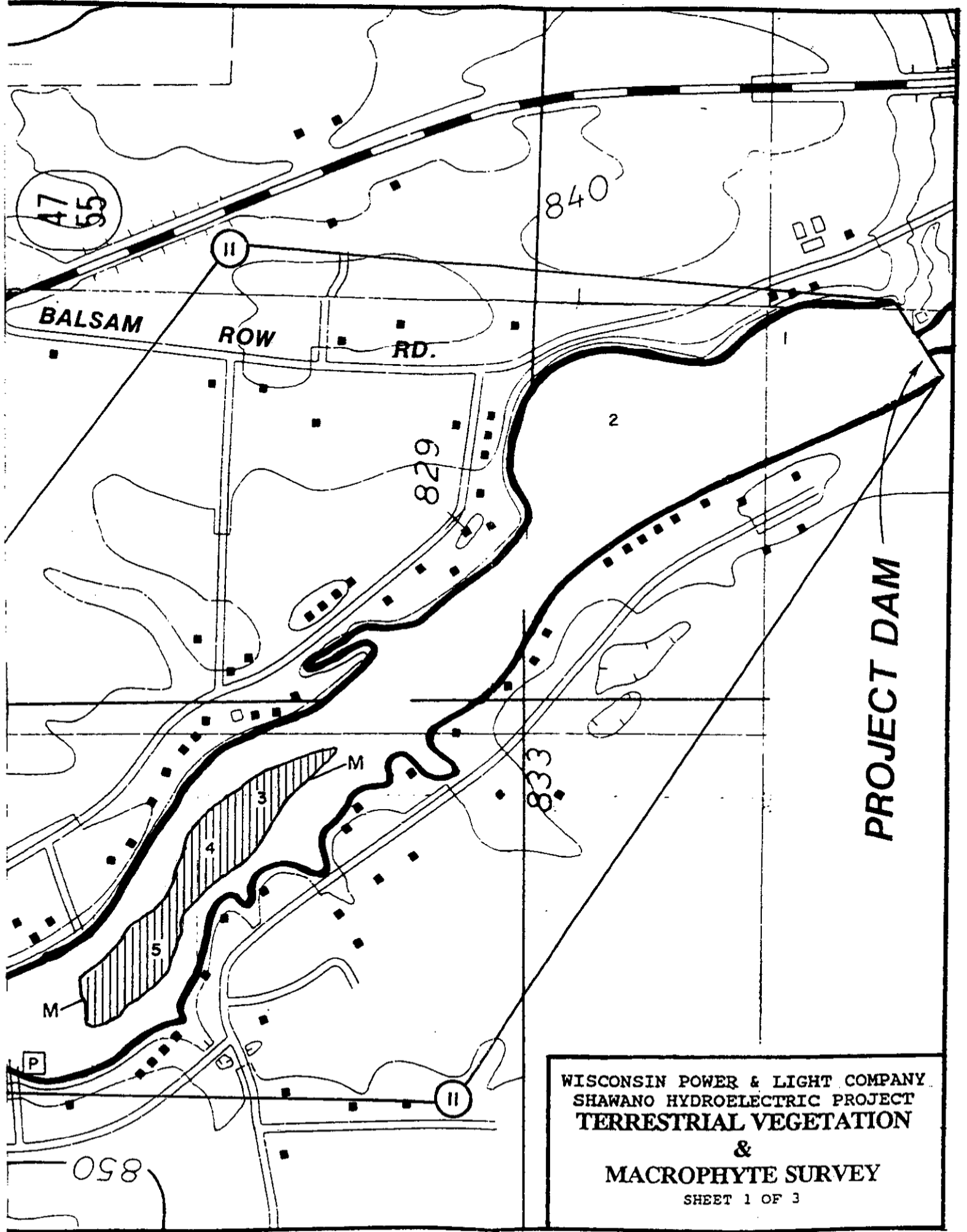
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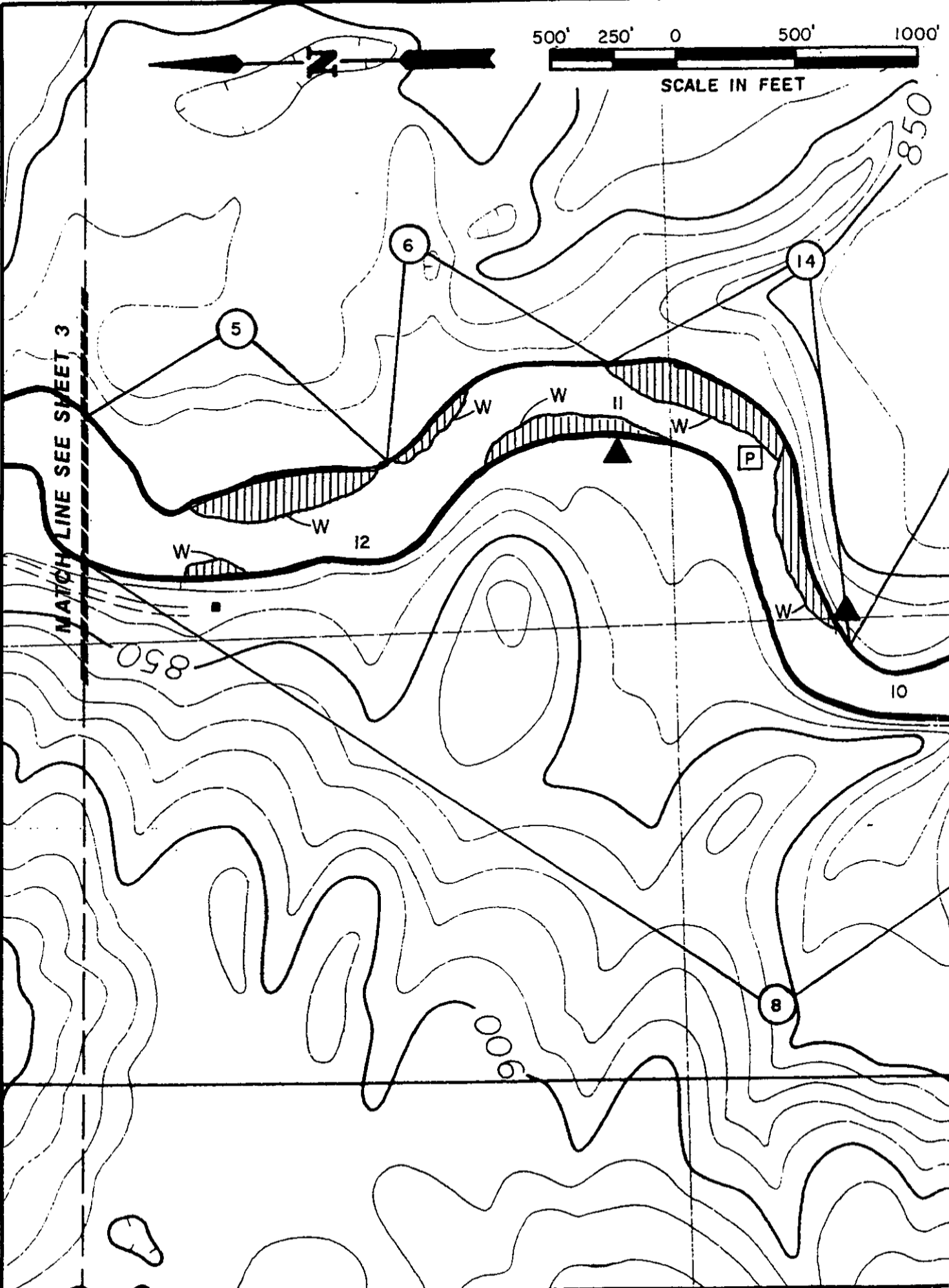
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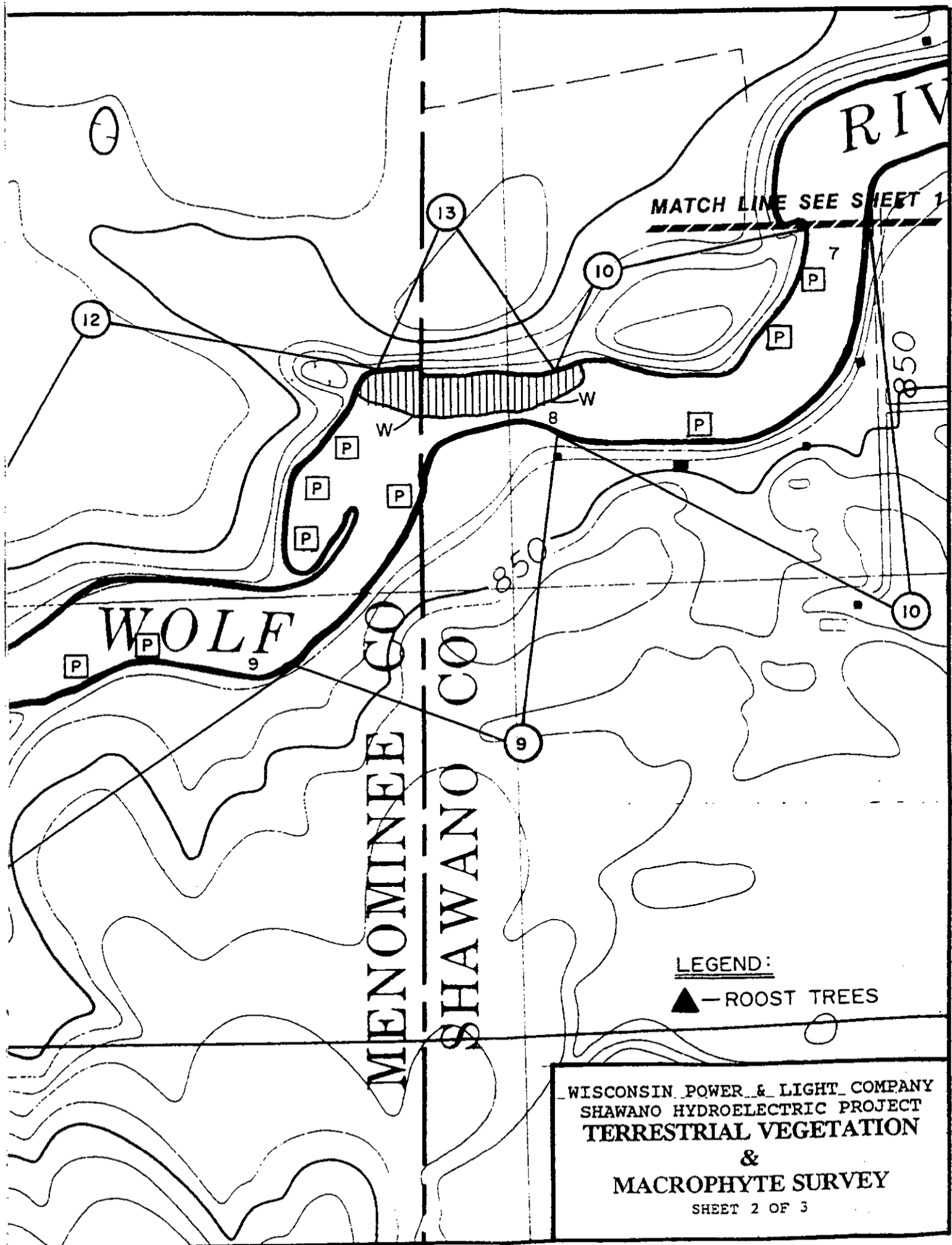


WISCONSIN POWER & LIGHT COMPANY
SHAWANO HYDROELECTRIC PROJECT
TERRESTRIAL VEGETATION
&
MACROPHYTE SURVEY
SHEET 1 OF 3



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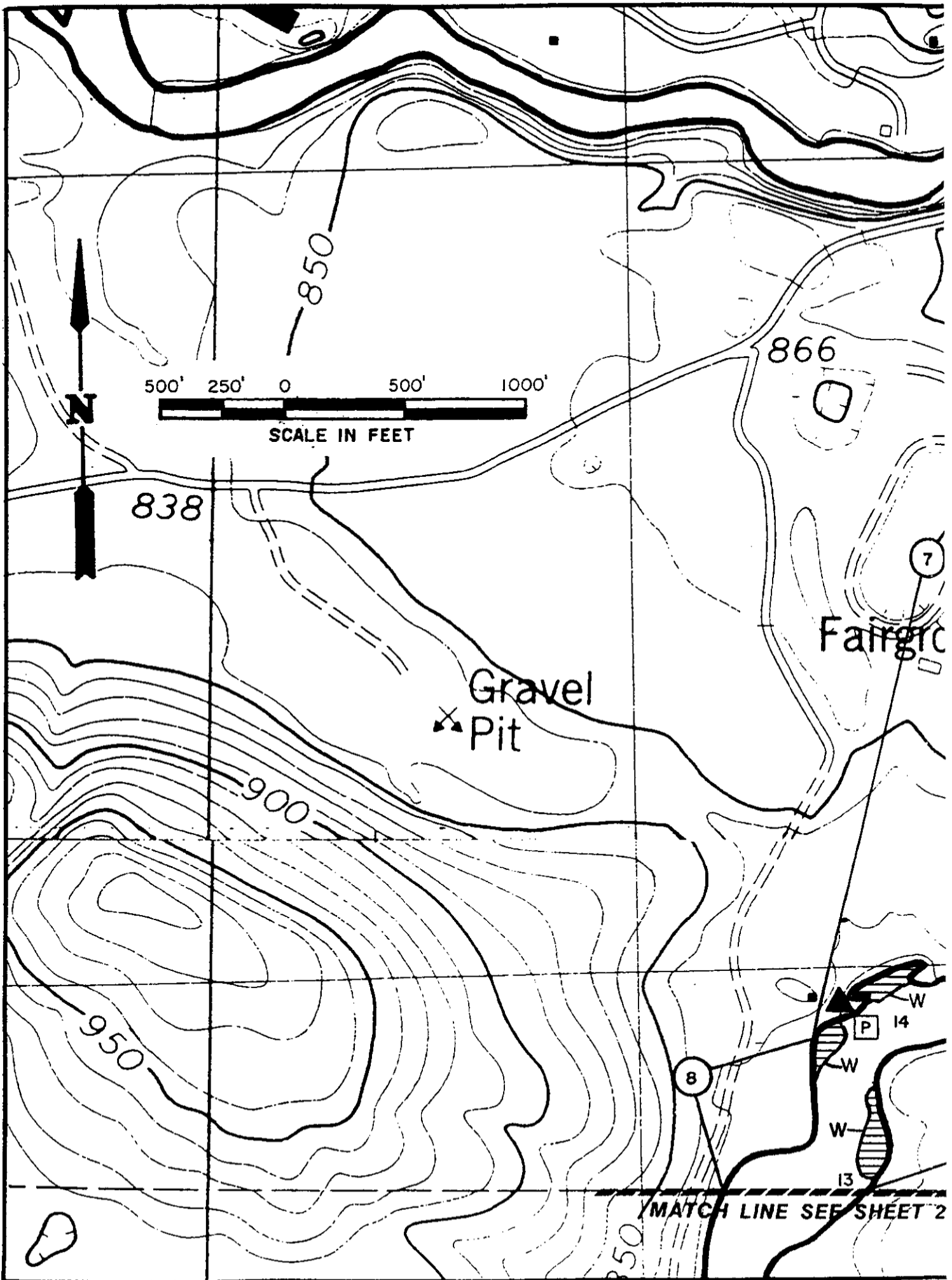


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WISCONSIN POWER & LIGHT COMPANY
SHAWANO HYDROELECTRIC PROJECT
TERRESTRIAL VEGETATION
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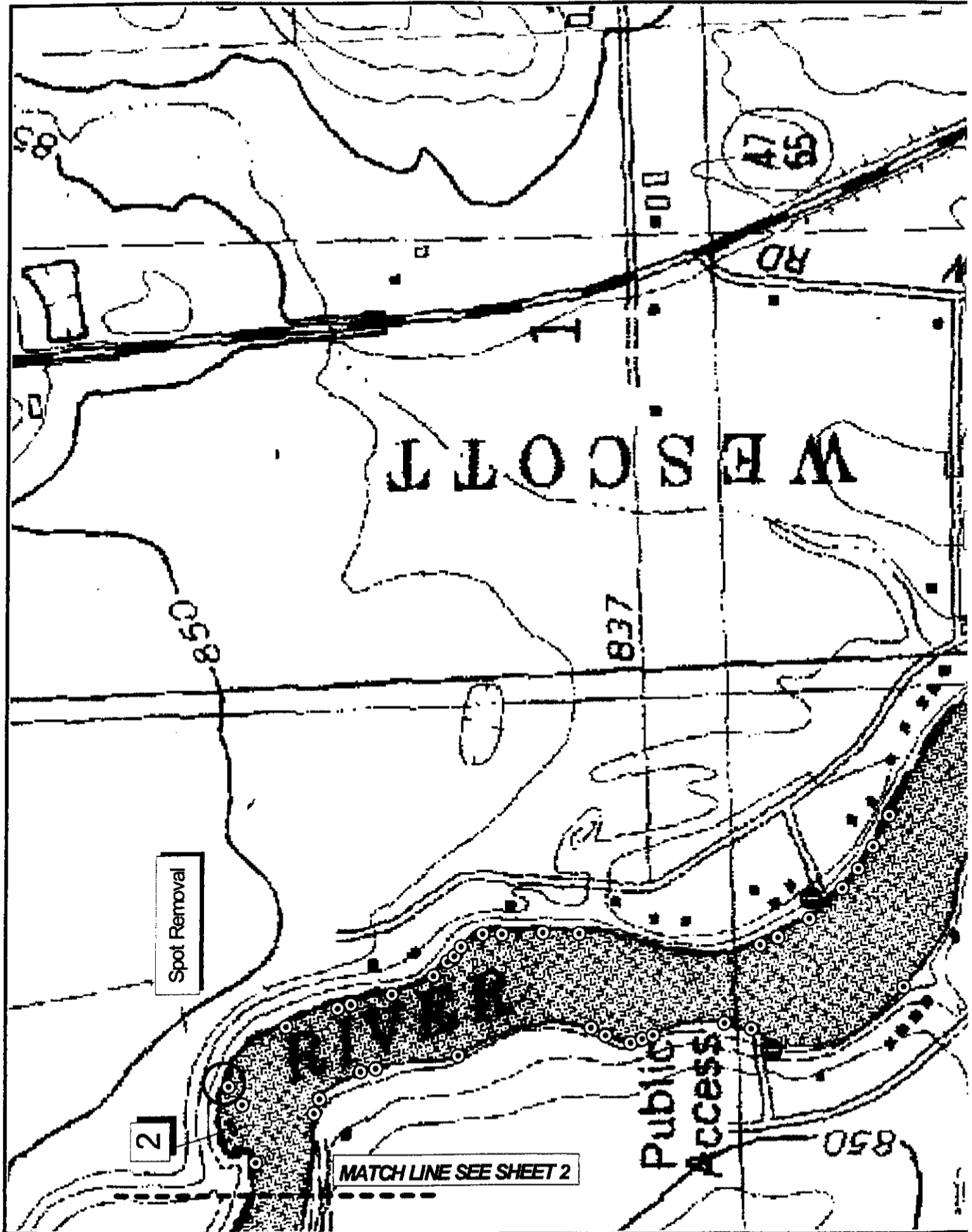
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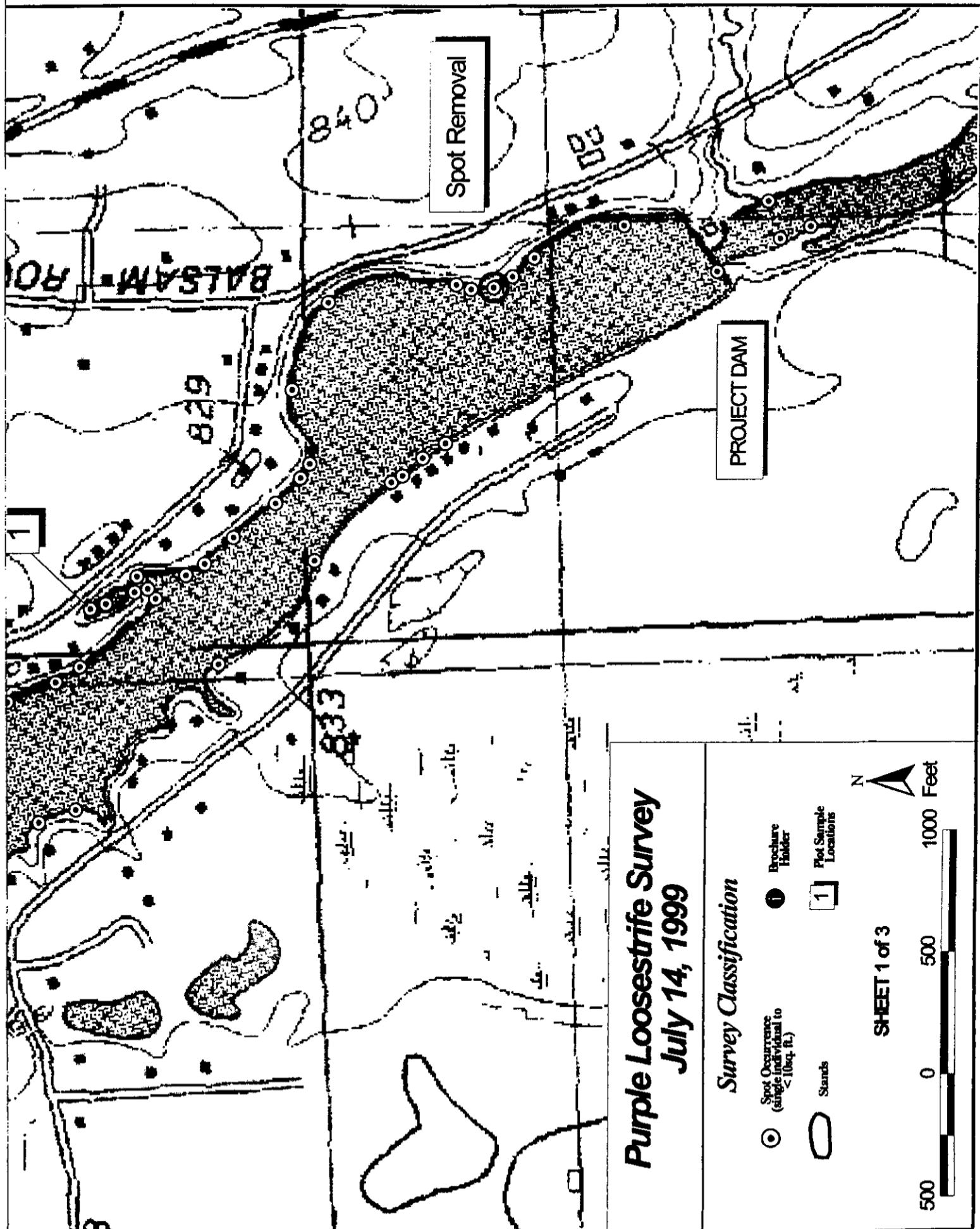
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Purple Loosestrife Survey

July 14, 1999

Survey Classification

- ⊙ Spot Occurrence (single individual to $< 1 \text{ lb.}</math>)$
- Prochore Holder
- Plot Sample Locations
- Stands



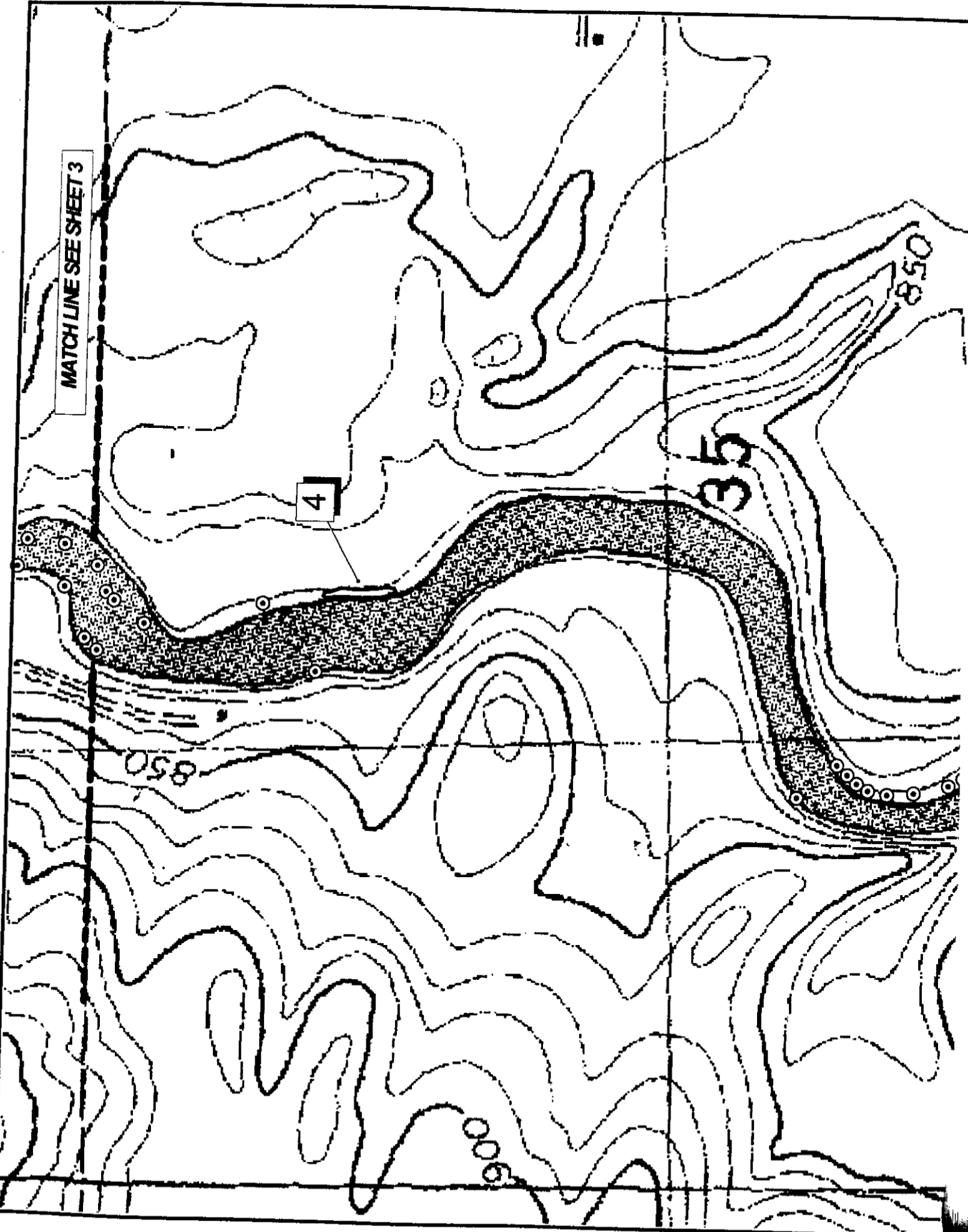
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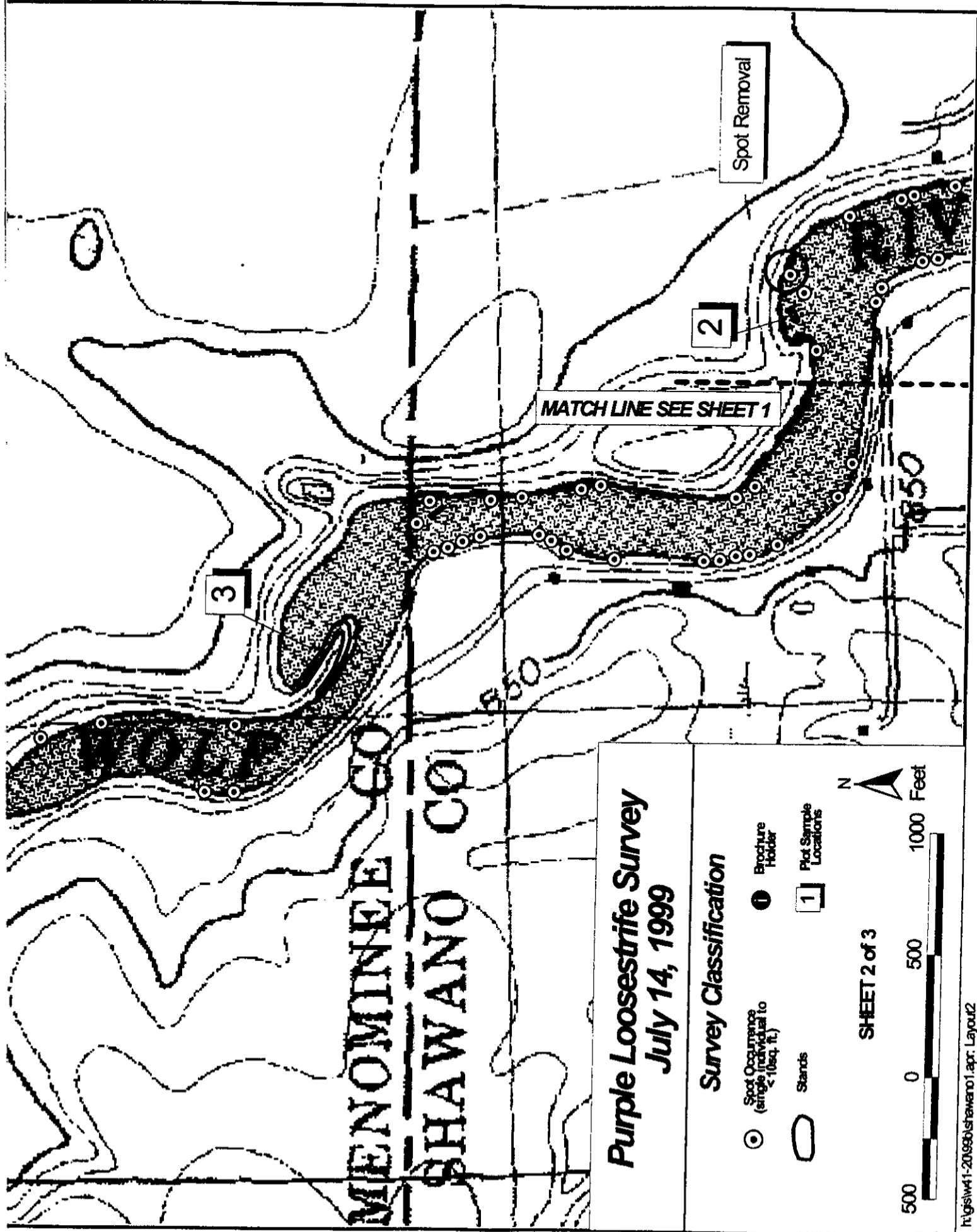
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Purple Loosestrife Survey
July 14, 1999

Survey Classification

- Spot Occurrence (single individual to $\leq 10\text{sq. ft.}$)
- Brochure Holder
- Stands
- Plot Sample Locations



SHEET 2 of 3

