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Designing the future

December 22, 2010

Ms. Kimberly D. Bose
Office of the Secretary
Federal Energy Regulatory Commission
Mail Code: DHAC, PJ-12.3
888 First Street, NE
Washington, DC 20426

Subject: *Invasive Plant Monitoring Report*
Sturgeon Falls Hydroelectric Project – FERC Project No. 2720
City of Norway, Michigan, Licensee

Dear Secretary Bose:

Article 406 of the Federal Energy Regulatory Commission (FERC) license for the Sturgeon Falls Hydroelectric Project requires the licensee to monitor the presence of Eurasian watermilfoil and purple loosestrife in project waters, and to implement measures to control their spread. The City of Norway's FERC-approved *Invasive Plant Monitoring Plan* specifies monitoring and reporting procedures.

Enclosed are one original and seven copies of *the Invasive Plant Monitoring Report* for calendar year 2010. Documentation of consultation with resource agencies is included in the report. If you have any questions regarding this submission or require additional information, please contact me.

Sincerely,

MEAD & HUNT, Inc.

Linda D. Mitchell

Linda D. Mitchell
Hydropower Compliance Specialist

Enclosures

cc: Ms. Jessica Mistak – Northern Lake Michigan Supervisor, DNRE Fisheries Division
Mr. Nick Utrup – U.S. Fish & Wildlife Green Bay Ecological Services Field Office
Mr. Joe Pickart – City of Norway

Mead & Hunt Inc. 6501 Watts Road Madison Wisconsin 53719-2700
608 273 6380 fax: 608 273 6391 www.meadhunt.com

Original

ORIGINAL

Invasive Plant Monitoring Report

Sturgeon Falls Hydroelectric Project

FERC Project No. 2720

Menominee River
Dickinson County, Michigan
Marinette County, Wisconsin

Report prepared for

City of Norway, Michigan

Report prepared by

Mead & Hunt
www.meadhunt.com

December 2010

Table of Contents

Appendices

1. Introduction

This *Invasive Plant Monitoring Report* for the Sturgeon Falls Hydroelectric Project has been prepared in conformance with requirements of the City of Norway's *Invasive Plant Monitoring Plan*, pursuant to Article 406 of the Federal Energy Regulatory Commission's (FERC) July 5, 2005, license order. Section 4 of the City's *Invasive Plant Monitoring Plan*, which has been approved by the FERC, calls for monitoring once per year through year 2010, followed by monitoring once every two years thereafter, during even-numbered years, for the term of the license. The City must file reports of monitoring with resource agencies and with the FERC. Reports filed with the FERC must include copies of agency comments and recommendations on the report, and specific descriptions of how the agencies' comments are accommodated.

Contents of this *Invasive Plant Monitoring Report* include:

- A *Progress Report for the Implementation of the Milfoil Solution Program for Eurasian Watermilfoil Control and Aquatic Vegetation Monitoring for Sturgeon Falls, Sturgeon River, MI* prepared by EnviroScience, Inc., presenting results of aquatic vegetation monitoring and detailing implementation of biological measures to control Eurasian Watermilfoil at the Sturgeon Falls reservoir.

- Copies of resource agency comments and recommendations, and descriptions of how the agencies' comments are accommodated.

- A discussion of future monitoring plans.

2. Monitoring Report

The above-referenced progress report, entitled *Progress Report for the Implementation of the Milfoil Solution Program for Eurasian Watermilfoil Control and Aquatic Vegetation Monitoring for Sturgeon Falls, Sturgeon River, MI*, is presented as Appendix A. The report presents results of field surveys to monitor the presence of Eurasian Watermilfoil and milfoil weevils (*Euhrychiopsis lecontei*), the presence of purple loosestrife (absent), and to access aquatic vegetation based on standard approved methods including visual and rake tow surveys. The presence and relative density of each aquatic plant species is presented, as well as approximate percent cover.

3. Consultation

A. Resource agency comments

A copy of the *Progress Report for the Implementation of the Milfoil Solution Program for Eurasian Watermilfoil Control and Aquatic Vegetation Monitoring for Sturgeon Falls, Sturgeon River, MI*, was provided by e-mail on December 6, 2010, to the Michigan Department of Natural Resources and Environment (MDNRE) and the U.S. Fish and Wildlife Service Green Bay Ecological Services Field Office. Resource agency comments and responses are provided below and documented in Appendix B.

Michigan Department of Natural Resources and Environment
Jessica Mistak – Northern Lake Michigan Supervisor, MDNRE Fisheries Division

Comment:
The results of the weevil survey are very promising in managing Eurasian Watermilfoil at the Sturgeon Falls Project. We appreciate the level of interest and cooperation expressed by the City of Norway in addressing this issue.

The report is not clear on proposed or required next steps. It would be helpful to outline what, if anything, is required by the license in addition to what may be recommended by EnviroScience. Please also include a timeline for future actions.

U.S. Fish and Wildlife Service
Nicholas Utrup - Hydropower Coordinator

Comment:
I concur with Jessica's comments.

B. Licensee response to resource agency comments

The City agrees with the MDNRE's assessment of results of its Eurasian Watermilfoil management efforts.

As noted in Section 1 of this *Invasive Plant Monitoring Report*, the City's FERC-approved *Invasive Plant Monitoring Plan calls for* monitoring once per year through year 2010, followed by monitoring once every two years thereafter, during even-numbered years, for the term of the license. The City intends to continue its monitoring effort in accordance with this schedule. This plan is consistent with EnviroScience's recommendation that weevil stocking sites be regularly monitored in order to implement a management plan should Eurasian Watermilfoil experience resurgence.

The next monitoring survey is scheduled for 2012. Control efforts will be determined based on results of that monitoring survey.

Appendix A. *Progress Report for the Implementation of the Milfoil Solution Program for Eurasian Watermilfoil Control and Aquatic Vegetation Monitoring for Sturgeon Falls, Sturgeon River, MI*

Progress Report for the Implementation of the Milfoil Solution® Program for Eurasian Watermilfoil Control and Aquatic Vegetation Monitoring for Sturgeon Falls, Sturgeon River, MI

Prepared for:

City of Norway, Power and Light

Prepared by:

EnviroScience, Inc.,
3781 Darrow Road, Stow, Ohio 44224
(800) 940-4025 · www.enviroscienceinc.com

December 6, 2010

1.0 Introduction

The City of Norway, Power and Light is required to manage the infestation and excessive growth of Eurasian watermilfoil *(Myriophyllum spicatum)* (EWM) and Purple Loosestrife (*Lythrum salicaria*) to comply with their FERC (Federal Energy Regulatory Commission) license. Milfoil weevils (*Euhrychiopsis lecontei*) have the potential to provide an environmentally safe alternative to traditional milfoil control techniques such as harvesting and herbicides. These traditional control methods are expensive, do not selectively target milfoil, and must be used repeatedly. In contrast, weevils provide a sustainable and extremely species-specific control of EWM. Using the Milfoil Solution® program (formerly MiddFoil®), the milfoil weevil is being investigated for its potential for controlling EWM in the Sturgeon Falls Hydroelectric Project area.

2.0 Overall Project Description

The City of Norway, Power and Light began a Milfoil Solution® program in the summer of 2008 stocking approximately 10,000 weevils in one site within the Sturgeon River. A second stocking event occurred on June 25, 2009, stocking 22,000 (12,000 contracted, 10,000 extra) weevils in two new locations: S2 and S3. The follow up survey occurred seven weeks later on August 17, 2009. A third stocking event occurred on June 24, 2010 in which 16,000 weevils were stocked in two new locations: S4 and S5 (Figure 1). The follow up survey was completed August 7, 2010. During the initial and follow-up surveys, qualitative and quantitative measurements are gathered in the field: Qualitative information gathered at each site includes native aquatic plant identifications, EWM observations, and observations of the presence and extent of weevils. Quantitative data measured includes analyses of three series of 10 stems (transects) (App. A, Table 2) taken from each site and three EWM density measurements (App. A,, Table 3). Transect stems are examined under a microscope and all life stages of the weevil are counted and

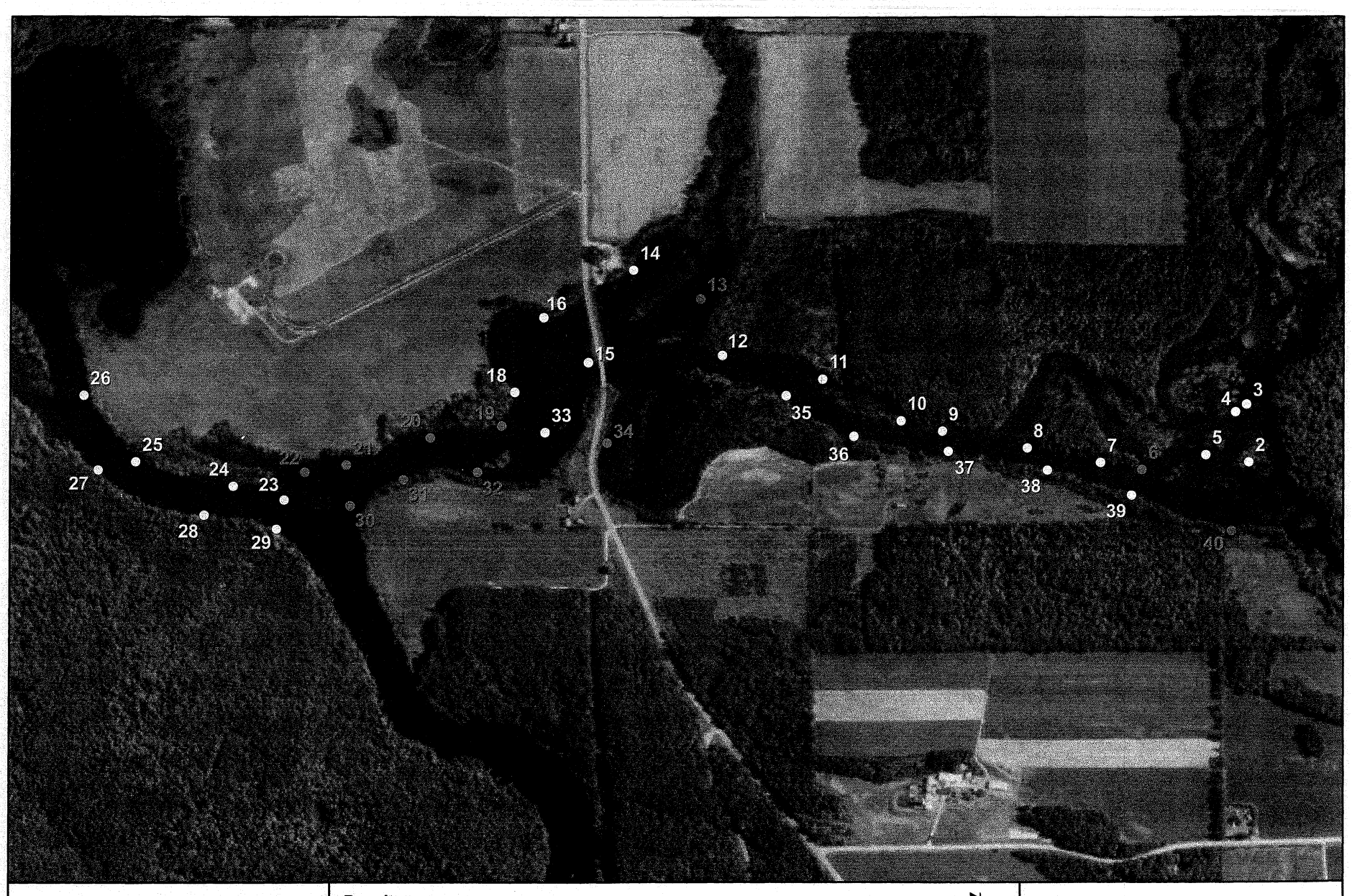

Figure 1. 2010 Sturgeon Falls Hydroelectric Project Survey Points.

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recorded along with the presence of any weevils damage. The data provides milfoil weevil population density estimates. EWM densities are gathered by collecting plants from a 0.09 m^2 PVC quadrat. The number of stems of EWM are counted and then converted to a number of plants per square meter. These measurements help to indicate any fluctuations in density of the milfoil beds over time.

3.0 2008 and 2009 Results Summary

The initial survey for the 2008 Milfoil Solution® program revealed the presence of an indigenous population of milfoil weevils, indicating that the river holds the necessary conditions to maintain a weevil population. Approximately 10,000 weevil eggs and larvae were stocked in one continuous dense milfoil bed, named S1, along the southern shore, southeast of the boat launch of the Sturgeon River on June 18, 2008. In addition to the EWM, a healthy native submersed plant community was observed.

By the time of the follow up survey performed at S1 on August 12, 2008, laboratory examination revealed an extraordinary increase in weevil life stages on the 30 stems collected from 13 early in the season to 68 weevil life stages at the time of the follow-up survey (App. A, Table 1). Additionally, the density of EWM decreased by more than half per square meter by the time of the August survey (App. A,, Table 2).

The second year of stocking occurred on June 25, 2009. An initial survey revealed that the EWM at S1 was sparse and unsuitable for stocking, with EWM composing roughly 10% of the plant community. Weevil adults, eggs and larvae were observed at this site, and damage from weevil larvae was estimated to be on 60% of the plants. Two new sites were then established: Site 2 (S2) and Site 3 (S3). S2 is located northwest of S1, closer to the channel of the river. The third stocking site, S3 is located to the east at the mouth of Hamilton Creek (Figure 1). The overall density of EWM at S2 was

ranked as dense and dominant, comprising approximately 95% of the aquatic plant community. Weevils were observed in the field, and approximately less than 5% of the plants exhibited weevil-induced damage. The EWM at S3 was moderately dense with 15% at the surface and flowering, with weevil-induced damage seen on 20% of the plants. Multiple weevil life stages were found in all three sites (App. A,, Table 1). After the initial survey was complete, 12,000 weevils were stocked in S2 and 10,000 weevils were stocked in S3.

On August 17, 2009, follow-up surveys for sites S1, S2, S3, were conducted. The once large bed of EWM in S1 found in 2008 and observed during the initial 2009 survey had decreased to sparse, sporadic stems and native macrophytes were the dominant species. Laboratory analyses of 30 transect stems revealed a high weevil count at S1 (3.07 weevils/stem). The overall density of EWM in S2 was sparse to moderate and the plants were still below the surface as seen during the initial survey. Many of the plants were lying on the bottom, covered in algae with new healthy meristems starting to grow. However, weevil damage was observed on the new growing tips. The overall density of EWM in S3 was sparse, and the composition of the plant community changed drastically with native aquatic plants making up 75% of the species present. Weevil damage was observed on 50% of the EWM plants and 10% on Northern watermilfoil plants. Laboratory analyses of the transect samples revealed weevil life stages and weevil-induced damage to the EWM at all three sites (App. A, Table 1.).

4.0 2010 Results

Initial Survey

On June 24, 2010, an EnviroScience field team surveyed S1 and S2 (they were unable to perform an initial survey at S3). Due to the sparse milfoil at these sites, two new stocking sites were established: S4 and S5. S4 is located southwest of the boat launch area, west of the County Rd 577/River Rd. bridge. S5 is located approximately 600m west of S4, at the confluence of the Sturgeon and Menominee rivers (Figure 1). After the initial surveys were

complete, 7,000 weevils were stocked in S4 and 9,000 weevils were stocked in S5.

The overall density of EWM at S1 was sparse and close to the shoreline, making up less than 5% of the aquatic plant community. The remaining macrophytes included Bladderwort (*Utricularia vulgaris*), Chara (*Chara spp.),* Elodea (*Elodea canadensis*), Flat-stem pondweed (*Potamogeton zosteriformis*), Northern watermilfoil (*Myriophyllum sibiricum*), Thread-leaf pondweed (*Potamogeton fiiliformis*), Variable watermilfoil (*Myriophyllum heterophyllum*) and White-stem pondweed (*Potamogeton praelongus*). Most of the EWM stems were brown and damaged, with few red meristems observed. Extensive weevil-induced damage and life stages were found on the transects upon further analysis. The EWM at this site was too sparse to take a density measurement, with less than 1 stem/m^2.

The EWM bed at S2 was narrow and close to the shoreline, with a density ranking of moderate. EWM made up approximately 10% of the aquatic plant community. The remaining macrophytes included Coontail (*Ceratophyllum demersum*), Elodea, Flat-stem pondweed, Lilies (*Nuphar spp.),* Northern watermilfoil, Thread-leaf pondweed and White-stem pondweed. Most of the EWM stems were green and healthy, with 10% displaying weevil-induced damage. This site was not suitable for stocking weevils as extensive weevil-induced damage and life stages were found in the field. The transect analysis confirmed the presence of a high weevil population density with 1.57 weevils/stem (App. A,, Table 1). The average density of EWM at this site was found to be 40.67 stems/m^2.

A new stocking site, S4, was established and contained a density rating of moderate and existing weevil damage estimated to 25% of the stems. EWM made up 40% of the aquatic plant community with the remainder including Elodea, Flat-stem pondweed, Northern watermilfoil, Thread-leaf

pondweed and White-stem pondweed.. Adult weevil life stages were seen in the field, and lab analysis revealed further weevil life stages as well as weevil-induced damage. The average density of EWM at this site was found to be 55.56 stems/m^2. 7,000 weevils were stocked at S4 after the initial survey and an orange buoy was placed to mark the site.

A second new stocking site, S5, was established and contained a density rating of moderate and about 5% weevil damage. EWM made up 80% of the aquatic plant community with the remainder including Bladderwort, Coontail, Elodea, Flat-stem pondweed, Thin-leaf pondweed, Water lilies, White-stem pondweed and Wild celery (*Vallisneria americana*). Adult weevil life stages were observed in the field, and lab analysis revealed additional weevil life stages as well as weevil-induced damage. The average density of EWM at this site was 51.78 stems/m^2. 9,000 weevils were stocked at S5 after the initial survey and an orange buoy was placed to mark the site.

Follow up Survey

On August 7, 2010, follow-up surveys for sites S1-S5 were conducted. The EWM at S1 was completely absent, and no transect samples were able to be taken.

The EWM bed at S2 was very sparse and made up less than 1% of the plant community. The remaining macrophytes recorded were Elodea, Spatterdock (*Nuphar variegata)* and White water buttercup (*Ranunculus longirostris*). The few EWM stems remaining were covered in algae and lab analysis revealed multiple weevil life stages and extensive damage. The average density of EWM at S2 was <0.05 stems/m^2. In addition, zebra mussels were found on a submersed branch nearby.

A follow-up survey was conducted at S3, a stocking site from 2009. EWM made up 30% of the aquatic plant community with the remainder

including Bladderwort, Coontail, Elodea, Spatterdock, Water stargrass (*Zosterella dubia*) and White-stem pondweed. Adult weevil life stages were seen in the field, and lab analysis revealed further weevil life stages as well as extensive weevil-induced damage. The average density of EWM at this site was 20.33 stems/m^2.

EWM at S4 during the follow-up survey made up roughly 60% of the aquatic plant community., The EWM around the orange buoy was largely removed, with most of the bed towards the center of the bay. Other macrophytes observed included Coontail, Illinois pondweed (Potamogeton *illinoensis*), Water stargrass and Wild celery. A high density of weevil life stages (1.30 weevils/stem) and damage were found on the transect stems analyzed in the lab. The average density of EWM at this site was 33.33 stems/m^2.

EWM at S5 during the follow-up survey made up a small percentage of the aquatic plant community, with most species identified as Coontail, Water stargrass, and Elodea. A high number of weevil life stages (1.27 weevils/stem) and damage were found in the lab on the transect stems. EWM stems were reported as brown and unhealthy, with a low density average of 2.78 stems/m^2.

5.0 Discussion

Over the past three years of the Milfoil Solution® program, dramatic decreases in average EWM densities have been observed at S1, S2 and S3. These sites have been managed to the point where the diverse native plant community has successfully moved in and now makes up a majority of the species composition. At this point, EWM at S1 and S2 is largely removed and maintains high numbers of weevils on the few stems that remain. The initial surveys of S4 and S5 revealed an exisitngweevil population, which may be due to a natural population or to the weevils migrating from adjacent beds as their healthy supply of EWM diminishes at other sites. Both scenarios are possible as S1 was found to contain a native weevil population during the initial 2008 survey. While the

new sites displayed a decrease in average EWM densities during the follow-up survey, these numbers are best viewed long-term and compared to subsequent years to more accurately view overall trends in the plant community. All sites continue to maintain relatively high numbers of weevil populations and have experienced a consistent decrease in EWM density while the diverse native plant community thrives. Regular monitoring of the stocked sites is recommended in order to implement a management plan should the EWM experience resurgence.

6.0 AVAS Plant Survey

Qualitative vegetation sampling was performed on August 7, 2010, using the Michigan DEQ guidance contained in Standard Procedures for Surveying Aquatic Plants. This method involves performing visual and rake tow surveys along sections of the littoral zone. For the Sturgeon Falls Project area, the shoreline of the Menominee and Sturgeon Rivers was divided into 40 sections (Figure 1). In each of these zones, the presence and relative density of each aquatic plant species was determined, and the information was recorded on the Standard Aquatic Vegetation Assessment Site Species Density Sheet (AVAS) developed by the State of Michigan (App. B) The approximate percent cover was reported rather than narrative ranges. On the summary sheet, however, these percentages were translated into cover codes A, B, C, and D to describe the approximate coverage of each plant within the map area, as described in the following table.

Cover Code	Approximate Cover Range
A	1-2%

B	3-20%
C	21-60%
D	61-100%

Visual and rake surveys were performed at each site until no new species were encountered and the biologist conducting the survey was confident that adequate information had been obtained to estimate the density of each species encountered. Species of questionable identity were placed in a plastic bag, appropriately labeled and identified using taxonomic keys at the completion of the survey. The boundary of each AVAS was determined using differential GPS technology.

7.0 Survey Findings

The August survey identified eighteen different plant species. One exotic submersed aquatic species was present, Eurasian watermilfoil (EWM), which was found in 23 of the 40 AVAS locations, making up 7.0 percent cumulative cover (CC). Most EWM locations were given a score of A (1-2%) or B (3-20%). The calculated cumulative cover value shows that the Sturgeon Falls project area currently contains four dominant native species: Buttercup (5.55 CC), Wild celery (4.63 CC), Spadderdock (4.25 CC) and Coontail (4.05) (App. B, Table 3). Other species were found less frequently such as Northern watermilfoil, Chara, Lilies, Arrowhead, Bladderwort, Elodea and various other pondweed species. Purple Loosestrife was not identified within the boundary waters of the Sturgeon Falls project area.

8.0 Discussion

The AVAS survey was first used in 2009 to measure the exotic species occurrence in the Sturgeon Falls Project area. This survey gives a cumulative cover percentage of every species identified within the survey

area. EWM was found to be sparsely distributed throughout most of the project area and was only given a ranking of D (61-100% cover range) in two site numbers. Weevil population surveys have not been conducted throughout the entire survey area, but may be a contributing factor to the decrease in EWM percent cover observed from 13.7 (2009) to 7.00 (2010).

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Appendix A

2008-2010 Progress Report Data Tables for Sturgeon

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Table 1. Summary Data from Site Transect Analysis of EWM During 2008-2010 Initial and Follow-up Surveys of Sturgeon River

Site #	Parameter Measured	Initial Survey 6/18/08	Follow-up Survey 8/12/08	Initial Survey 6/25/09	Follow-up Survey 8/17/09	Initial Survey 6/24/10	Follow-up Survey 8/ 7/10
S1	Total weevils	13.00	68.00	89.00	25.00	20.00	-
	Total stems	30.00	30.00	29.00	30.00	28.00	-
	Average weevils/stem	**0.43**	**2.27**	**3.07**	**0.83**	**0.71**	-
	Avg. meristems/stem	2.00	1.90	2.00	2.17	2.00	-
S2	Total weevils	***	***	21.00	20.00	47.00	19.00
	Total stems	***	***	29.00	30.00	30.00	30.00
	Average weevils/stem	***	***	**0.72**	**0.67**	**1.57**	**0.63**
	Avg. meristems/stem	***	***	1.59	1.50	2.10	1.37
S3	Total weevils	***	***	79.00	3.00	-	39.00
	Total stems	***	***	30.00	30.00	-	30.00
	Average weevils/stem	***	***	**2.63**	**0.10**	-	**1.30**
	Avg. meristems/stem	***	***	1.59	2.27	-	1.70
S4	Total weevils	***	***	***	***	24.00	10.00
	Total stems	***	***	***	***	28.00	28.00
	Average weevils/stem	***	***	***	***	**0.86**	**0.36**
	Avg. meristems/stem	***	***	***	***	2.21	2.14
S5	Total weevils	***	***	***	***	7.00	38.00
	Total stems	***	***	***	***	30.00	30.00
	Average weevils/stem	***	***	***	***	**0.23**	**1.27**
	Avg. meristems/stem	***	***	***	***	2.73	1.13

*** = site not yet established
- = data not available

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Table 2. Average Density of Eurasian Watermilfoil (stem/m^2) Collected During the 2008-2010 Initial and Follow-up Surveys on the Sturgeon River

Site #	6/18/08	8/12/08	6/25/09	8/17/09	6/24/10	8/ 7/10
S1	103.33	33.33	9.22	1.76	0.00	0.00
S2	***	***	100.00	33.33	40.67	0.00
S3	***	***	66.67	70.00	-	20.33
S4	***	***	***	***	55.56	33.33
S5	***	***	***	***	51.78	2.78

*** = site not yet established
- = data not available

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Appendix B

Standard Aquatic Vegetation Assessment Site Species Density Sheets, Summary Sheet and Table

Table 3. Aquatic Plant Species Encountered in Sturgeon Falls

3781 DARROW ROAD, STOW, OHIO 44224
330-688-0111 / TOLL FREE: 800-940-4025 / FAX: 330-688-3858

Lake Name: Sturgeon River County: Dickinson Co. Surveyor Name: Thomas Alwin Survey Date: August 7, 2010

Standard Aquatic Vegetation Assessment Site Species Density Sheet

Code No.	Plant Name	Aquatic Vegetation Assessment Site Number							
		NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8
1	Eurasian watermilfoil	d				a	b	a	
2	Curly leaf pondweed								
3	Chara		b						
4	Thin leaf pondweed								
	flatstem pondweed								
5	Robbins pondweed								
6	White stem pondweed	b	a				a	a	
7	Richardsons pondweed								
8	flatstem pondweed		a			a			
9	Large leaf pondweed								
10	Variable pondweed								
11	Illinois pondweed								
12	Water stargrass	a		c	a	b	c	c	a
13	Wild celery						a		a
14	Arrowhead (submergent)				a				
15	Northen watermilfoil							a	
16	Whorled watermilfoil								
17	Coontail	a	b	a		a			
18	Spatterdock	b	b					b	
19	Elodea	b	a				a		
20	Bladderwort	a	a			a			
21	Bladderwort (mini)								
22	Buttercup		c			b	b		
23	Najas spp.								
24	Brittle naiad								
25	Sago pondweed		a						
26	water merigold								
27	small pondweed								
28	White waterlily								
29	Yellow waterlily								
30	Watershield								
31	Small duckweed								
32	Great duckweed								
33	Watermeal								
34	Arrowhead								
35	Pickerelweed								
36	Arrow arum								
37	Cattail								
38	Bulrush								
39	Iris								
40	Swamp Loosestrife								
41	Carex spp								
42	Rush spp								
43	Burr Reed								
44	Long Leaf Pondweed								

Code No.	Plant Name	Aquatic Vegetation Assessment Site Number							
		NO. 9	NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16
1	Eurasian watermilfoil			a		b		a	a
2	Curly leaf pondweed								
3	Chara								
4	Thin leaf pondweed								
5	Robbins pondweed								
6	White stem pondweed							a	
7	Richardsons pondweed								
8	flatstem pondweed	a	a		a				
9	Large leaf pondweed								
10	Variable pondweed								
11	Illinois pondweed					b			a
12	Water stargrass			b	b	c	c	b	b
13	Wild celery		a	b			c	b	b
14	Arrowhead (submergent)								
15	Northern watermilfoil							a	
16	Whorled watermilfoil								
17	Coontail				a		a	b	
18	Spatterdock			b	a	c	c	b	b
19	Elodea						c	a	
20	Bladderwort			a	a			a	
21	Bladderwort (mini)								
22	Buttercup						b	b	
23	Najas spp.				a	a			
24	Brittle naiad								
25	Sago pondweed							a	
26	water merigold								
27	small pondweed								
28	White waterlily		a			a			a
29	Yellow waterlily								
30	Watershield								
31	Small duckweed								
32	Great duckweed								
33	Watermeal								
34	Arrowhead		a						
35	Pickerelweed								
36	Arrow arum								
37	Cattail								a
38	Bulrush								
39	Iris								
40	Swamp Loosestrife								
41	Carex spp								
42	Rush								a
43	Burr Reed								
44	Long Leaf Pondweed								

Lake Name: Sturgeon River County: Dickinson Co. Surveyor Name: Thomas Alwin Survey Date: August 7, 2010

Standard Aquatic Vegetation Assessment Site Species Density Sheet

Code No.	Plant Name	Aquatic Vegetation Assessment Site Number							
		NO. 17	NO. 18	NO. 19	NO. 20	NO. 21	NO. 22	NO. 23	NO. 24
1	Eurasian watermilfoil	d	a	b	b	b	b	a	
2	Curly leaf pondweed								
3	Chara								
4	Thin leaf pondweed								
5	Robbins pondweed								
6	White stem pondweed	a							a
7	Richardsons pondweed								
8	flatstem pondweed	b	a			a			
9	Large leaf pondweed								
10	Variable pondweed								
11	Illinois pondweed			a	a		a		
12	Water stargrass			b	a	b	c	c	a
13	Wild celery								
14	Arrowhead (submergent)								
15	Northern watermilfoil	b							
16	Whorled watermilfoil								
17	Coontail		c	a	b	b	b		b
18	Spatterdock	a			b	b	a	a	
19	Elodea	a	b	a					
20	Bladderwort	a		a					
21	Bladderwort (mini)								
22	Buttercup	c	c						
23	Najas spp.								
24	Brittle naiad								
25	Sago pondweed	a							
26	water merigold								
27	small pondweed								
28	White waterlily	a			a				
29	Yellow waterlily								
30	Watershield								
31	Small duckweed								
32	Great duckweed								
33	Watermeal								
34	Arrowhead								
35	Pickerelweed								
36	Arrow arum								
37	Cattail				a	a	a		
38	Bulrush								
39	Iris								
40	Swamp Loosestrife								
41	Carex spp								
42	Rush				a				
43	Burr Reed								
44	Long Leaf Pondweed								

Code No.	Plant Name	Aquatic Vegetation Assessment Site Number							
		NO. 25	NO. 26	NO. 27	NO. 28	NO. 29	NO. 30	NO. 31	NO. 32
1	Eurasian watermilfoil				a		b	b	b
2	Curly leaf pondweed								
3	Chara								
4	Thin leaf pondweed								
5	Robbins pondweed								
6	White stem pondweed	b			a	a		a	
7	Richardsons pondweed								
8	flatstem pondweed						a		a
9	Large leaf pondweed								
10	Variable pondweed								
11	Illinois pondweed							a	a
12	Water stargrass				b	a	b	b	a
13	Wild celery	b			c	b	c	b	b
14	Arrowhead (submergent)								
15	Northern watermilfoil								
16	Whorled watermilfoil								
17	Coontail	a			a		a	a	a
18	Spatterdock					a		a	a
19	Elodea						a		a
20	Bladderwort								a
21	Bladderwort (mini)								
22	Buttercup							b	
23	Najas spp.								a
24	Brittle naiad								
25	Sago pondweed								
26	water merigold								
27	small pondweed								
28	White waterlily	a							
29	Yellow waterlily								
30	Watershield								
31	Small duckweed								
32	Great duckweed								
33	Watermeal								
34	Arrowhead								
35	Pickerelweed								
36	Arrow arum								
37	Cattail	b							b
38	Bulrush								
39	Iris								
40	Swamp Loosestrife								
41	Carex spp								
42	Rush								
43	Burr Reed								
44	Long Leaf Pondweed								

Lake Name: Sturgeon River County: Dickinson Co. Surveyor Name: Thomas Alwin Survey Date: August 7, 2010

Standard Aquatic Vegetation Assessment Site Species Density Sheet

Code No.	Plant Name	Aquatic Vegetation Assessment Site Number								Code No.	Plant Name	Aquatic Vegetation Assessment Site Number							
		NO. 33	NO. 34	NO. 35	NO. 36	NO. 37	NO. 38	NO. 39	NO. 40			NO. 41	NO. 42	NO. 43	NO. 44	NO. 45	NO. 46	NO. 47	NO. 48
1	Eurasian watermilfoil	a	b	a					b	1	Eurasian watermilfoil								
2	Curly leaf pondweed									2	Curly leaf pondweed								
3	Chara									3	Chara								
4	Thin leaf pondweed									4	Thin leaf pondweed								
5	Robbins pondweed									5	Robbins pondweed								
6	White stem pondweed		a			a			a	6	White stem pondweed								
7	Richardsons pondweed									7	Richardsons pondweed								
8	flatstem pondweed	a				a				8	flatstem pondweed								
9	Large leaf pondweed									9	Large leaf pondweed								
10	Variable pondweed									10	Variable pondweed								
11	Illinois pondweed		a	a	a					11	Leafy pondweed								
12	Water stargrass			b	b	b		a	b	12	Water stargrass								
13	Wild celery			b	b	b	a	a		13	Mare Tail								
14	Arrowhead (submergent)									14	Arrowhead (submergent)								
15	Northern watermilfoil									15	Northern watermilfoil								
16	Whorled watermilfoil									16	Whorled watermilfoil								
17	Coontail	c	b						a	17	Coontail								
18	Spatterdock			a	a				a	18	Spatterdock								
19	Elodea	b	b						a	19	Elodea								
20	Bladderwort								a	20	Bladderwort								
21	Bladderwort (mini)									21	Bladderwort (mini)								
22	Buttercup	c	b	a					a	22	Buttercup								
23	Najas spp.					a				23	Najas spp.								
24	Brittle naiad									24	Brittle naiad								
25	Sago pondweed									25	Sago pondweed								
26	water merigold									26	water merigold								
27	small pondweed									27	small pondweed								
28	White waterlily								a	28	White waterlily								
29	Yellow waterlily									29	Yellow waterlily								
30	Watershield									30	Watershield								
31	Small duckweed									31	Small duckweed								
32	Great duckweed									32	Great duckweed								
33	Watermeal									33	Watermeal								
34	Arrowhead				a	b	d	a	a	34	Arrowhead								
35	Pickerelweed									35	Pickerelweed								
36	Arrow arum									36	Arrow arum								
37	Cattail		a	a	a					37	Cattail								
38	Bulrush									38	Bulrush								
39	Iris									39	Iris								
40	Swamp Loosestrife									40	Swamp Loosestrife								
41	Carex spp									41	Carex spp								
42	Rush				a					42	Rush								
43	Burr Reed									43	Burr Reed								
44	Long Leaf Pondweed									44	Long Leaf Pondweed								

LAKE: Sturgeon River COUNTY: Dickinson Co. SURVEY DATE: August 7, 2010

Standard Aquatic Vegetation Summary Sheet SURVEY BY: Thomas Alwin

		Total number of AVAS's for each Density Catagory				Calculations				Sum of Previous Four Columns	Total Number of AVAS's	Quotient of Column 9 divided by Column 10		
		A	B	C	D	Catagory A x 1	Catagory B x10	Catagory C x 40	Catagory D x 80					
Code No	Plant Name	1	2	3	4	5	6	7	8	9	10	11	Code No	Plant Name
1	Eurasian milfoil	10	11	0	2	10	110	0	160	280	40	7.00	1	Eurasian milfoil
2	Curly leaf pondweed	0	0	0	0	0	0	0	0	0	40	0.00	2	Curly leaf pondweed
3	Chara	0	1	0	0	0	10	0	0	10	40	0.25	3	Chara
4	Thinleaf pondweed	0	0	0	0	0	0	0	0	0	40	0.00	4	Thinleaf pondweed
5	Flatstem pondweed	11	1	0	0	11	10	0	0	21	40	0.53	5	Flatstem pondweed
6	Robbins pondweed	0	0	0	0	0	0	0	0	0	40	0.00	6	Robbins pondweed
7	Variable pondweed	0	0	0	0	0	0	0	0	0	40	0.00	7	Variable pondweed
8	Whitestem pondweed	12	2	0	0	12	20	0	0	32	40	0.80	8	Whitestem pondweed
9	Richardsons pondweed	0	0	0	0	0	0	0	0	0	40	0.00	9	Richardsons pondweed
10	Illinois pondweed	0	0	0	0	0	0	0	0	0	40	0.00	10	Illinois pondweed
11	Large leaf pondweed	0	0	0	0	0	0	0	0	0	40	0.00	11	Large leaf pondweed
12	American pondweed	0	0	0	0	0	0	0	0	0	40	0.00	12	American pondweed
13	Floating leaf pondweed	0	0	0	0	0	0	0	0	0	40	0.00	13	Floating leaf pondweed
14	Water stargrass	8	14	7	0	8	140	280	0	428	40	10.70	14	Water stargrass
15	Wild Celery	5	10	2	0	5	100	80	0	185	40	4.63	15	Wild Celery
16	Leafy pondweed	0	0	0	0	0	0	0	0	0	40	0.00	16	Sagitteria
17	Northern milfoil	2	1	0	0	2	10	0	0	12	40	0.30	17	Northern milfoil
18	M. verticillatum	0	0	0	0	0	0	0	0	0	40	0.00	18	M. verticillatum
19	M. herterophyllum	0	0	0	0	0	0	0	0	0	40	0.00	19	M. herterophyllum
20	Coontail	12	7	2	0	12	70	80	0	162	40	4.05	20	Coontail
21	Elodea	8	4	1	0	8	40	40	0	88	40	2.20	21	Elodea
22	Bladderwort	10	0	0	0	10	0	0	0	10	40	0.25	22	Bladderwort
23	Bladderwort-mini	0	0	0	0	0	0	0	0	0	40	0.00	23	Bladderwort-mini
24	Buttercup	2	6	4	0	2	60	160	0	222	40	5.55	24	Buttercup
25	Najas spp.	4	0	0	0	4	0	0	0	4	40	0.10	25	Najas spp.
26	Brittle naiad	0	0	0	0	0	0	0	0	0	40	0.00	26	Brittle naiad
27	Sago pondweed	3	0	0	0	3	0	0	0	3	40	0.08	27	Sago pondweed
28	Water Merigold	0	0	0	0	0	0	0	0	0	40	0.00	28	Water Merigold
29	Spadderdock	10	8	2	0	10	80	80	0	170	40	4.25	29	Spadderdock
30	White water lily	7	0	0	0	7	0	0	0	7	40	0.18	30	White water lily
31	Nuphar sp.	0	0	0	0	0	0	0	0	0	40	0.00	31	Nuphar sp.
32	Watershield	0	0	0	0	0	0	0	0	0	40	0.00	32	Watershield
33	Equisitum	0	0	0	0	0	0	0	0	0	40	0.00	33	Equisitum
34	Spirodella	0	0	0	0	0	0	0	0	0	40	0.00	34	Spirodella
35	Watermeal	0	0	0	0	0	0	0	0	0	40	0.00	35	Watermeal
36	Arrowhead	4	2	0	1	4	20	0	80	104	40	2.60	36	Arrowhead
37	Smartweed	0	0	0	0	0	0	0	0	0	40	0.00	37	Smartweed
38	Quillwort	0	0	0	0	0	0	0	0	0	40	0.00	38	Quillwort
39	Cattails	7	2	0	0	7	20	0	0	27	40	0.68	39	Cattails
40	Three square bulrush	0	0	0	0	0	0	0	0	0	40	0.00	40	Bulrushes
41	Iris	0	0	0	0	0	0	0	0	0	40	0.00	41	Iris
42	Swamp Loosestrife	0	0	0	0	0	0	0	0	0	40	0.00	42	Swamp Loosestrife
43	Carex spp.	0	0	0	0	0	0	0	0	0	40	0.00	43	Purple Loosestrife
44	Rush spp.	3	0	0	0	3	0	0	0	3	40	0.08	44	Rush spp.

Common Name	Scientific Name	Cumulative Cover
1. Eurasian watermilfoil	*Myriophyllum spicatum*	7.00
2. Chara	*Chara sp*	0.25
3. White stem pondweed	*Potamogeton praelongus*	0.80
4.Flatstem pondweed	*Potamogeton richardsonii*	0.53
5. Sago pondweed	*Potamogeton pectinatus*	0.08
6. Coontail	*Ceratophyllum demersum*	4.05
7. Elodea	*Elodea Canadensis*	2.20
8. Northern watermilfoil	*Myriophyllum sibiricum*	0.30
9. Wild Celery	*Vallisneria Americana*	4.63
10. Waterlily	*Nuphar sp.*	0.18
11. Watershield	*Brasenia sp.*	0.10
12. Buttercup	*Ranunculus longirostris*	5.55
13. Bladderwort	*Utricularia vulgaris*	0.25
14. Naiad	*Najas spp.*	0.10
15. Spadderdock	*Nuphar variegata*	4.25
16. Arrowhead	*Sagittaria spp.*	2.60
17. Cattail	*Typha spp.*	0.68
18. Rush	*Juncus spp.*	0.08

3781 DARROW ROAD, STOW, OHIO 44224
330-688-0111 / TOLL FREE: 800-940-4025 / FAX: 330-688-3858

Appendix B. Resource Agency Comments and Recommendations

Linda Mitchell

From: Linda Mitchell
Sent: Tuesday, December 07, 2010 11:46 AM
To: 'Mistak, Jessica (DNRE)'; Nick_Utrup@fws.gov
Cc: Sarah Lomske; dpl@norwaymi.com
Subject: RE: Sturgeon Falls Hydro - FERC No. 2720 - Exotic Species Monitoring

Jessica,

Thanks for the prompt reply and congratulations on your promotion. I'll talk with the City to find out their future plans for complying with their Invasive Plan Monitoring Plan.

Linda Mitchell | Compliance Specialist
Mead & Hunt, Inc | M & H Architecture, Inc | 6501 Watts Road | Madison, WI 53719
Main: 608-273-6380 | Mobile: 608-445-2554 | Direct: 608-443-0461
linda.mitchell@meadhunt.com | www.meadhunt.com

From: Mistak, Jessica (DNRE) [mailto:MistakJ@michigan.gov]
Sent: Tuesday, December 07, 2010 6:26 AM
To: Linda Mitchell; Nick_Utrup@fws.gov
Cc: Sarah Lomske; dpl@norwaymi.com
Subject: RE: Sturgeon Falls Hydro - FERC No. 2720 - Exotic Species Monitoring

Hi Linda,
The results of the weevil survey are very promising in managing Eurasian Watermilfoil at the Sturgeon Falls Project. We appreciate the level of interest and cooperation expressed by the City of Norway in addressing this issue.

The report is not clear on proposed or required next steps. It would be helpful to outline what, if anything is required by the license in addition to what may be recommended by EnviroScience. Please also include a timeline for future actions.

Lastly, as you will see in my signature, I was recently promoted. We are working to hire my replacement and anticipate that this individual will be hired by February. In the interim, I may be forwarding issues to my colleague, Kyle Kruger.

Thank you,
Jessica

Jessica Mistak, Northern Lake Michigan Supervisor
DNRE Fisheries Division
6833 Hwy 2, 4, and M-35
Gladstone, MI 49837
906-786-2351 x127
906-786-1300 FAX

From: Linda Mitchell [mailto:linda.mitchell@meadhunt.com]
Sent: Monday, December 06, 2010 5:33 PM
To: Mistak, Jessica (DNRE); Nick_Utrup@fws.gov
Cc: Sarah Lomske; dpl@norwaymi.com
Subject: Sturgeon Falls Hydro - FERC No. 2720 - Exotic Species Monitoring

Dear Jessica and Nick,

In accordance with its FERC license, the City of Norway monitors Eurasian watermilfoil and purple loosestrife in project waters, and has implemented measures to control watermilfoil spread.

The City has contracted with EnviroScience, Inc. to conduct a monitoring and control plan using targeted release of milfoil weevils. A report of the control program and associated reservoir surveys is attached for your review and comment. Please send any comments on this report to my attention within 30 days. The City will submit the report to the FERC in accordance with provisions of its Invasive Plant Monitoring Plan.

Should you have any questions, please do not hesitate to contact me.

Linda Mitchell | Compliance Specialist
Mead & Hunt, Inc | M & H Architecture, Inc | 6501 Watts Road | Madison, WI 53719
Main: 608-273-6380 | Mobile: 608-445-2554 | Direct: 608-443-0461
linda.mitchell@meadhunt.com | www.meadhunt.com

Linda Mitchell

From: Nick_Utrup@fws.gov
Sent: Tuesday, December 07, 2010 12:21 PM
To: Linda Mitchell
Cc: dpl@norwaymi.com; Mistak, Jessica (DNRE); Sarah Lomske
Subject: RE: Sturgeon Falls Hydro - FERC No. 2720 - Exotic Species Monitoring

Hi Linda,

I concur with Jessica's comments.

Nick

Nicholas J. Utrup
Hydropower Coordinator
U.S. Fish and Wildlife Service
Green Bay Ecological Services Field Office
2661 Scott Tower Drive
New Franken, WI 54229

Office: (920) 866-1736
Mobile: (920) 530-9937
FAX: (920) 866-1710
Email: Nick_Utrup@fws.gov

Linda Mitchell <linda.mitchell@meadhunt.com>
12/07/2010 11:45 AM

To: "Mistak, Jessica (DNRE)" <MistakJ@michigan.gov>, "Nick_Utrup@fws.gov" <Nick_Utrup@fws.gov>
cc: Sarah Lomske <slomske@enviroscienceinc.com>, "dpl@norwaymi.com" <dpl@norwaymi.com>
Subject: RE: Sturgeon Falls Hydro - FERC No. 2720 - Exotic Species Monitoring

Jessica,