

**PURPLE LOOSESTRIFE
MONITORING REPORT**

**SHAWANO HYDROELECTRIC
PROJECT
WOLF RIVER
SHAWANO, WISCONSIN**

August 29, 2007

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FERC PROJECT NO. 710
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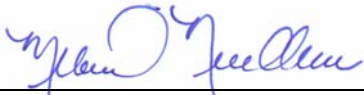
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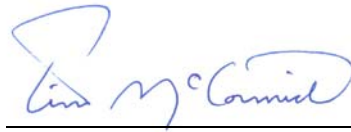
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1.0 EXECUTIVE SUMMARY

Northern Environmental Technologies, Incorporated (Northern Environmental) was contracted by Wolf River Hydro Limited Properties to conduct a purple loosestrife survey for a segment of the Wolf River located from the Keshena Bridge in Menominee County to 300 meters downstream of the hydroelectric dam in Shawano County. The purpose of the survey was to document individual and conglomerate occurrences of purple loosestrife within the dam reservoir area of the Wolf River.

The results of this survey indicate purple loosestrife has become more established in the project area over time as indicated by historical trends of total stand area and average percent coverage. Eradication efforts are planned for September 2007 to reduce the prevalence of purple loosestrife in the study area.

2.0 INTRODUCTION

Wolf River Hydro Limited Properties retained Northern Environmental Technologies, Incorporated (Northern Environmental) to conduct a purple loosestrife survey for a segment of the Wolf River located from the Keshena Bridge in Menominee County to 300 meters downstream of the hydroelectric dam in Shawano County (Figure 1). The purpose of the survey was to document individual and conglomerate occurrences of purple loosestrife within the dam reservoir area of the Wolf River.

According to the Wisconsin Department of Natural Resources (WDNR), purple loosestrife is a wetland herb that was introduced as a garden perennial from Europe during the 1800's. The plant's reproductive success across North America can be attributed to its wide tolerance of physical and chemical conditions characteristic of disturbed habitats, and its ability to reproduce prolifically by both seed dispersal and vegetative propagation. The absence of natural predators, like European species of herbivorous beetles that feed on the plant's roots and leaves, also contributes to its proliferation in North America.

Purple loosestrife was first detected in Wisconsin in the early 1930's, but remained uncommon until the 1970's. It is now widely dispersed in the state, and has been recorded in 70 of Wisconsin's 72 counties. Areas of heaviest infestation are sections of the Wisconsin River, the extreme southeastern part of the state, and the Wolf and Fox River drainage systems. This plant's optimal habitat includes marshes, stream margins, alluvial flood plains, sedge meadows, and wet prairies. It is tolerant of moist soil and shallow water sites such as pastures and meadows, although established plants can tolerate drier conditions. Purple loosestrife has also been planted in lawns and gardens, which is often how it has been introduced to many of our wetlands, lakes and rivers (WDNR, 2001).

3.0 METHODS

The survey was conducted on August 20, 2007 while plants were in peak bloom and easily identified by the survey team. The survey team consisted of Melanie Needham, Registered Engineer, an environmental engineer with experience in wetland plant identification, and Tom Reif, Technician, with experience in invasive species eradication. The shoreline upstream of the dam was surveyed by slowly boating along the shore. The area downstream of the dam was monitored by foot for a distance of approximately 300 meters. Locations of purple loosestrife occurrences were marked directly on scale maps of the study area.

Eight conglomerate stands of purple loosestrife, 100 m² or greater, were located during the survey. These stands are labeled Sites A through H on Figure 1 (attached). For each stand, the area was visually estimated and three samples were taken to determine percent cover, the number of purple loosestrife plants, and number of stems in a 1 m² area (Table 1). The percent cover was visually estimated by randomly tossing a 1 meter square. In addition, 186 individual occurrences of purple loosestrife were identified in the survey area.

4.0 DISCUSSION

4.1 Prevalence of Purple Loosestrife: Director Order (B) – The licensee shall annually survey the project reservoir at peak blooming for purple loosestrife

Purple loosestrife continues to have a dominant presence in the Wolf River Hydro Limited Partnership project area. Table 1 shows the stand area for each of the eight stands over 100 m² that were identified, as well as percent cover, number of purple loosestrife plants, and number of stems identified in randomly selected 1 m²

Table 1
2007 Survey Data – Purple Loosestrife Stands > 100 m²

	Area (sq m)	Sample			Average
		1	2	3	
Stand A	2,290				
% Cover		95	85	75	85
# of Plants		1	2	2	2
# Stems		75	40	30	48
# of stems/plant		75	20	15	37
Stand B	1,791				
% Cover		75	60	60	65
# of Plants		1	1	2	1
# Stems		12	10	25	16
# of stems/plant		12	10	13	12
Stand C	1,987				
% Cover		15	15	15	15
# of Plants		1	1	1	1
# Stems		5	5	5	5
# of stems/plant		5	5	5	5
Stand D	3,270				
% Cover		10	10	10	10
# of Plants		1	1	1	1
# Stems		5	5	5	5
# of stems/plant		5	5	5	5
Stand E	21,741				
% Cover		40	40	10	30
# of Plants		1	1	1	1
# Stems		12	12	5	10
# of stems/plant		12	12	5	10
Stand F	1,832				
% Cover		90	90	90	90
# of Plants		2	3	4	3
# Stems		20	21	20	20
# of stems/plant		10	7	5	7
Stand G	15,989				
% Cover		25	60	60	48
# of Plants		1	2	2	2
# Stems		15	25	15	18
# of stems/plant		15	13	8	12
Stand H	1,261				
% Cover		50	50	50	50
# of Plants		3	2	3	3
# Stems		28	20	30	26
# of stems/plant		9	10	10	10

Total Stand Area = 50,159 m²
 Average Percent Cover = 49%
 Average No. of Plants/m² = 2
 Average No. of Stems/m² = 19
 Average No. of Stems/Plant = 12

Sample areas in each of the stands. Figure 1 illustrates the location of the stands presented in Table 1, as well as the individual occurrences of purple loosestrife that were identified.

The stand labeled Site A on Figure 1 was not identified during the 2001 and 2002 surveys, but was present in 2003 and 2004. The size of this stand, as well as the percent cover and number of stems per plant has steadily increased since the stand was first identified in 2003, as shown in Table 2.

Table 2
Site A – Historical Trend

Site A	Survey Year		
	2003	2004	2007
Stand Area (m ²)	640	1638	2290
Percent Cover	12	37	85
No. Stems/Plant	6	13	37

The stand labeled Site B on Figure 1 was not identified during the 2001, 2002 and 2004 surveys, but was present during 2003. While this stand was observed to clear up from 2003 to 2004 to the point that no individual occurrences of purple loosestrife were observed in this area in 2004, the stand has become larger and denser in 2007 than was observed in 2003, as shown in Table 3.

Table 3
Site B – Historical Trend

Site B	Survey Year	
	2003	2007
Stand Area (m ²)	1262	1791
Percent Cover	3	65
No. Stems/Plant	6	12

At the location labeled Site C on Figure 1, a purple loosestrife stand greater than 100 m² had not been identified previously in the 2001, 2002, 2003 or 2004 surveys. In fact, individual plant occurrences had not been noted at that location since 2002.

The stand labeled Site D on Figure 1 had only individual plant occurrences in 2001, but was identified as a stand in 2002, 2003 and 2004. While the overall size of this stand has increased, the percent cover of purple loosestrife in the stand has decreased, as well as the number of stems per plant, as shown in Table 4.

Table 4
Site D – Historical Trend

Site D	Survey Year			
	2002	2003	2004	2007
Stand Area (m ²)	930	2057	1980	3270
Percent Cover	30	12	67	10
No. Stems/Plant	11	6	17	5

The stand labeled Site E on Figure 1 was noted as a stand location in all of the previously reviewed survey reports from 2001, 2002, 2003 and 2004. While the overall size of this stand was somewhat variable between 2001 and 2004, the stand is considerably larger in 2007 than what has been observed previously. However, the percent cover has decreased since 2004, as has the number of stems per plant. This information is summarized in Table 5.

Table 5
Site E – Historical Trend

Site E	Survey Year				
	2001	2002	2003	2004	2007
Stand Area (m ²)	10500	3700	12802	6720	21741
Percent Cover	30	5	4	79	30
No. Stems/Plant	21	6	5	22	10

The stand labeled Site F on Figure 1 was also noted as a stand area in 2002 and 2004, but not 2001 or 2003. The data collected in 2002, 2004 and 2007 show the size of the stand is not substantially different, and it is a very dense stand with approximately 90% cover of purple loosestrife. This information is summarized in Table 6, below.

Table 6
Site F – Historical Trend

Site F	Survey Year		
	2002	2004	2007
Stand Area (m ²)	1650	2002	1832
Percent Cover	90	92	90
No. Stems/Plant	8	30	7

The stand labeled as Site G on Figure 1 was observed in all of the previously reviewed surveys completed in 2001, 2002, 2003 and 2004. While this site declined in overall size from 2001 to 2002 and 2003, the stand increased in size in 2004 and has increased again in 2007. The percent cover of this stand increased from 2004 to 2007, but is not as high as the density observed in 2002. The number of stems per plant has remained relatively consistent, with a slight increase observed in 2004 and 2007. This information is summarized in Table 7, below.

Table 7
Site G – Historical Trend

Site G	Survey Year				
	2001	2002	2003	2004	2007
Stand Area (m ²)	15000	4200	4572	12650	15989
Percent Cover	12	60	7	33	48
No. Stems/Plant	6	8	6	15	12

Site H, as shown on Figure 1, was not identified as a purple loosestrife stand in any of the previously completed survey reports from 2001, 2002, 2003 and 2004. However, this site appears to lie just outside the survey area, defined as 300 m downstream of the hydroelectric dam.

A summary of data from the entire survey area is present in Table 8, below.

Table 8
Entire Survey Area – Historical Trend

	Survey Year				
	2001	2002	2003	2004	2007
Total Stand Area (m ²)	44800	14120	21973	33408	50159
Average Percent Cover	12	60	7	33	48
Ind. Occurrences	N/A	201	154	191	186

A review of the 2007 survey data indicate purple loosestrife continues to occur in areas where it has been observed in years past, and that these stands are remaining stable or increasing in size. In addition, purple loosestrife stands are becoming established at new locations in the study area. This translates to an increasing trend of stand size within the survey area. The average percent cover has also increased over time, with the exception of a spike in 2002, indicating the density of purple loosestrife within these stands is also increasing. However, the number of individual occurrences has remained relatively stable over time, indicating the increased prevalence of purple loosestrife in the Wolf River Hydro Limited Partnership project area can be attributed to continued growth of established stand areas, and new stand areas becoming established.

4.2 Removal of Purple Loosestrife: Director Order (C) – The licensee shall take appropriate steps to physically remove any purple loosestrife plants at the time of detection from within the project boundary

Eradication of purple loosestrife within the Wolf River Hydro Limited Partnership project area will be completed in September 2007. Eradication will be completed via physical removal of the plants, which will be collected in plastic bags and disposed of at a licensed solid waste disposal facility. Receipts of this disposal will be received and held on file as confirmation that the eradication and disposal was completed.

4.3 Education: Director Order (D) – The licensee shall obtain brochures on purple loosestrife from the Fish and Wildlife Service (FWS) and place them at access points to the hydropower project

Brochure holders are located at two public access boat landings on the Wolf River. They are approximately ¾ of a mile upstream from the dam. The holders are made of weather proof plastic and mounted on treated wood.

5.0 CONCLUSIONS

Purple loosestrife has been surveyed and monitored in the project area since 1992. Surveys completed in 2001, 2002, 2003 and 2004 were reviewed prior to completion of this report. Based on the data reviewed from these reports and the survey data collected in 2007, purple loosestrife has become more established in the project area as indicated by total stand area and average percent coverage. Since no physical removal of purple loosestrife occurred in 2003 and 2004, it will be instructive to note whether eradication efforts in 2007 result in decreased incidence of the plant in future surveys.

6.0 REFERENCES

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