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Nekoosa and Port Edwards Mills
100 Wisconsin River Drive
Port Edwards, WI 54465
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SECRETARY

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FEDERAL ENERGY
REGULATORY COMMISSION

ORIGINAL



Mr. Larry Thompson
U.S. Fish & Wildlife Service
Green Bay Field Office
2661 Scott Tower Drive
New Franken, WI 54229

September 28, 2004

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

Dear Mr. Thompson and Ms. Stephenson:

Subject: Domtar Wisconsin Dam Corp.
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 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 2004 survey was performed during August as described in the report.

If there are any questions, please feel free to contact me at (715) 887-5155.

Sincerely,

Daniel O. Cummins, P.G.
Environmental Coordinator

Enclosure

*Picture? damaged
removed

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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. Magalie Salas, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

PURPLE LOOSESTRIFE MONITORING SURVEY FOR 2004

prepared September 17, 2004 for

**Domtar Industries, Inc.
Environmental Department
100 Wisconsin River Drive
Port Edwards, WI 54469**

by

**Flark Associates, Inc.
8221 100th Street South
Wisconsin Rapids, Wisconsin 54494**

**Principal Investigator: Robert W. Freckmann, Ph. D.
Curator of Vascular Plants
University of Wisconsin – Stevens Point
and
Sharon Schwab, M.S.
President, Flark Associates, Inc.**

BACKGROUND:

During July and August, 1997, Flark Associates, Inc. conducted a survey for the occurrence of purple loosestrife, *Lythrum salicaria*, 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 in 1998 was the survey by boat between the Nekoosa dam and the Port Edwards hydro-electric 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 were taken in 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 populations 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. 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.

The purple loosestrife survey for 2002 followed the 2001 survey closely. R. Freckmann and S. Schwab again walked the routes surveyed in 1997 through 2001 on August 8 and 13, 2002. S. Schwab surveyed one area not covered earlier on August 16, 2002 and R. Freckmann surveyed the remaining area not covered on August 17, 2002. Photographs were taken from the same places as those of previous years, along with a few photographs from new sites of interest. Additional observations were made on the effects of various factors such as lowered water levels, herbivory by Japanese beetles (*Popillia japonica*), parasitism by dodder (*Cuscuta* sp.), herbicide application, and isolation on survival and seed set on purple loosestrife plants. A new set of maps was prepared using the same base maps as those of the 2001 report, but adding the style-length of plant; using "S" for plants with short-styled flowers, "M" for medium style length, and "L" for long styles.

The 2003 survey, conducted in late July and early August by R. Freckmann and S. Schwab and accompanied one day by Daniel Cummins of Domtar, again followed previous surveys. Photographs were taken from most of the same vantage points as previous years, with a few new sites added. The style lengths of all accessible plants were recorded; however in a few large populations, style length was no longer recorded after all three style lengths had been observed in that population.

The 2004 survey was conducted by R. Freckmann and S. Schwab in August, accompanied by Daniel Cummins for part of one day, following the same procedures as the previous years. However, this year a GPS (global position system) unit was used to

determine exact locations for the photographs; these locations are listed in the appendix to this narrative.

DESCRIPTIONS OF THE PURPLE LOOSESTRIFE POPULATIONS IN 2004:

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 seven 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. 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 have 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 is obviously reduced from previous years. Purple loosestrife has 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*; American elm, *Ulmus americana*; green ash, *Fraxinus pennsylvanica*; dogwoods, *Cornus* spp.; grapes, *Vitis riparia*; and especially black locust, *Robinia pseudoacacia*; and glossy-leaved buckthorn, *Rhamnus frangula*.

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. Three medium-styled plants were 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 in 2003, was so deeply rooted among the rock retaining wall where State Highways 54 and 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. The total number of plants on the west bank in 2001 was between 20-25 plants.

The 2002 surveys showed a remarkable reduction in purple loosestrife in this same area. Only three plants were seen, one of which we removed and the other two were too deeply rooted for removal. The reduction in purple loosestrife might be attributed to at least three factors: the effects of removing plants in 2001, the desiccation of plants by lowering the water levels of the river, and weakening of plants by Japanese beetle herbivory. Water levels upstream from the Centralia Dam were substantially lower in August 2003 as construction work took place on the dam. A number of purple loosestrife plants were apparently killed when the water levels dropped below their root zone and obviously desiccated plants were seen along the river down to the Centralia Dam.

- Japanese beetles were abundant on scattered plants throughout the entire survey area, -
apparently concentrating on eating flower parts, especially pollen, and preventing seed
set. One of the two plants which could not be uprooted in the DC-305 area was heavily
damaged. Although Japanese beetles reportedly feed on a wide range of plants, most of
the beetles were seen on the loosestrife and only a few on nearby smartweed (*Polygonum*
spp.).

The purple loosestrife population appeared to increase slightly in 2003 compared
with 2002. Six of the approximately 20 plants present on the west bank of the Wisconsin
River were removed. The total purple loosestrife population in 2004 appeared to be
about the same as that of 2003. Plants were still scattered along the west bank of the
Wisconsin River and about ten of these plants were removed. One purple loosestrife
plant has now appeared on Belle Island. Figures 2-9 and 11-14 provide comparisons
from 1997 through 2004. The only change notable in these photographs in 2004 was that
vigorous growth of buckthorn and black locust has now choked out herbaceous plants,
including any potential loosestrife population, on a part of the west bank, as shown in
figure 4. Figure 10 shows a purple loosestrife plant removed from the west bank south of
the Riverview bridge, showing the buoyant root system which can allow plants to float
on the river and take root quickly when lodged against the bank.

The area in drawing DC-306 included only two large populations of purple loose-
strife in 1997 through 2000. By 2001 the purple loosestrife populations had reached in
excess of 100 plants. 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 included plants of all three style lengths, but in 2000
the population seemed to be smaller than in previous years, probably being crowded out
and shaded by a mixture of shrubs; goldenrods, *Solidago canadensis*, and *S. gigantea*;
bluejoint grass, *Calamagrostis canadensis*; etc. In 2001 only six plants remained and all
were long-styled; some of these were being crowded out by staghorn sumac, *Rhus*
typhina. Four new medium-styled plants were found on the west bank opposite the gap
between Garrison and Edwards Islands in 2002 and all were removed. Two more plants
were found along the boat landing, and both of these were removed in 2002. Several
more plants were removed in 2003 opposite Garrison Island, but one population had
grown to 20-30 plants, and most could not be removed.

The population of purple loosestrife on the west bank of the Wisconsin River has
changed little from 2003 to 2004. We removed several plants, but the population
opposite the north end of Garrison Island is too large, with many plants too deeply rooted
among rocks, to remove without extraordinary effort. Figures 15-18 show an interesting
case of fluctuating purple loosestrife on a large rock in the river near Garrison Island.
Purple loosestrife has been seen on this rock since 1997. Two plants were noted and
photographed here in 2001. These plants were apparently killed by desiccation following
a draw-down on the river in 2002. But plants returned in 2003 and are more vigorous this
year.

Figures 19-26 document variation in a population of few purple loosestrife on the Masonic Lodge grounds south of Boles Creek. Four plants were seen in 1998. None were seen in 1999, although they may have been present but cut off as the area had been mowed nearly to the water edge that year. Several plants were seen in 2000, and the population has grown steadily, except during the river draw-down in 2002.

Purple loosestrife has never been common on the east side of the river, although a few plants were seen at the end of Riverwood Lane in 2001, and all but two were removed that year. No plants were found on the east side of the river beyond the end of Riverwood Lane in 2002. In 2003, two new plants were found there and removed, and five were removed in 2004.

Figures 29-32 shows a low dam at the edge of wooded cribs at the Centralia Dam where purple loosestrife was absent in 1997, common by 2003, but no longer present in 2004. Between years 1997-2001 the surveys showed a large population of purple loosestrife around the Centralia dam and footpath. The construction work in 2002 eliminated this population and it has not returned as of 2004; figures 33-36 show four of the yearly photographs taken from the west end of the dam.

The hiking and biking trail area in DC-307, shown in figures 37-40, continues to be free of purple loosestrife. 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. This population increased slightly in 2003 and remains unchanged in 2004, as shown in figures 41 & 42. About 20 young plants had apparently become established in 2003 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 almost free of purple loosestrife in 2003, although a few more widely scattered plants were noted among the rocks in 2004.

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 have returned in 2000, but the population grew through 2002. Much of the population appears to have been killed by herbicides in 2003. 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. Figures 49 & 50 show a large stand of Amur silver-grass, *Miscanthus sacchariflorus*, which tends to exclude all other species, although a few purple loosestrife plants are persisting at the edge of the clone. The small population near the hydroelectric plant, as shown in figures 45-48, has remained about the same since 2000.

As noted in the reports of 1999, 2000, 2001, 2002, and 2003, 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. The plants are moderately common, but scattered. The appearance of new plants along some stretches of the river is roughly equal to the numbers which have disappeared along other stretches. However, as noted in the 2000 and 2003 reports, the wetland between the bend of the river the State Highway 73 has changed in the past six years from scattered to abundant purple loosestrife. Previously this was a fairly disturbed area dominated by narrow-leaved cattail, *Typha angustifolia*, with reed canary-grass on the slope.

Purple loosestrife continues to be scattered along the river bank in Riverside Park. Japanese beetles were noted on plants here in 2001 and 2002, but not in 2003 or 2004. Nearly all plants in Riverside Park were removed in 2002, but at least six new plants were present in 2003, and a few new plants were seen, and most removed, in 2004. However, figures 51-56 documents the gradual elimination of a purple loosestrife plant between 1999 and 2004 through the growth of competing vegetation and increased shade from the trees.

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 State 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 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 places the purple loosestrife has been crowded out where the wooded vegetation extends to the water edge. But in 2001 purple loosestrife was again abundant amid broadleaved cattails, *Typha latifolia*, wherever there was a flat area between the river and the dense growth of sumac, black locust, dogwoods, and willows (*Salix* spp.). By 2002 purple loosestrife greatly increased at the south edge of Riverside Park and now, in 2004, represents the largest population within the area of this survey (figures 57-59).

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 seems inevitable. The populations on

the east bank continued to increase through 2002, but were somewhat smaller in 2003 and 2004 (figures 60-63). The causes of this population reduction were not apparent.

CONCLUSIONS

The opinion of the principal investigator remains the same as that expressed in all earlier 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 eight years of these surveys. Any increase in purple loosestrife at one site seems to be offset by a reduction somewhere else. The 2002, 2003, and 2004 surveys reinforce the statement made in the 1999 report that the most striking observation 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 or hand-pulling loosestrife should be continued in area with low density populations. The large purple loosestrife populations south of Riverside Park would probably be a good area to release two beetles, *Galerucella pusilla* and *G. californiensis*, which are being raised by some area schools for loosestrife control. Because the beetles feed exclusively on purple loosestrife (and perhaps closely related species of *Lythrum*), they are most effective in reducing the number of plants in a large population where they will not eliminate their food source and die out. Because it is very difficult to eliminate an entire large population of purple loosestrife, the beetles can achieve the best realistic objective of keeping the purple loosestrife population small.

APPENDIX I

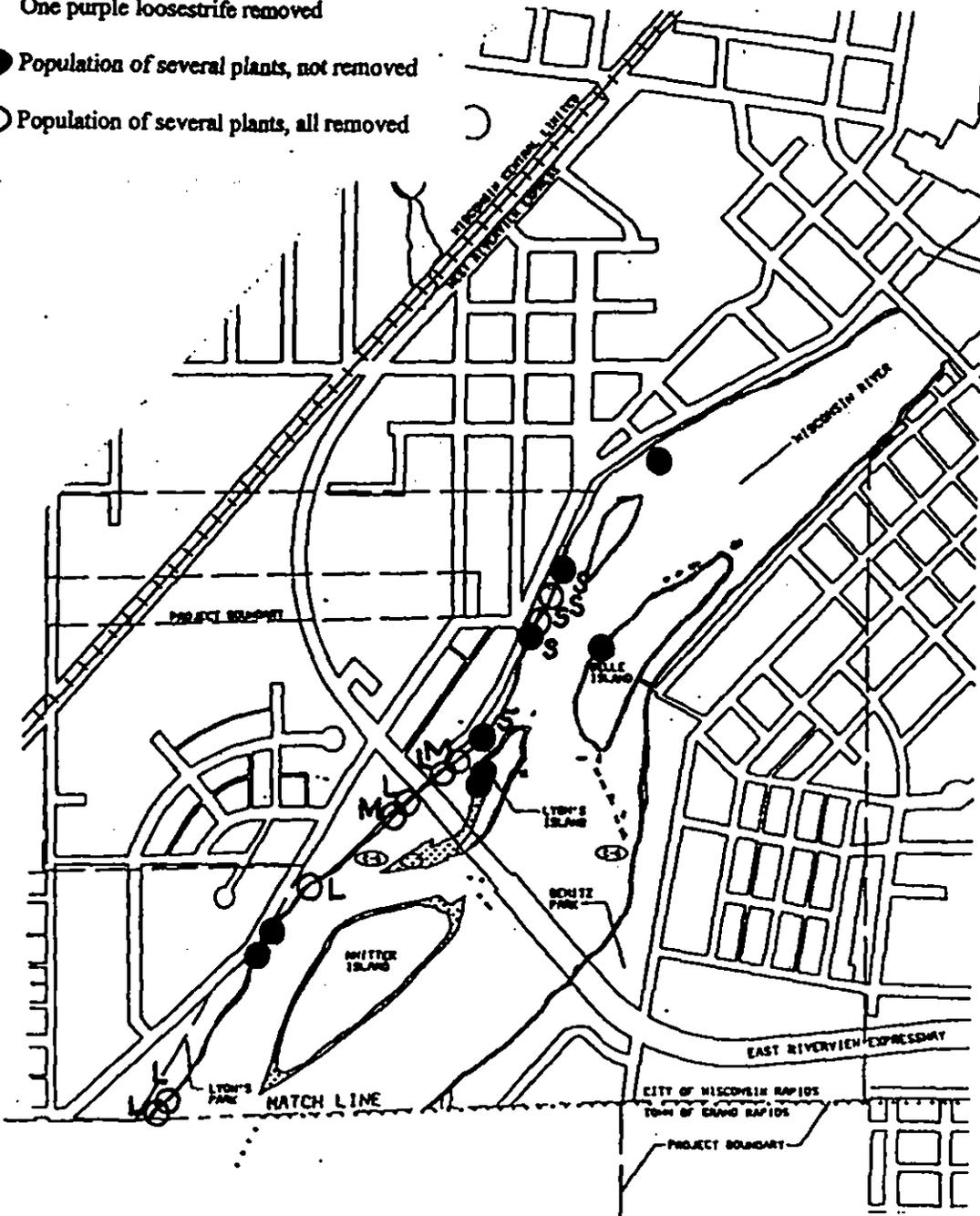
Global Position System Camera Locations for Figures

Fig. 1-4	44 23.214', 89 50.074
Fig. 5-9	44 23.155', 89 50.115'
Fig. 11-14	44 22.981', 89 50.393'
Fig. 15-18	44 22.455', 89 50.966'
Fig. 19-26	44 22.462', 89 51.055'
Fig. 27-28	44 22.459', 89 51.054'
Fig. 29-32	44 22.090', 89 51.453'
Fig. 33-36	44 22.065', 89 51.340'
Fig. 37-40	44 21.975', 89 51.308'
Fig. 41-44	44 20.969', 89 51.255'
Fig. 45-48	44 20.268', 89 51.405'
Fig. 49-50	44 20.684', 89 51.439'
Fig. 51-56	44 19.491', 89 53.290'
Fig. 57-59	44 19.187', 89 53.258'
Fig. 60-63	44 18.501', 89 53.903'

2004 SURVEY

MAP EQUIVALENT TO DC-305 OF PREVIOUS SURVEYS

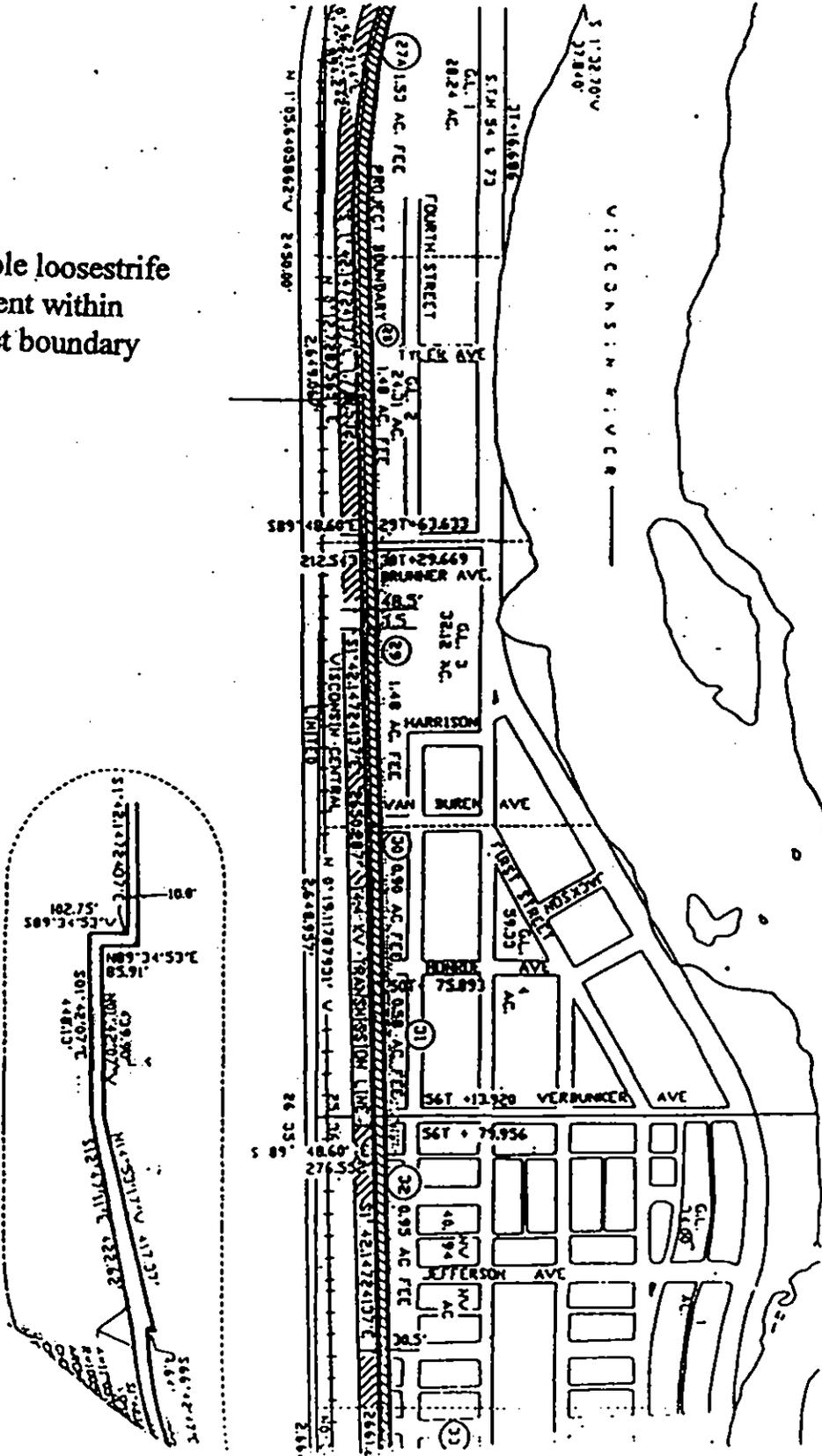
- One purple loosestrife present, not removed
- One purple loosestrife removed
- Population of several plants, not removed
- Population of several plants, all removed



2004 SURVEY

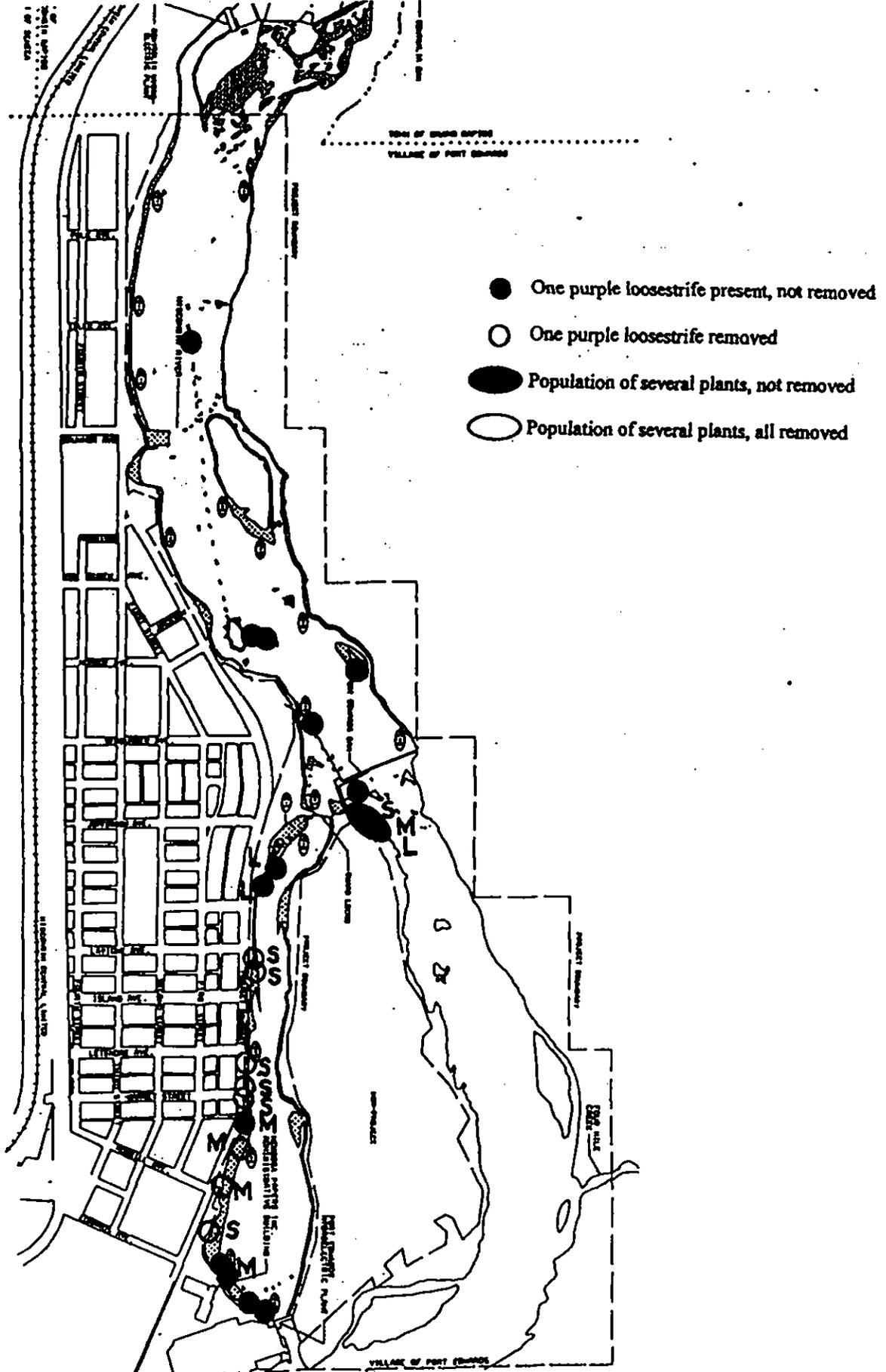
MAP EQUIVALENT TO DC-307 OF PREVIOUS SURVEYS

No purple loosestrife present within project boundary



2004 SURVEY

MAP EQUIVALENT TO DJ-2894 OF PREVIOUS SURVEYS



2004 SURVEY

MAP EQUIVALENT TO DN-2741 OF PREVIOUS SURVEYS

