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ORIGINAL

Ms. Janet M. Smith  
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Green Bay, WI 54311-8311

September 13, 2001

Ms. Julia Stephenson  
Department of Natural Resources  
473 Griffith Avenue  
Wisconsin Rapids, WI 54494

Dear Ms. Smith and Ms. Stephenson

Subject: Nekoosa Papers Inc.  
FERC Projects 2255, 2291 and 2292,  
Centralia, Port Edwards and Nekoosa Projects  
Purple Loosestrife Monitoring

Attached is a report for purple loosestrife monitoring as required by Article 408 for projects 2255 and 2291 and by Article 407 for project 2292. A single report for the three projects has been prepared.

The survey is required on an annual basis, but the reporting is due on a biennial basis. This is the year when the survey and report are required. The survey was performed substantially as described in the plan submitted to the FERC Secretary on January 13, 1997, and as approved by FERC on July 16, 1997. The 2001 survey was performed on August 9, 16 and 31.

The one exception of the actual survey to the plan was that NPI contacted Dr. Robert W. Freckman, curator of vascular plants from the University of Wisconsin-Steven Point to conduct the survey as opposed to using trained NPI employees.

If there are any questions, please feel free to contact me at (715) 887-5253

David K. Reinke  
Manager, Regulatory and Environmental Compliance

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cc: Ms. Peggy A. Harding  
Regional Director  
Federal Energy Regulatory Commission  
Chicago Regional Office  
230 South Dearborn Street  
Chicago, IL 60604

Mr. David P. Boergers, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, D.C. 20426

# PURPLE LOOSESTRIFE MONITORING SURVEY FOR 2001

prepared September 7, 2001 for

Domtar  
Environmental Department  
100 Wisconsin River Drive  
Port Edwards, WI 54469

by

Flark Associates, Inc.  
8221 100<sup>th</sup> Street South  
Wisconsin Rapids, Wisconsin 54494

Principal Investigator: Robert W. Freckmann, Ph. D.  
Curator of Vascular Plants  
University of Wisconsin – Stevens Point

## BACKGROUND:

During July and August, 1997, Flark Associates, Inc. conducted a survey for the occurrence of *Lythrum salicaria* L., purple loosestrife, within the project boundary lands as designated on the Nekoosa Papers, Inc. Project Boundary Location Drawings Numbers DC 305, DC 306, DC 307, DJ 2894, DJ 2740, and DN 2341. During that period the principal investigator covered on foot most of the west side of the Wisconsin River from Wisconsin Rapids through to the boundary area south of Nekoosa, as well as most of the east side of the Wisconsin River and the islands accessible by bridges. The smaller islands and outcroppings were surveyed by boat. The principal investigator made general notes on the vegetation and took black and white or color photographs at various locations to document either the general nature of the vegetation in areas free of purple loosestrife at that time, or to show representative areas of purple loosestrife infestations as of 1997. The locations of the purple loosestrife plants were marked on the Project Boundary Location Drawings and on a reduced photocopy of these drawings. The results of this survey were summarized in a report prepared on September 4, 1997 and submitted to Georgia-Pacific.

During July and August, 1998, the principal investigator conducted a survey for purple loosestrife within the same project boundary lands which were surveyed in 1997. One of the objectives of the 1998 survey was to duplicate the coverage of 1997 to eliminate variation due to methods so that the results would reflect actual changes in purple loosestrife distribution. The investigator carried copies of the drawings submitted with the previous report and marked 1998 purple loosestrife occurrences directly on these 1997 drawings. He also revisited sites where photographs were taken in 1997 and took new photographs for comparison. Any major changes in the vegetation at any site from 1997 to 1998 were noted. The only major part of the 1997 survey which was not repeated

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in 1998 was the survey by boat between the Nekoosa dam and the Port Edwards hydroelectric plant. This part of the Wisconsin River was surveyed by binoculars from shore in 1998.

One addition was made in the 1998 survey and in surveys of subsequent years. Several purple loosestrife populations were examined to determine whether the populations consisted of plants of all the same style length or of two or three style lengths, and to note indications of maturing seed. The flowers of purple loosestrife are composed of 5, 6, or 7 erect clawed petals surrounded by the same number of sepals, and these combine to form a tube. Nectar is produced at the base of this tube. Most insects visiting the flowers probe head-downward for the nectar while their head, thorax, and abdomen typically contact anthers or stigmas. A purple loosestrife plant can have one of three arrangements of anthers and stigmas. A short-styled plant has the stigma at a level which is apt to contact the head of a typical pollinator and pick up any pollen present on the insect's head. Half of the 10-14 anthers are on medium length filaments and tend to deposit pollen on the thorax of the insect; the other half of the anthers are on long filaments and tend to deposit pollen on the abdomen. A medium-styled plant has stigmas at a level where it tends to contact the thorax, and anthers on short and long filaments where they tend to deposit pollen on the head and abdomen. A long-styled plant can pick up pollen from the abdomen and deposit pollen on the head and thorax. Pollinators visiting flowers of the same style lengths tend to pick up pollen on the same parts of the body each time and transfer little pollen to the stigmas. Therefore, isolated populations of plants with the same style length produce little seed; populations with two or three style lengths are apt to be the main sources of purple loosestrife seed.

In July and August 1999 the same principal investigator surveyed the same areas as those covered in 1997 and 1998, following the same survey procedures as used in 1998. Most of the photographs taken in 1999 show approximately the same areas as those in the 1997 and 1998 photographs. The maps included in the 1998 report were duplicated with symbols added to indicate either new purple loosestrife population discovered in the 1999 survey or the absence in 1999 of purple loosestrife populations present in 1998.

In August and early September 2000 the same principal investigator repeated the procedures of the 1998 and 1999 surveys. Photographs were again taken from many of the same places as those of previous years, often using certain large distinctive trees as markers to make the photographs as nearly comparable to previous years as possible. Field notes were taken as in previous years and some populations were checked again to see if there were plants of only one flower type (and therefore less likely to produce seed) or of two or all three flower types. Since the field work was done somewhat later in 2000 than in 1999, fewer observations were made on flower types, but more observations were made on fruit set. The maps included in the 1999 report were again duplicated and the changes noted in 2000 were superimposed. As was done in 1999, areas which did not have purple loosestrife present previously were checked with binoculars and if there still was no evidence of purple loosestrife the survey on foot was reduced to spot checks.

On August 9, 16, and 31, 2001 the same principal investigator and Sharon Schwab, president of Flark Associates, Inc. again walked the routes surveyed in 1997 through 2000. Photographs were taken from the same places as those of previous years to indicate whether the purple loosestrife populations at these sample points were increasing, decreasing, or remaining constant. Field notes were taken as in previous years, although in 2001 the flower types present in every accessible population were examined to assess the probability of successful pollination and seed set in each population. Isolated purple loosestrife plants or plants in small populations were pulled up, except for those which were inaccessible or so large and deeply-rooted that they could not be pulled by hand. Plants on rock outcroppings in the river and on the dams were checked with binoculars. The changes in purple loosestrife abundance and distribution were marked in the field on photocopies of the maps included in the report for 2000, but, because the maps in the 2000 report had become so covered with symbols as to almost obscure the details, new maps were prepared for the 2001 report. The new maps cover the same areas as those of previous reports and are equivalent to drawings DC-305, DC-306, DC-307, DJ-2894, DN-2740, and DN-2341.

#### **DESCRIPTIONS OF THE PURPLE LOOSESTRIFE POPULATIONS IN 2001:**

As noted in the 1997 report, much of the land shown on drawing DC-305 is residential and neither the neighborhood nor the vegetation appears to have changed during the past four years. Purple loosestrife plants had been uprooted at four locations on the west bank of the Wisconsin River during the 1997 survey. Two of these sites were free of purple loosestrife in 1998, but new plants were found at the other two sites. One well-established population in 1997 appeared to be unchanged in 1998 and three new populations were noted in 1998. All of the new populations in 1998 consisted of only long-styled plants. In 1998 only the population on the west bank opposite Pete Rogers Island had two style lengths: long and medium.

Although no new populations were detected in the area covered by the DC-305 drawing in 1999, two plants with short-styled flowers were found. Because no short-styled plants were seen here in 1998, these may indicate that some new plants had come into these populations in 1999. Although plants of each of the three types were found in the survey in 2000, the total number of plants on the west side of the river north of the bridge was reduced from previous years. Purple loosestrife had almost vanished near the point where First Avenue turns to the west. It appears that they have been shaded out by growth of river birch, *Betula nigra* L.; American elm, *Ulmus americana* L.; green ash, *Fraxinus pennsylvanica* Marshall; dogwoods, *Cornus* spp.; grapes, *Vitis riparia* Michaux; and especially black locust, *Robinia pseudoacacia* L.; and glossy-leaved buckthorn, *Rhamnus frangula* L.

Scattered long, medium, and short-styled plants were still present on the west bank of the Wisconsin River opposite Pete Rogers Island in 2001, and some of these were pulled out. One plant was noted on a small rock outcropping as seen in figure 4. Three medium-styled plants were now present south of the Riverview Expressway where no

plants had been seen in previous years; these were too deeply rooted to be pulled out. Three long-styled plants on the west bank opposite the north end of Witter Island, which had been noted as new in the 1998 survey, were removed. One long-styled plant, apparently new this year, was so deeply rooted among the rock retaining wall where highways 54 & 73 come closest to the river that it could not be pulled out. Four new plants, including all three style types, on the bank along Lyon Park were removed.

Figures 1 & 2, and 5-8 in this report are matched with photographs taken in 1997-2000. These photographs show little change in the vegetation and minimal purple loosestrife spread.

The area in drawing DC-306 included only two large populations of purple loosestrife in 1997 through 2000. Four new plants, two long-styled and two short-styled, were found in 2001 on the west bank at the north end of drawing DC-306; two were pulled out. A new short-styled plant to the south was found and removed, but two long and one short-styled plant at the base of the bank farther south were inaccessible. The population on the west bank opposite Garrison Island includes plants of all three style lengths, but in 2000 the population seemed to be smaller than previous years, probably being crowded out and shaded by a mixture of shrubs; goldenrods, *Solidago canadensis* L. and *S. gigantea* Aiton; bluejoint grass, *Calamagrostis canadensis* (Michaux) P. Beauv.; etc. In 2001 only six plants remained and all were long-styled; some of these were being crowded out by staghorn sumac, *Rhus typhina* L. Four new medium-styled plants were found on the west bank opposite the gap between Garrison and Edwards Island, and all were removed. Two more new plants were found along the boat landing, and both of these were removed. The rock outcropping, shown in figures 9 & 10, opposite Edwards Island this year has two plants instead of the one seen in previous years.

In 1998 a few plants were seen on the bank south of Boles Creek at the edge of the mowed lawn around the Masonic Lodge. No plants were seen here in 1999, but in 2000 either new plants had come in or possibly the 1998 plants had been mowed and recovered by 2000. At least ten plants were present in 2001; figures show changes in this area between 1997 and 2001.

In the 1997-1999 surveys a large population of purple loosestrife was present and photographed (figures 19 & 20) around the Centralia dam and footpath. No plants were noted or photographed along the crest of the dam above the footpath in the 2000 survey but a few scattered plants were present in 2001 (figures 21 & 22). Another population associated with the Centralia dam includes mostly long-styled plants with some medium-styled individuals. This population seems to be unchanged over the five years of the survey.

In 1997 one plant was seen and removed from the east bank of the Wisconsin River south of the end of Riverwood Lane at the mouth of a small stream and no plants were seen here in 1998. In 1999, two small purple loosestrife plants were noted and removed from the Wisconsin River bank slightly north of the 1997 site. Several new plants were seen in 2000 along with a growing population of glossy-leaved buckthorn.

Because the east bank of the Wisconsin River is still remarkably free of loosestrife and most other invasive aliens, this site should be watched carefully for signs of spread of both exotic species. In 2001 only three purple loosestrife plants, long and medium-styled plants, were seen on the river bank north of the creek. One was removed; the other two were too deeply rooted. The glossy-leaved buckthorn, however, is abundant.

The hiking and biking trail area in DC-307 continues to be free of purple loosestrife (figures 26 & 27). Deep shade and dense native vegetation should continue to make establishment of purple loosestrife here unlikely.

In 1998 the purple loosestrife population on the headwaters dam in DJ-2894 was conspicuously reduced from 1997, but short and long-styled plants were common on soil amid concrete structures west of the dam. In 2001 the Port Edwards dam and adjacent area was free of purple loosestrife except for one medium-styled and one short-styled plant which were too well rooted among the rock and concrete to be pulled. About 20 young plants had apparently become established recently on sand along the river on the northeast side of the island. All of these plants were pulled. The river banks and rock outcroppings on the rest of the east side of the island where scattered plants had been seen in previous years were now free of purple loosestrife almost to the Port Edwards hydro-electric plant.

The populations noted in the 1997 survey on the west bank above the Port Edwards hydro-electric plant were also essentially unchanged in 1998. In 1999, with the river level down and construction work on the dam, the purple loosestrife populations of the previous two years were greatly reduced. The construction activity eliminated most of the vegetation, including all but a few small loosestrife plants. Purple loosestrife on the west bank above the Port Edwards hydro-electric plant was almost eliminated, possibly due to desiccation of the plants following the drop in water level. Only a few plants returned in 2000. In 2001 no purple loosestrife plants were found from the crib and dam south to Lavigne Street, perhaps partly because of the shade from sumacs and other shrubs, and by the large stand of Amur silver-grass, *Miscanthus sacchariflorus* (Maxim.) Hack., which excludes all other species. However, the west bank from Lavigne to Market Street now has a population of over 30 plants amid reed canary-grass, *Phalaris arundinacea* L., and sedges, *Carex* spp. One purple loosestrife plant noted yearly since 1998 still persists on the west bank near the Communications building. Two plants were removed near the hydro-plant, and one long styled and one short-styled plant could not be pulled.

As noted in the reports of 1999 and 2000, the total population of purple loosestrife in most of the area shown on DN-2740 did not appear to have shown any obvious net change from 1997 through 2000 and the same observation applies in 2001. The plants are moderately common, but scattered. Two new plants have appeared below the hydro-plant dam since last year, and a few plants persist along the north bank of the river near the mill parking lots. These new plants are more than offset by the absence of plants farther to the west along the bank as well as by their disappearance from most of the islands, bank, and inlet on the south side of the river. Only two plants remain on the west

end of one small island. Furthermore, only one plant persists near the boat landing where several were noted a couple of years ago. However, as noted in the 2000 report, the wetland between the bend of the river and state highway 73 has changed in the past three years from scattered purple loosestrife to almost dominance by that species. Previously this was a fairly disturbed area dominated by narrow-leaved cattail, *Typha angustifolia* L., with reed canary-grass on the slope. This was the only area where loosestrife changed from scattered occurrence to abundance between 1998 and 1999. The population in 2001 seems to be about the same as that seen in 1999 and 2000. Purple loosestrife has now disappeared around the mouth of Moccasin Creek.

Purple loosestrife continues to be scattered along the river bank in Riverside Park. One long-styled plant was observed at the boat landing on the north end of the park. It should be noted that this plant was being eaten by several large unidentified beetles. These beetle were apparently not the species being bred and released for purple loosestrife control (the beetles we saw were much too large to be this biological control species) and they were also observed feeding on nodding smartweed, *Polygonum lapathifolium* L. At least ten plants were scattered southward along the bank in Riverside Park. These plants included all three style types. Two of them were pulled out. A small group of plants noted since 1997 at the south end of the Park has disappeared.

In 1998 the purple loosestrife density or distribution in the Nekoosa area indicated on drawing DN-2341 was essentially unchanged from 1997, except on the west bank of the river north of the highway 173 bridge. The 1999 report had noted that the loosestrife had almost vanished here, apparently as a result of the growth of black locust and staghorn sumac, which have shaded it. The trend toward elimination of purple loosestrife by woody vegetation continued in 2000. The draw down of the river in 1999 apparently eliminated some purple loosestrife plants by leaving them desiccated on the higher part of the bank, but allowing some new plants to colonize the area near the river at its lower stage. In 2000, with the water levels high again, the low-lying population had been flooded out, and in some place the purple loosestrife had been crowded out where the wooded vegetation extended to the water edge. But in 2001 purple loosestrife was again abundant amid broadleaved cattails, *Typha latifolia* L., wherever there is a flat area between the river and the dense growth of sumac, black locust, dogwoods, and willows (*Salix* spp.). One new plant has appeared on a small island north of the highway 73 bridge.

Purple loosestrife is absent from the west bank near the highway 173 bridge down almost to the Nekoosa dam. One plant, too deeply rooted to pull out, has appeared on the bank where the barge is anchored. Two plants, noted in previous years, are wedged in an opening along the wall of the hydroplant. About seven plants are present on the dam.

The 1999 report noted that purple loosestrife appears to be increasing slowly down river from the Nekoosa dam as new plants appear on some of the small outcroppings in the river and that, because these outcroppings are rather inaccessible and are open areas subject to colonization, this increase seemed inevitable. However, the abundance of purple loosestrife in 2001 remains about the same. One new plant has



appeared on the tip of the island south of the dam, but another nearer the west bank has disappeared. Approximately the same number of plants grow on the rock outcroppings along the east bank, with new plants balanced by losses of plants from previous years.

## CONCLUSIONS:

The opinion of the principal investigator again remains the same as that expressed in the 1998, 1999, and 2000 reports: that purple loosestrife is not as abundant in the Wisconsin Rapids – Port Edwards – Nekoosa area as it is in most wetlands and along most rivers and roadsides in the more developed or ecologically disturbed areas in central Wisconsin.

In general, the net abundance of purple loosestrife appears to have remained about the same over the five years of these surveys. Any increase in purple loosestrife at one site seems to be offset by a reduction somewhere else. The 2001 survey again of 2000 reinforces the statement made in the 1999 report that the most striking observation over the five years is how effective intact native vegetation and deep shade from trees and shrubs are in preventing purple loosestrife colonization, as shown by areas along the east bank of the Wisconsin River which are free from purple loosestrife. Control of purple loosestrife in these areas probably depends more on keeping these areas undisturbed and wooded, and in allowing native vegetation to grow more densely in other areas, than on efforts to pull or remove purple loosestrife. Repeating the comments of the 1999 report, it is probably fortunate that much of the Wisconsin River bank in the Wisconsin Rapids – Port Edwards – Nekoosa area is owned by parks or relatively few private owners, making it easier to control disturbance of the river banks.

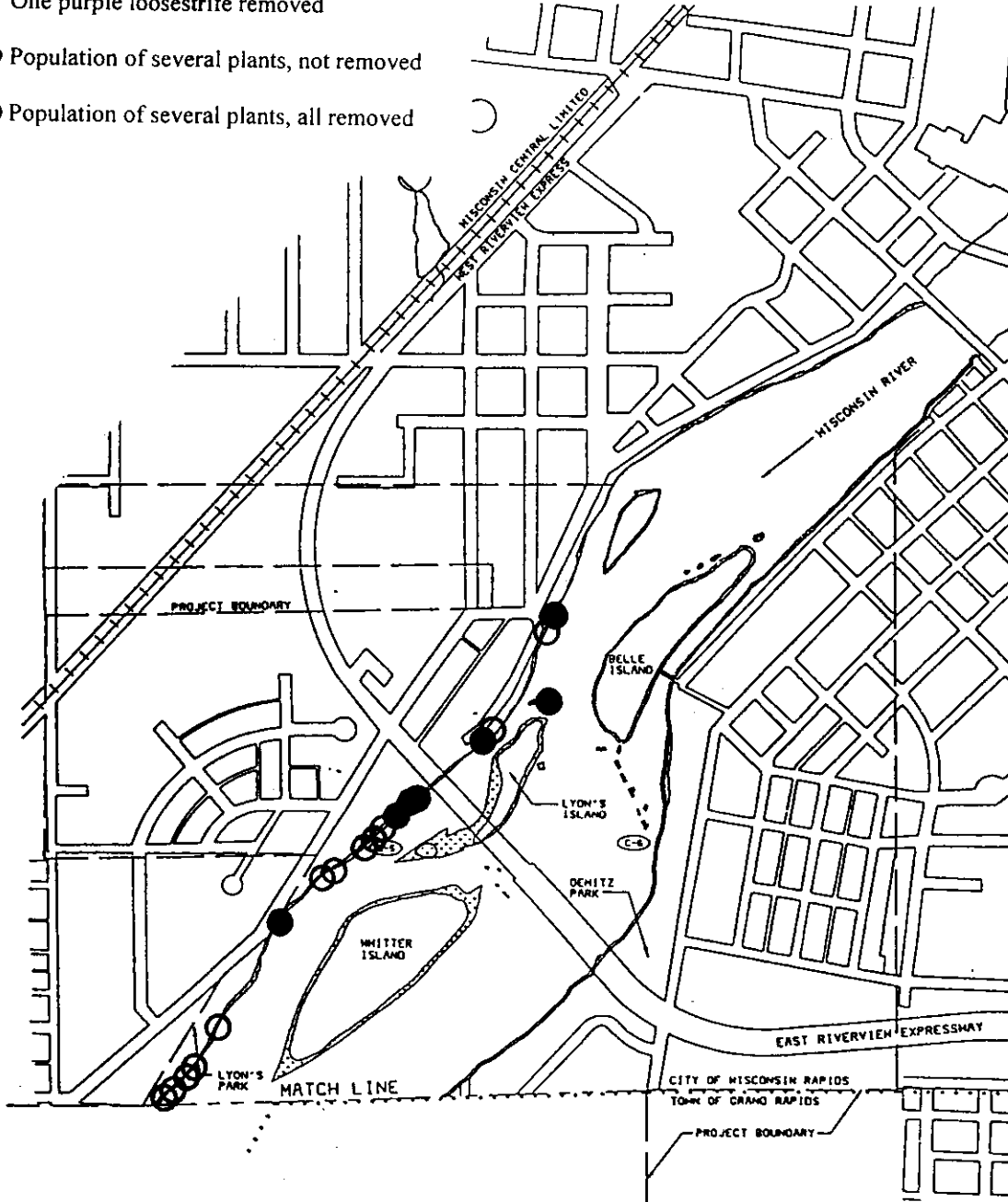
Also, as noted in previous reports, control of purple loosestrife on the small outcroppings in the Wisconsin River and in places on the dams where soil accumulates is difficult. These habitats are nearly inaccessible and are frequently disturbed by waves, currents, and fluctuations on water levels, thereby renewing the open, disturbed habitats conducive to purple loosestrife establishment.

Digging, hand-pulling, or cutting of purple loosestrife should be continued in areas with low density populations. Some consideration should be given to biological control of purple loosestrife for high density populations on the islands or along higher river bank sites which are not prone to repeated flooding. Two species of beetles, *Galerucella pusilla* and *G. calmariensis*, are leaf-eating beetles which seriously affect growth and seed production by feeding on the leaves and new shoot growth of purple loosestrife. Releases of *Galerucella* spp. in central Wisconsin have been coordinated in cooperation with area high schools by Golden Sands Resource Conservation and Development Council, Inc., Stevens Point (contact Bill Ebert, 343-6214). Brock Woods, Wisconsin Department of Natural Resources Research Center, 1350 Femrite Drive, Monona, WI 53716 coordinates the beetle release program statewide.

# 2001 SURVEY

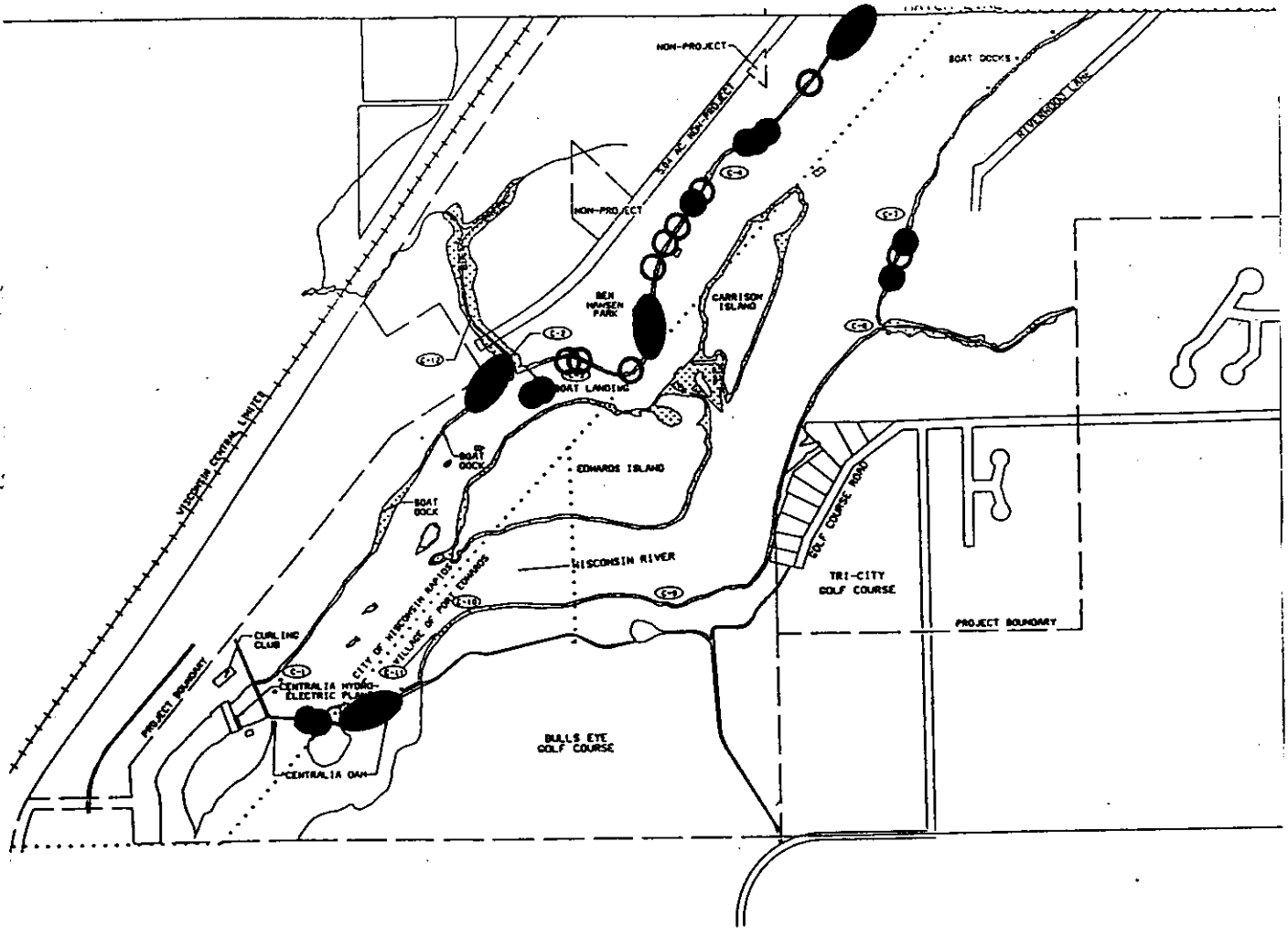
## MAP EQUIVALENT TO DC-305 OF PREVIOUS SURVEYS

- One purple loosestrife present, not removed
- One purple loosestrife removed
- Population of several plants, not removed
- Population of several plants, all removed



# 2001 SURVEY

## MAP EQUIVALENT TO DC-306 OF PREVIOUS SURVEYS

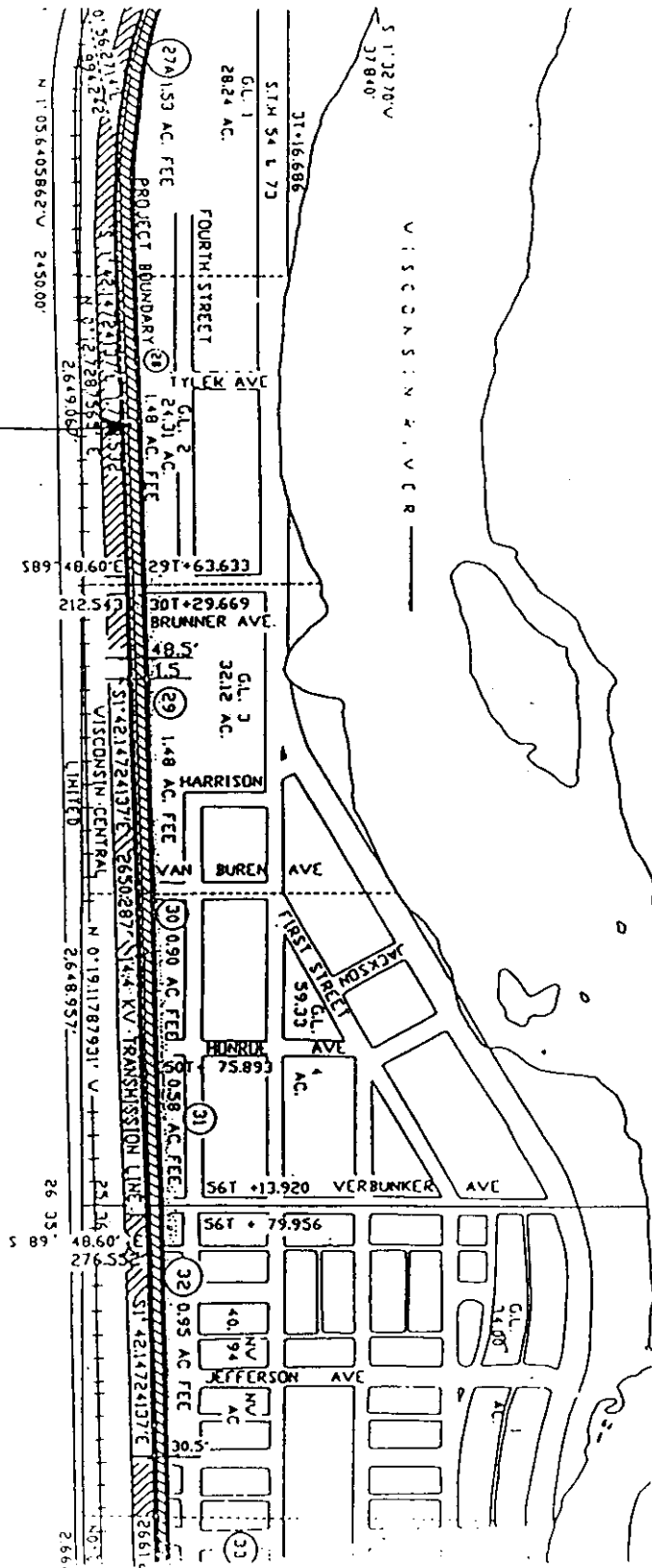
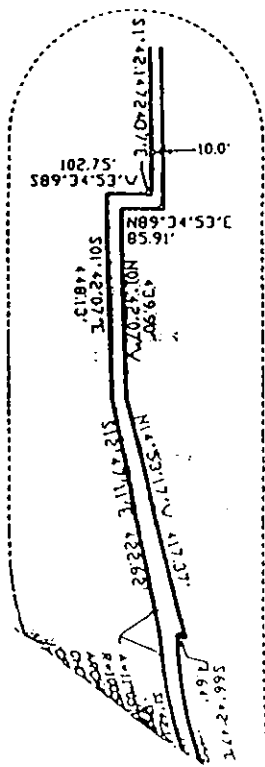


- One purple loosestrife present, not removed
- One purple loosestrife removed
- Population of several plants, not removed
- Population of several plants, all removed

# 2001 SURVEY

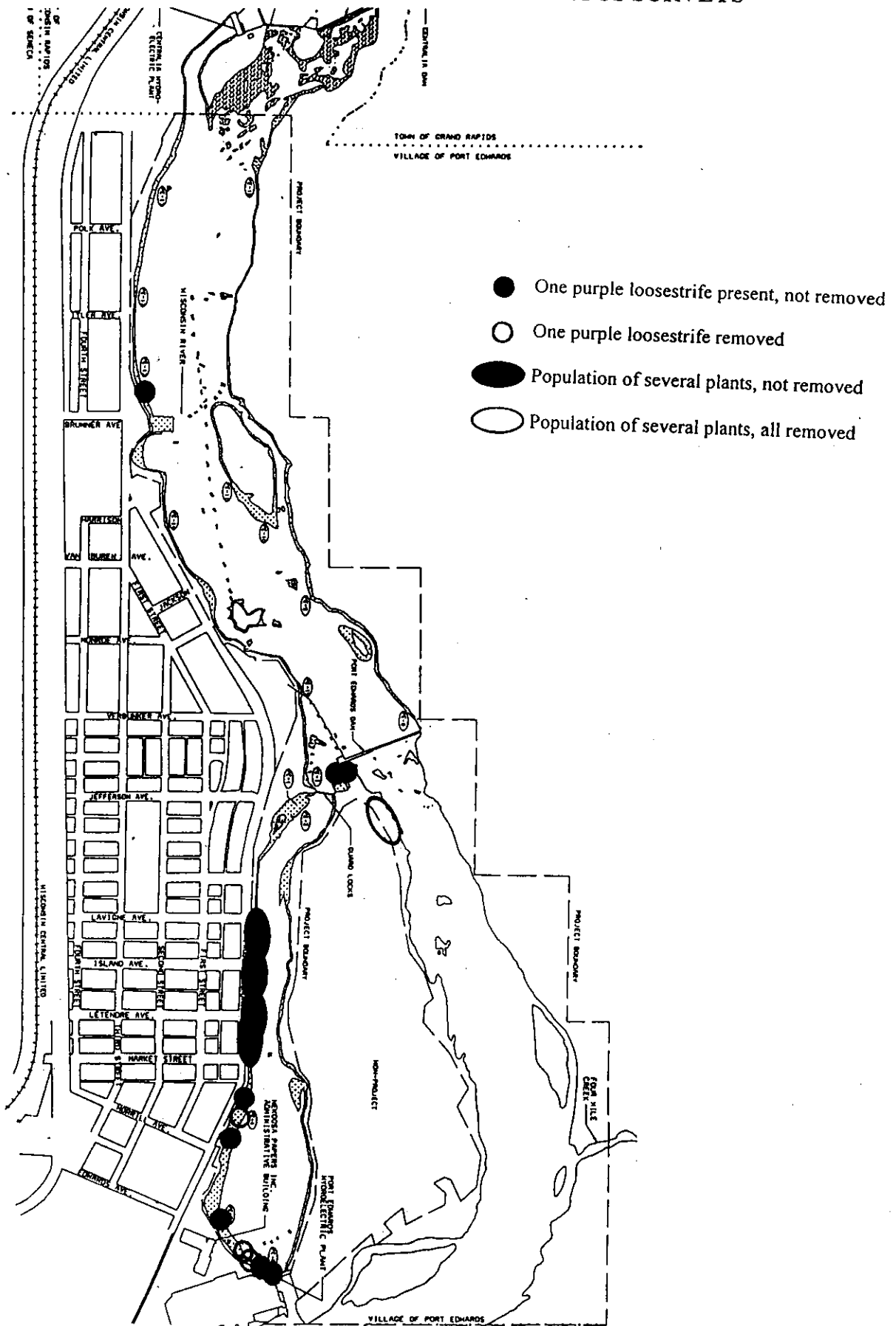
MAP EQUIVALENT TO DC-307 OF PREVIOUS SURVEYS

NO PURPLE LOOSE-  
STRIFE PRESENT  
WITHIN PROJECT  
BOUNDARY



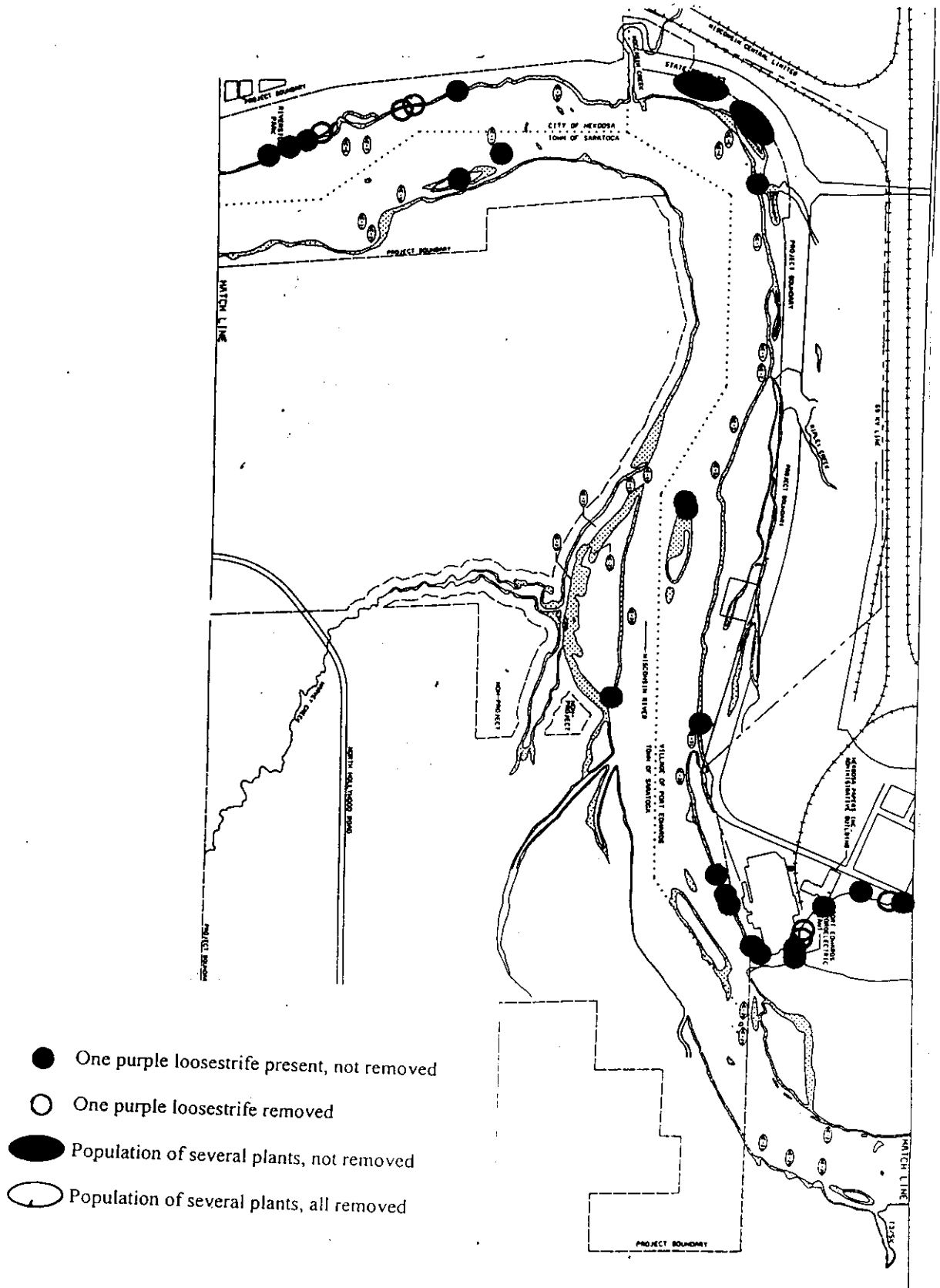
# 2001 SURVEY

## MAP EQUIVALENT TO DJ-2894 OF PREVIOUS SURVEYS



# 2001 SURVEY

MAP EQUIVALENT TO DN-2740 OF PREVIOUS SURVEYS



# 2001 SURVEY

## MAP EQUIVALENT TO DN-2741 OF PREVIOUS SURVEYS

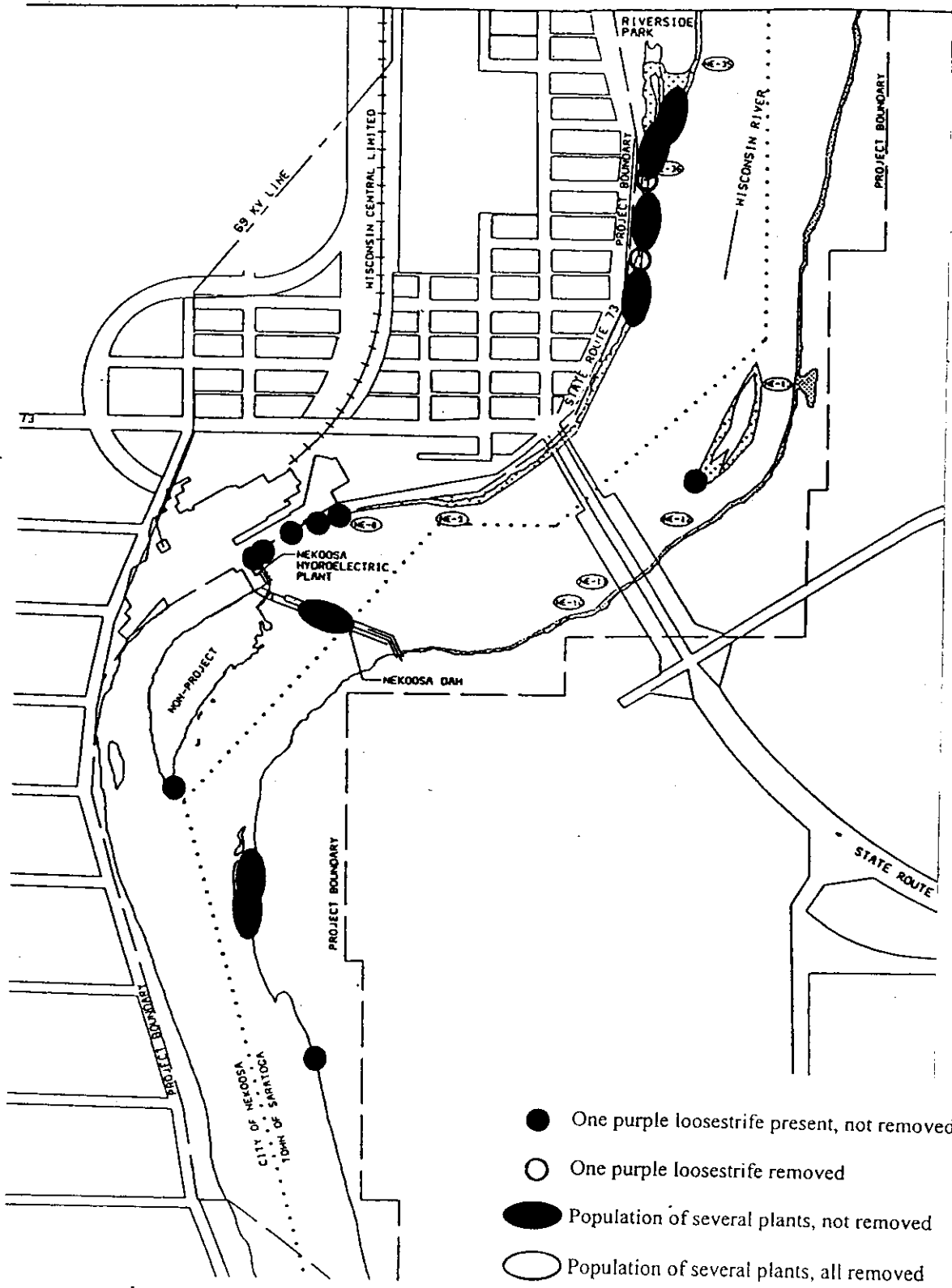




Fig. 1 West side of Belle Island, 1997. No purple loosestrife.



Fig. 2. West side of Belle Island, 2001. No purple loosestrife.





Fig. 3 West side of Pete Rogers Island, 2000. No purple loosestrife.

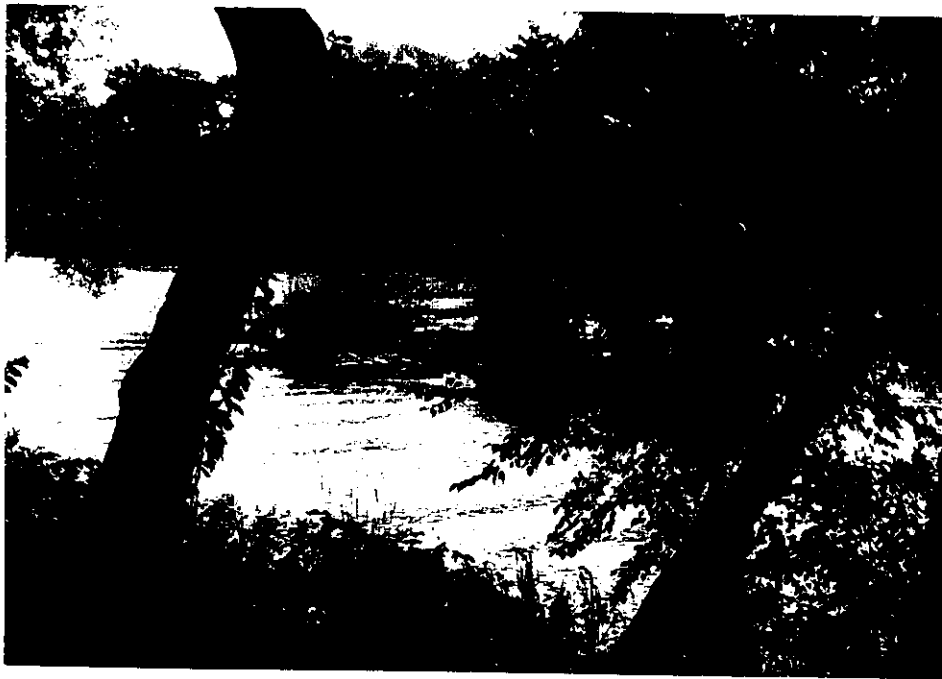


Fig. 4. West side of Pete Rogers Island (labelled Lyons Island on 2001 map), 2001, showing appearance of a new purple loosestrife plant on a rock outcropping.

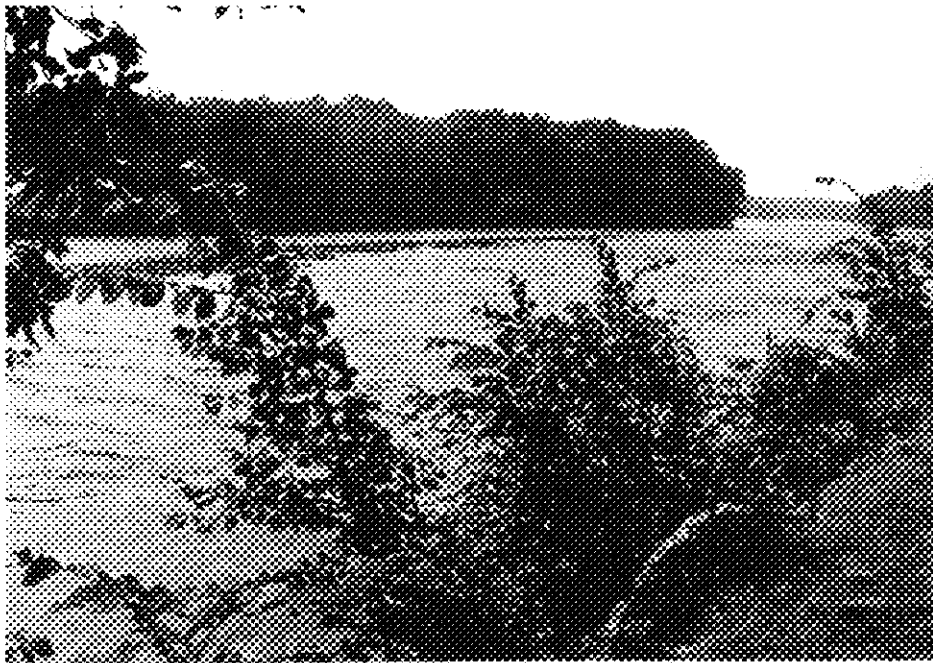


Fig. 5. West side of Witter Island, 2000. No purple loosestrife on island, a few on near bank of Wisconsin River.

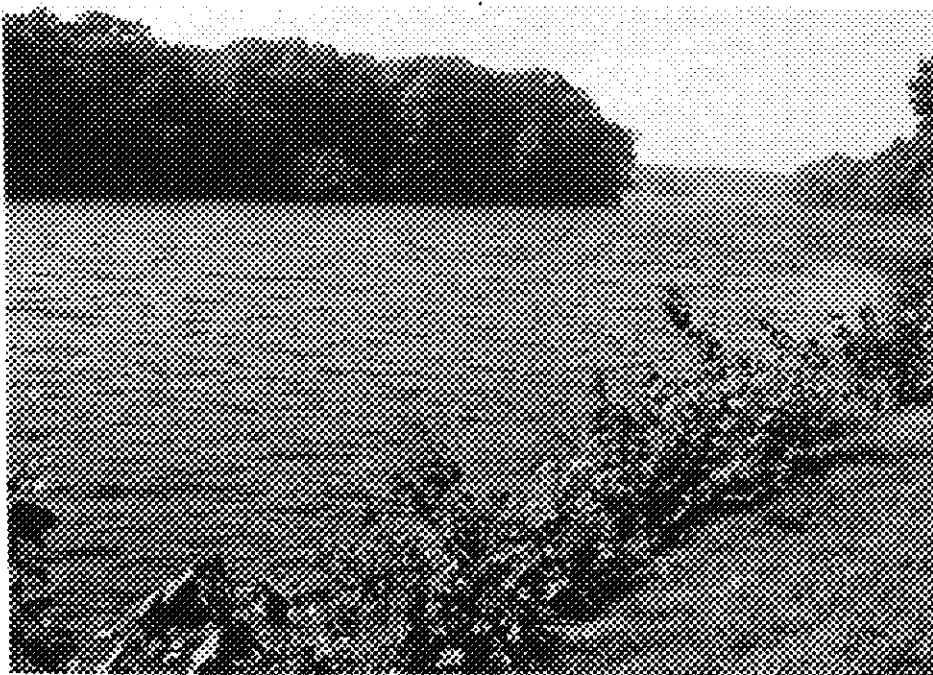


Fig. 6. West side of Witter Island and near bank, 2001. No purple loosestrife on Island, one plant on near bank.

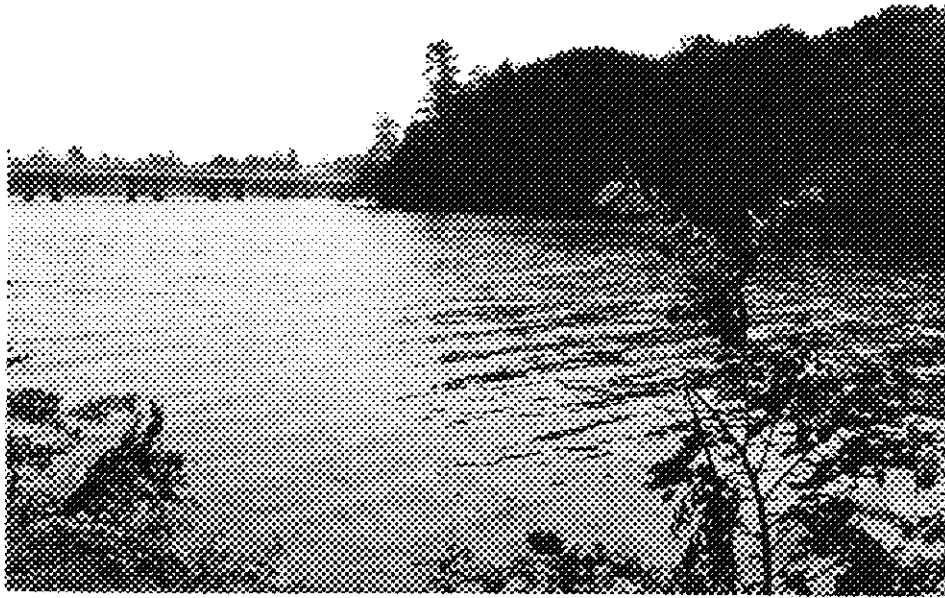


Fig. 7. West side of Witter Island, 2000. No purple loosestrife on Island, one on bank in foreground.

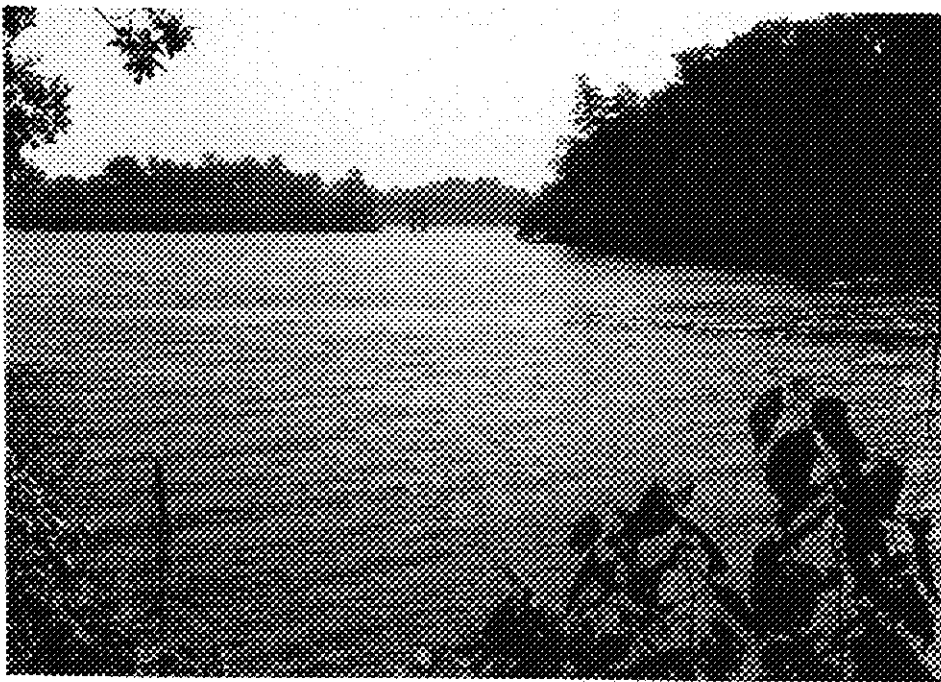


Figure 8. Same view in 2001. No purple loosestrife on Island, one plant in foreground, which was removed after the photograph was taken.

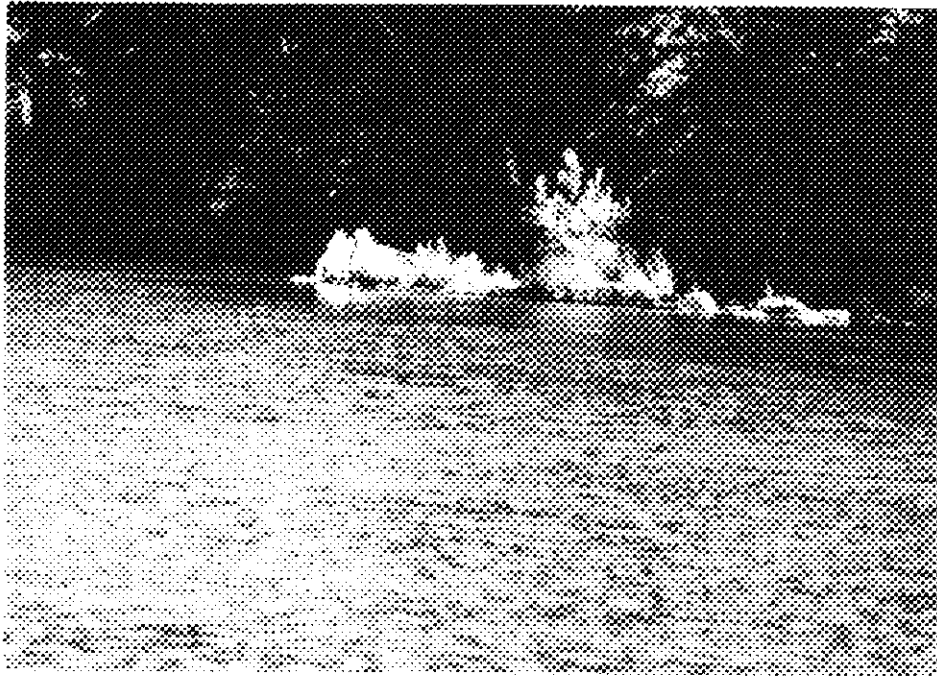


Fig. 9. Rock outcropping in River east of Boles Creek, 1998, with one purple loosestrife.

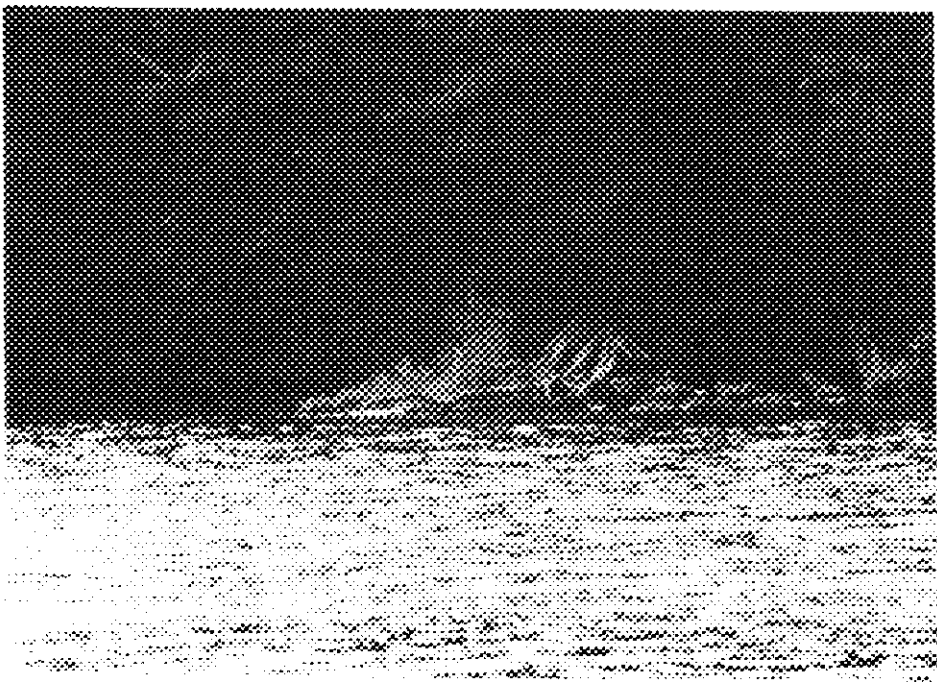


Fig. 10. Same rock outcropping, 2001. A second purple loosestrife plant has now appeared.



Fig. 11. West side of Edwards Island and Wisconsin River at Boies Creek, 2000. Three purple loosestrife plants on Masonic Lodge grounds near Picnic table.

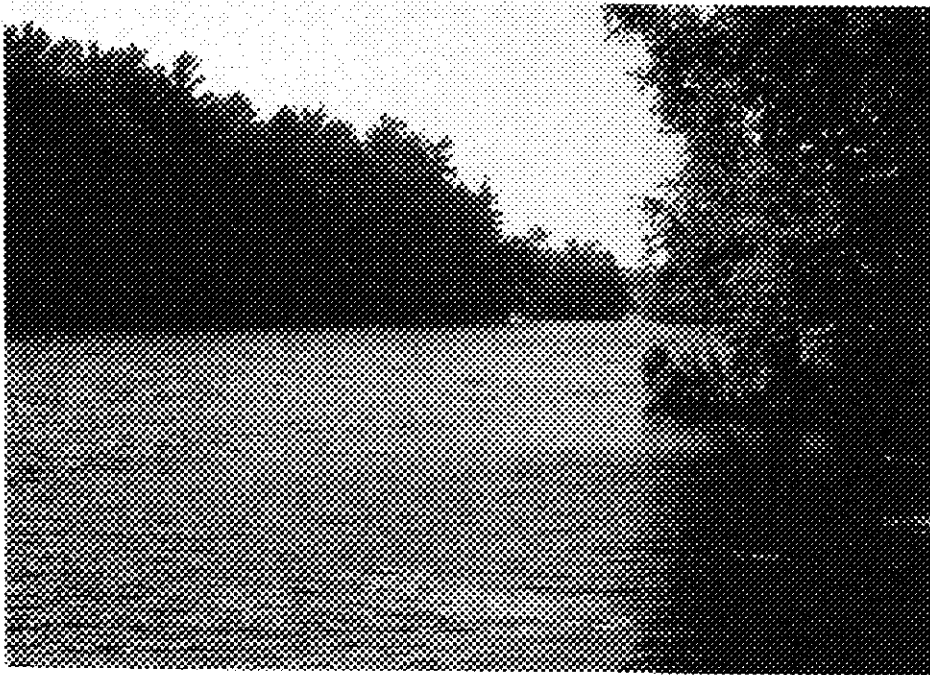


Fig. 12. Same view, 2001. Purple loosestrife plants larger.

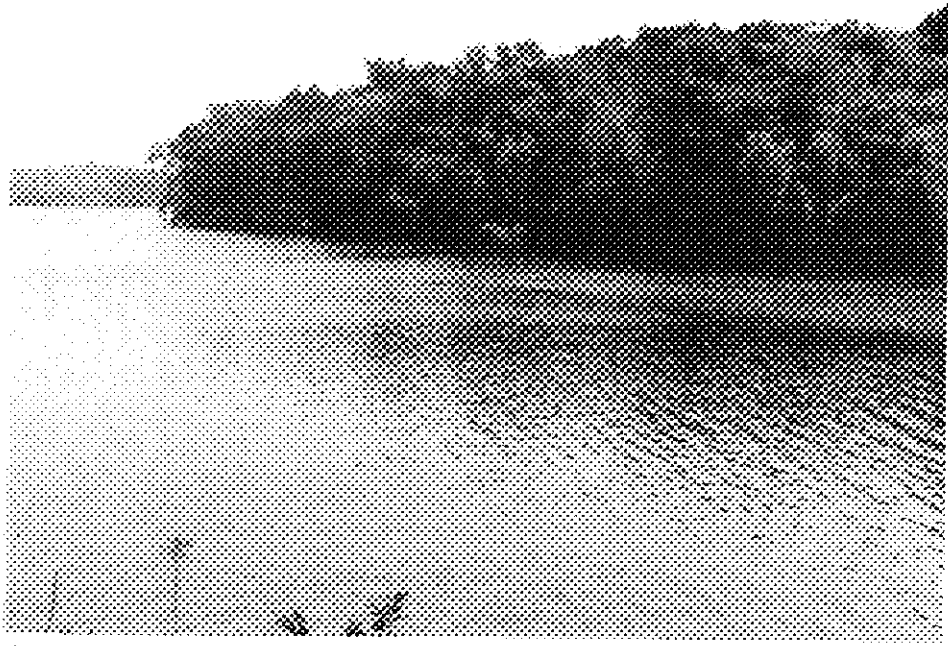


Fig. 13. North end of Garrison Island, 2000. No purple loosestrife.

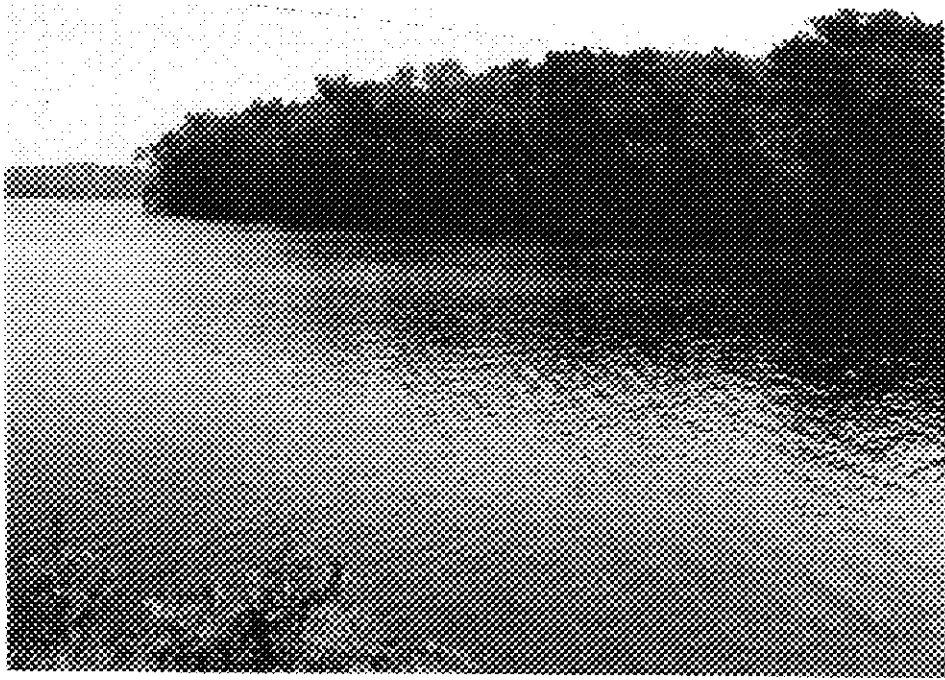


Fig. 14. Same view, 2001. No purple loosestrife; purple-flowered plants in foreground are blazing-stars, *Liatris aspera* Michx.

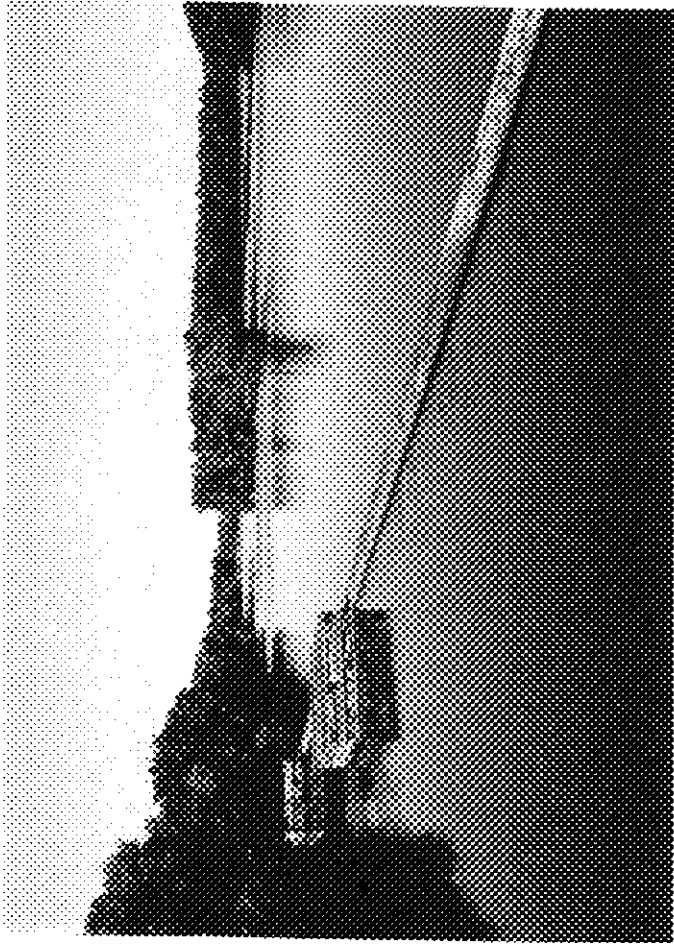


Fig. 15. West bank of the Wisconsin River from the Centralia Dam, 1997. No purple loosestrife.

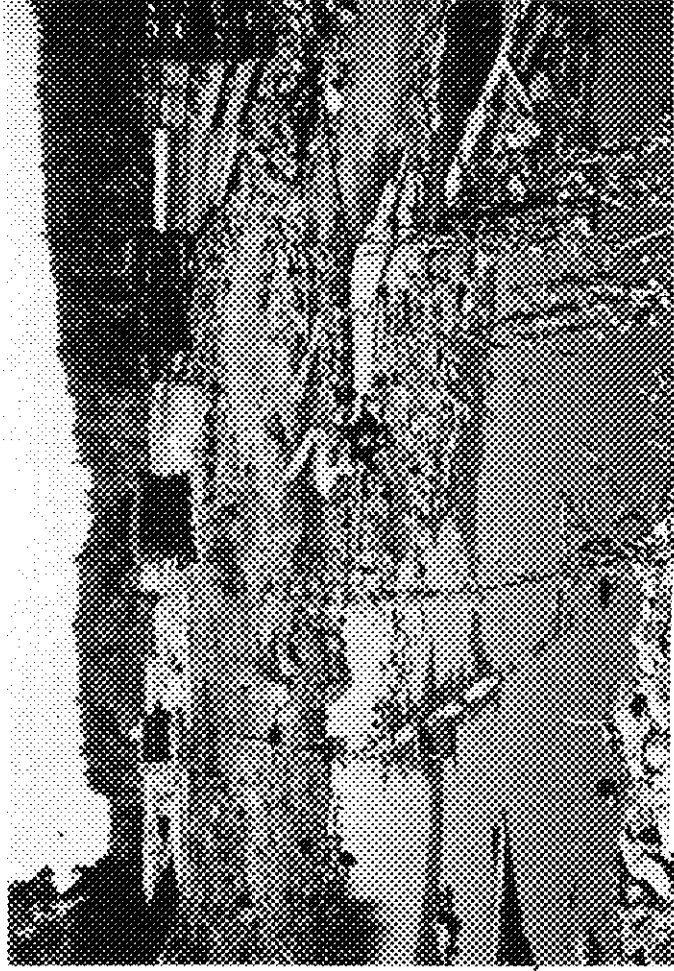


Fig. 16. West bank of Wisconsin River and Centralia Dam headwater, 1999, during river drawdown. Purple loosestrife plant in foreground.

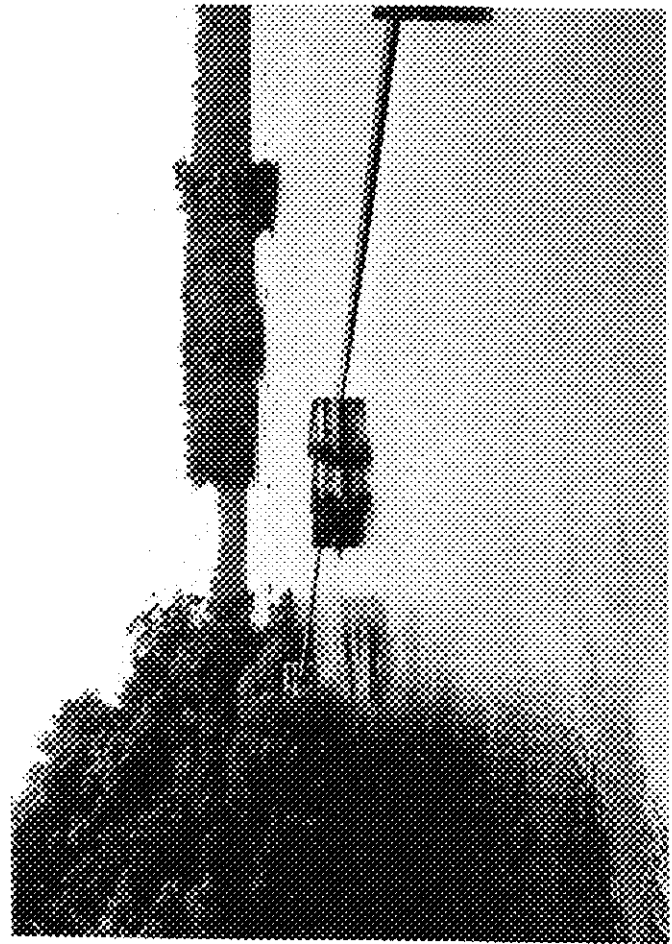


Fig. 17. Same view as figure 15, in 2000. No purple loosestrife.

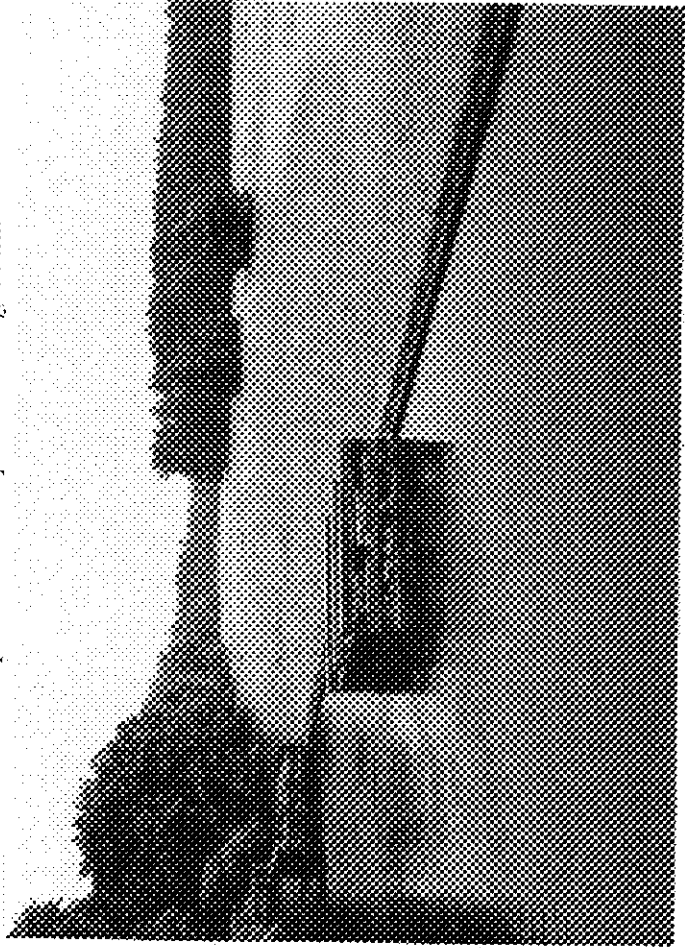


Fig. 18. Same view as figures 15 and 17, in 2001. No purple loosestrife.



Fig. 19. Centralia Dam, 1997.  
Purple loosestrife abundant.

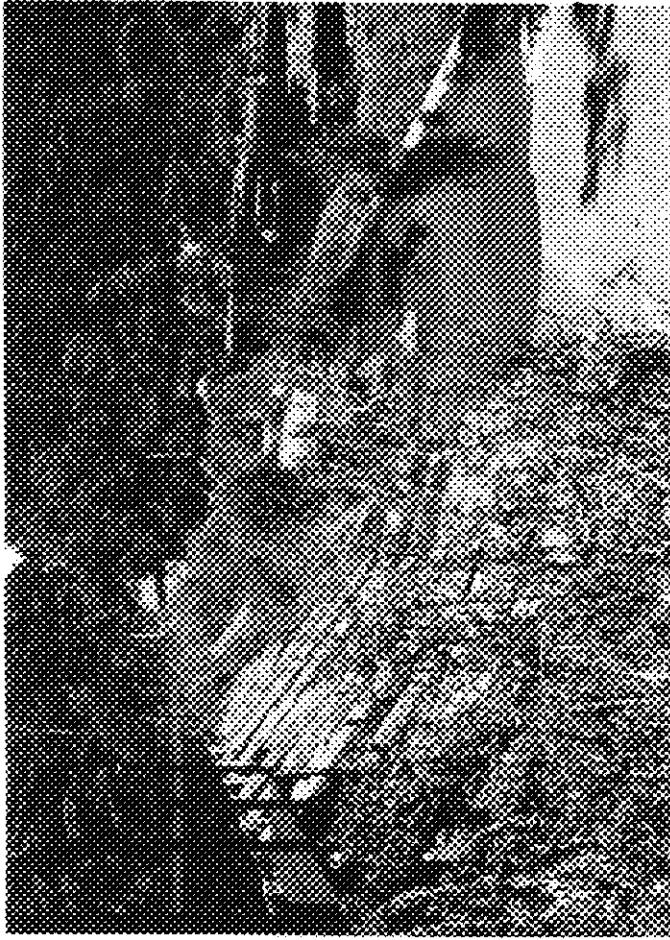


Fig. 20. Centralia Dam, 1999.  
Purple loosestrife abundant.

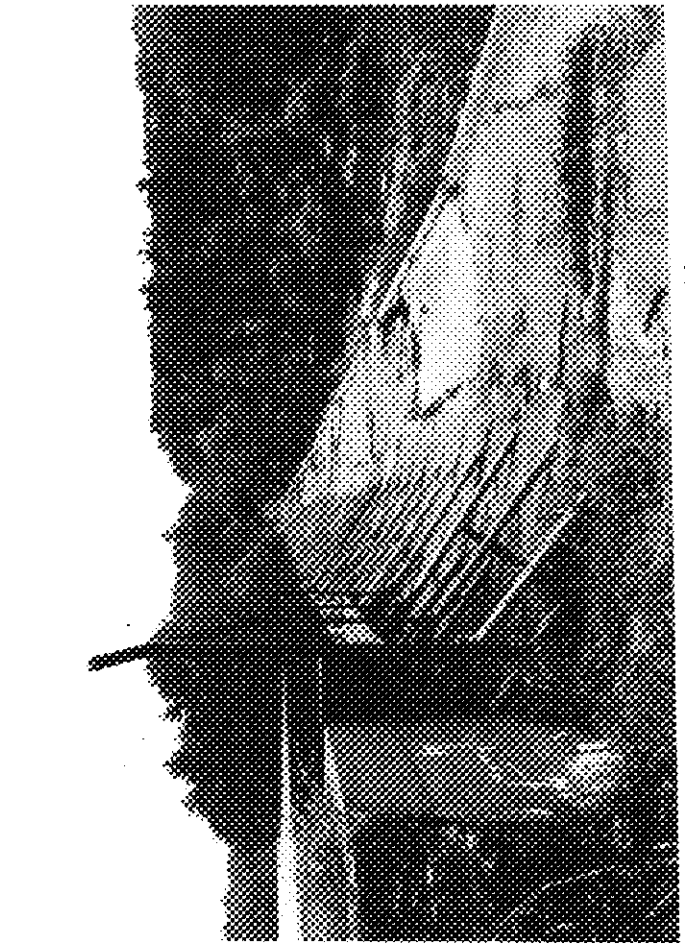


Fig. 21. Centralia Dam, 2000.  
Purple loosestrife almost absent.

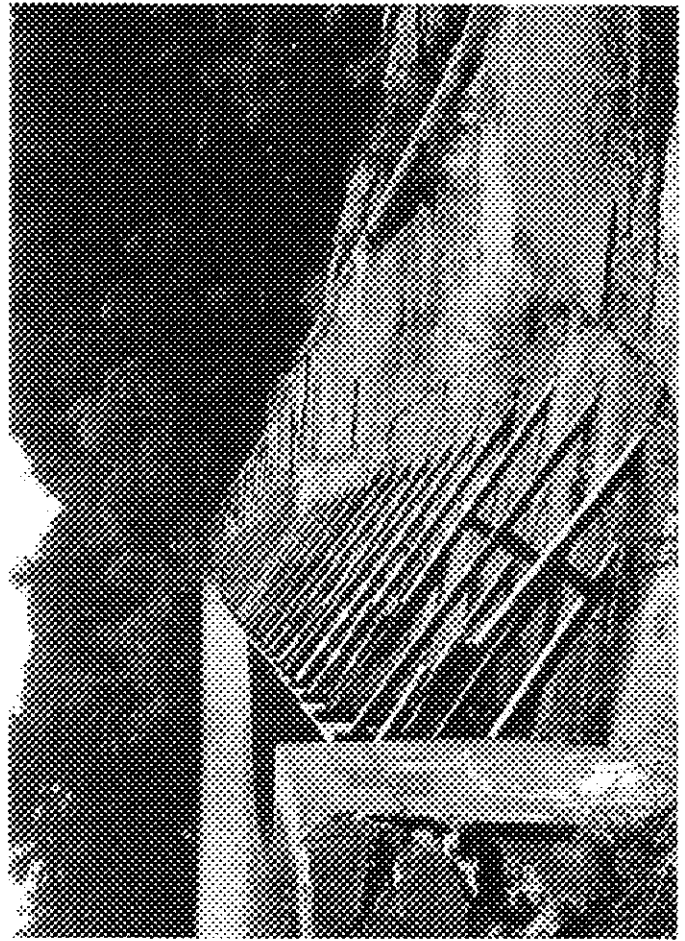


Fig. 22. Centralia Dam, 2001.  
Slight increase in purple loosestrife.





Fig. 23. Purple loosestrife on west bank of Wisconsin River in Port Edwards, 1999, during river drawdown.



Fig. 24. Same population in 2000 during high water.



Fig. 25. Same population in 2001. This population has grown slowly since 1997 regardless of water levels.

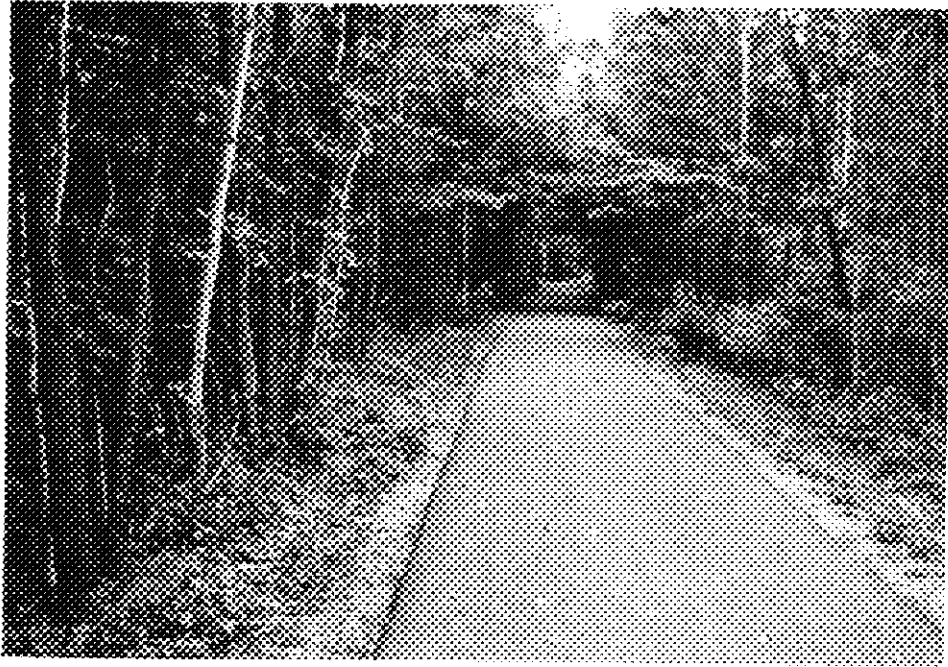


Fig. 26. Bicycle path, 2000. No purple loosestrife.

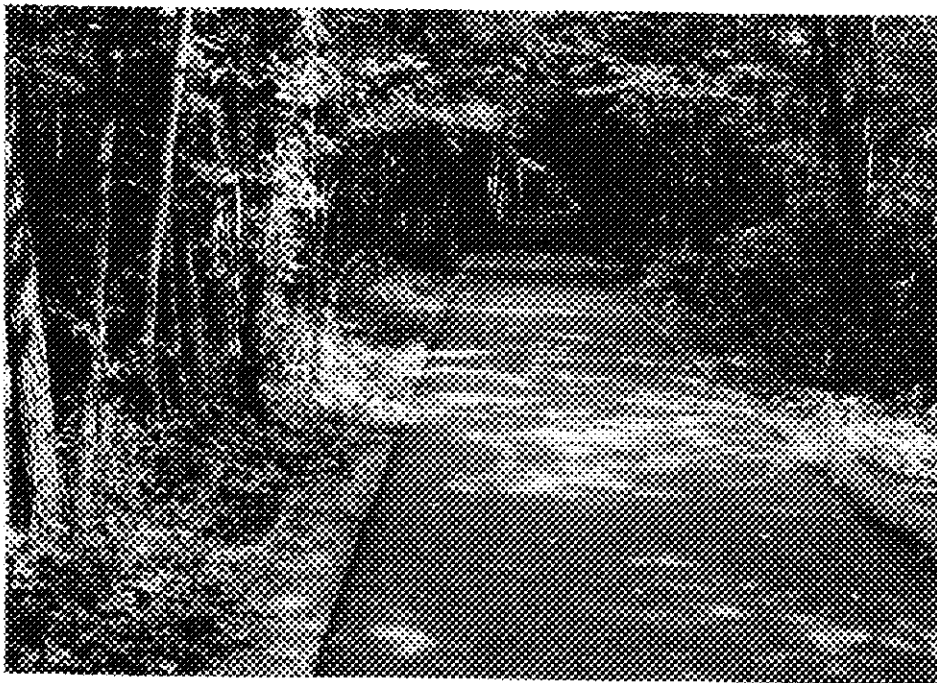


Fig. 27. Bicycle path, 2001. No purple loosestrife.

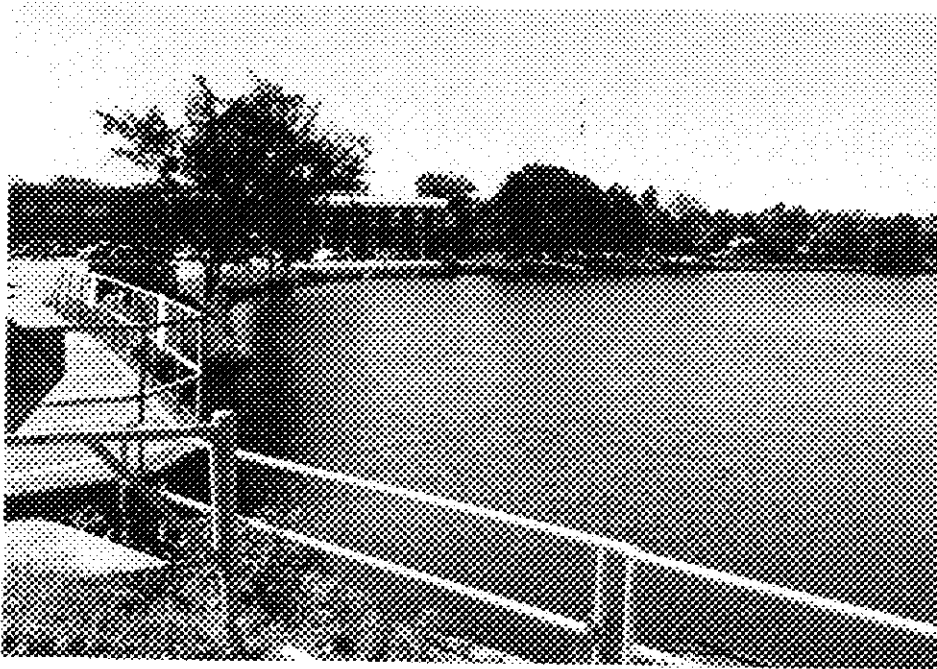


Fig. 28. Port Edwards Hydroplant, looking toward Communications Building, 2000. A few scattered purple loosestrife plants.

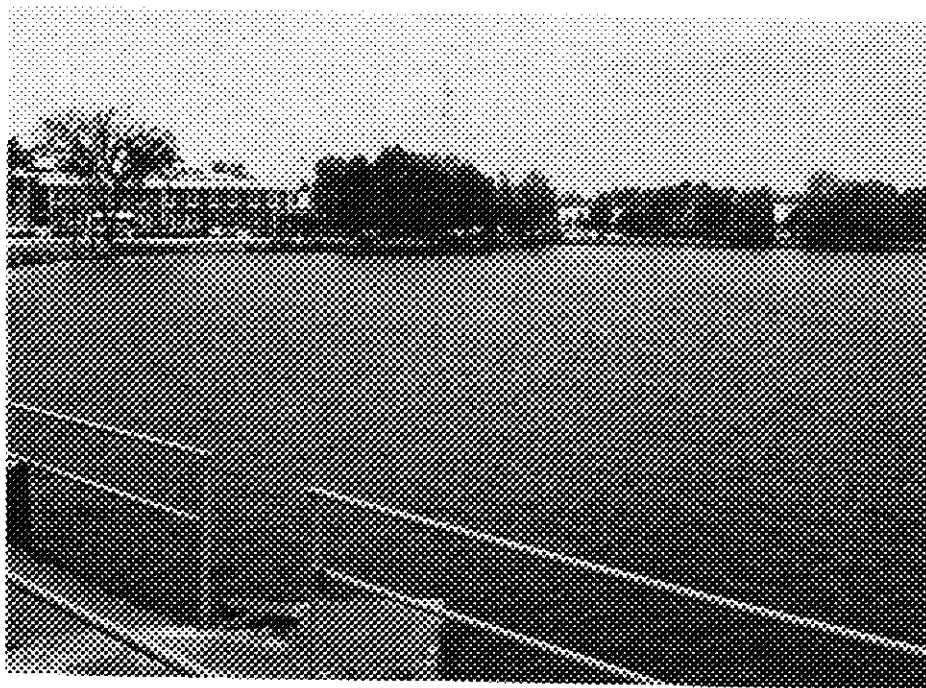


Fig. 29. Same view. A few scattered purple loosestrife plants still present.

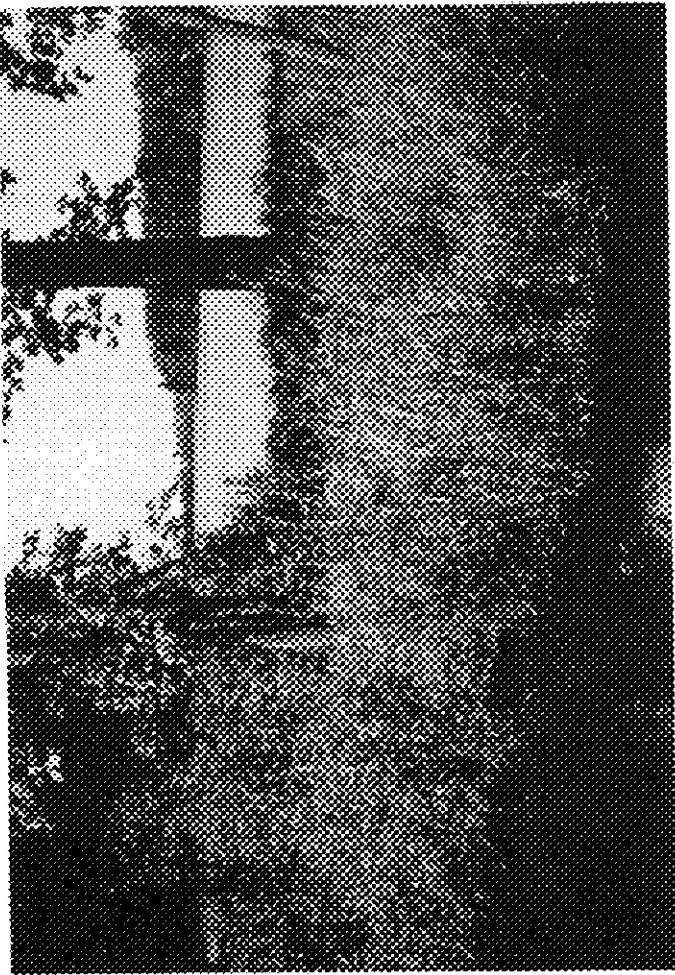


Fig. 30. Purple loosestrife plant on small island in Riverside Park in 1999.

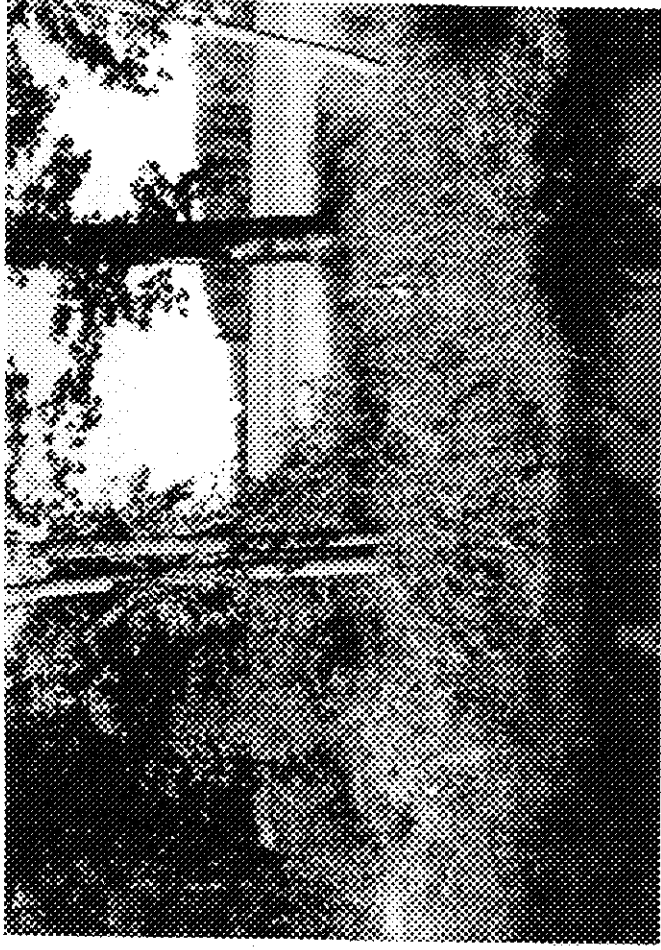


Fig. 31. Same plant in 2000.

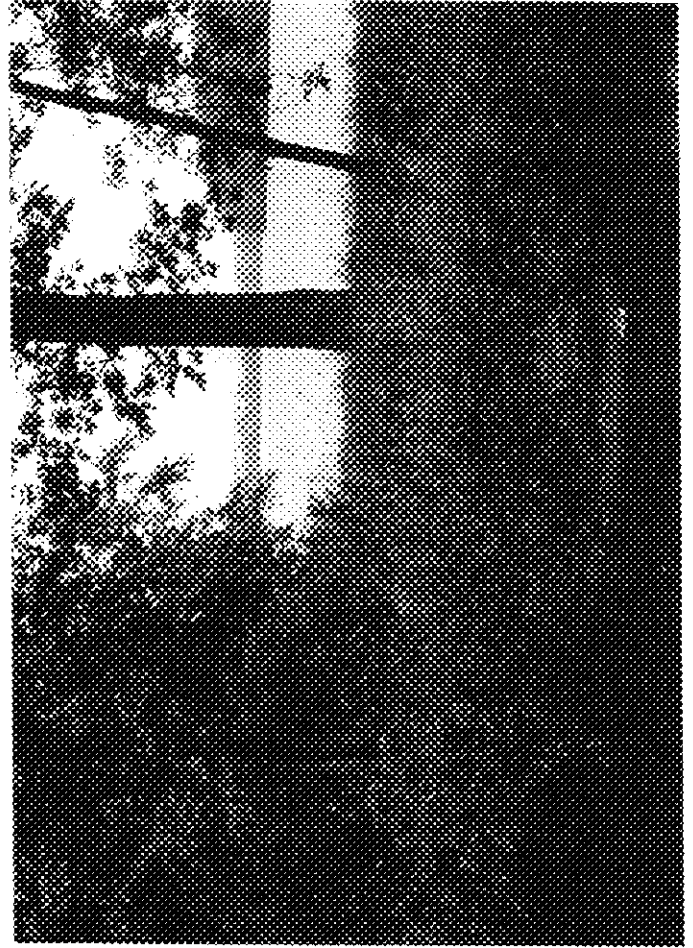


Fig. 32. Same plant in 2001.  
No change apparent since 1997

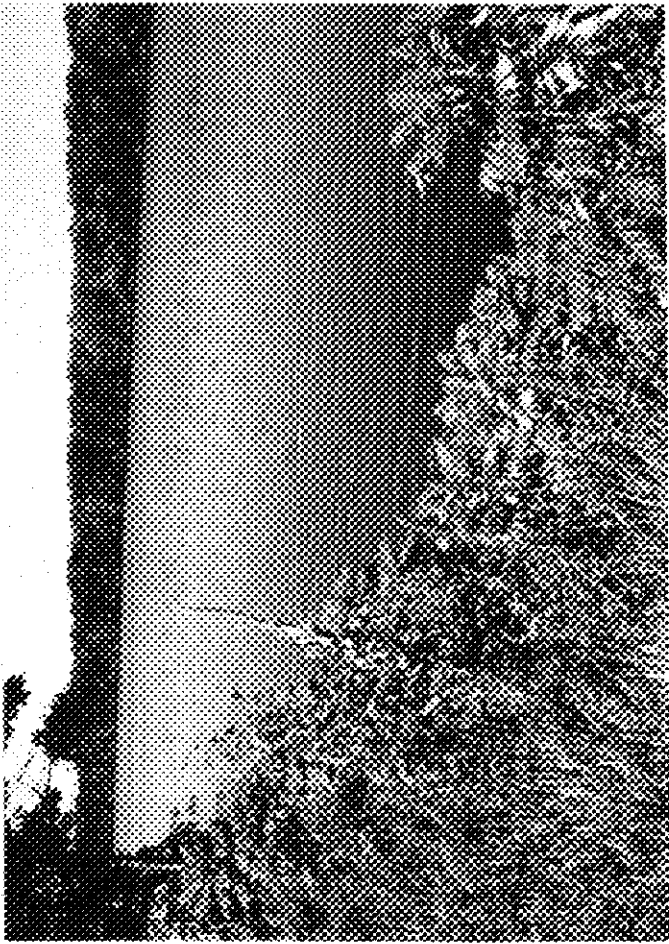


Fig. 33. Wisconsin River bank north of Nekoosa in 1979, showing growth of sumac.

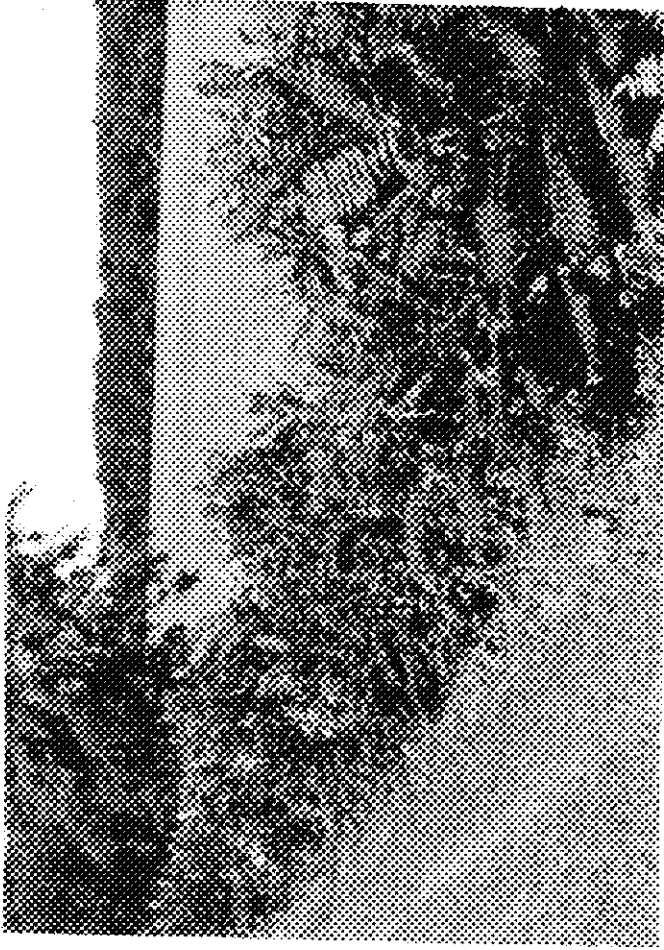


Fig. 34. Same area in 2000, with sumac expanding.

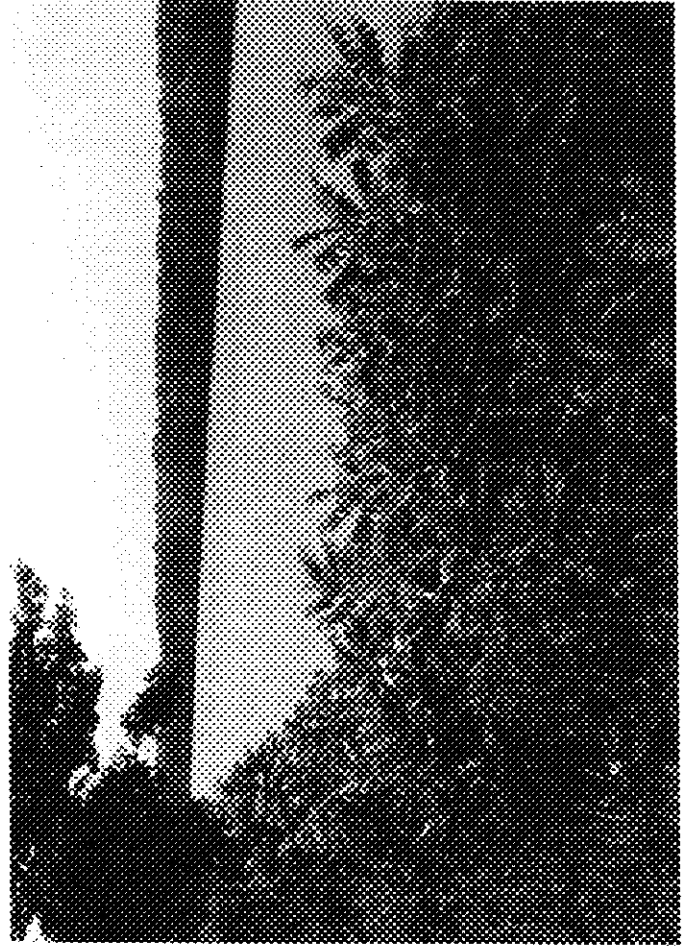


Fig. 35. Same area in 2001, with purple loosestrife now confined to edge of river

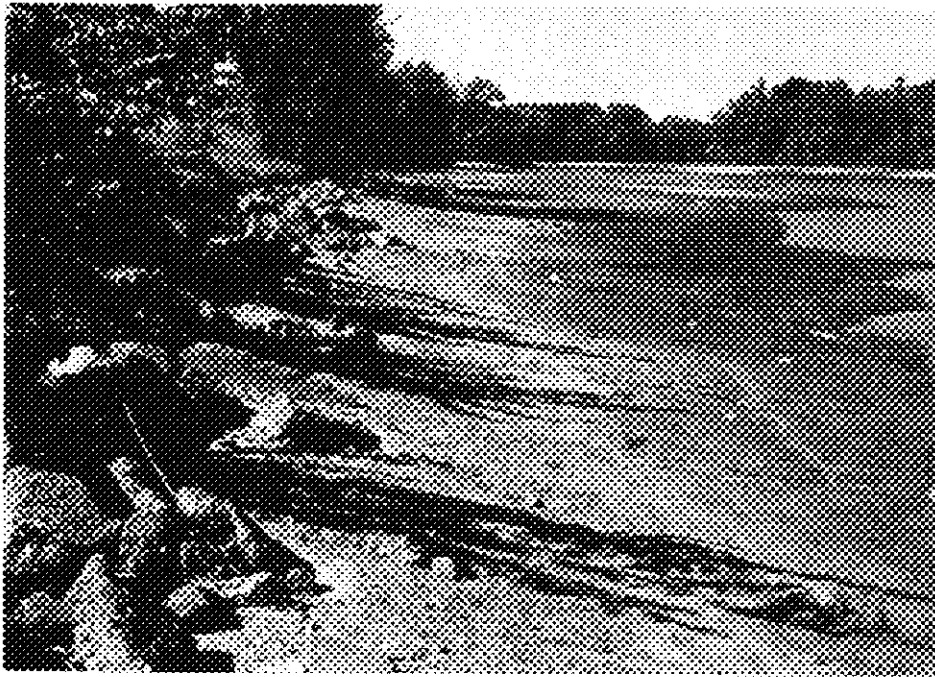


Fig. 36. River drawdown in 1999 north of Nekoosa bridge, with space for purple loosestrife colonization.



Fig. 37. Same area in 2001 with purple loosestrife plants being crowded out between the river and growth of staghorn sumac.