City of Norway

P.O. Box 99 - 915 Main St., Norway, MI 49870 - Ph. 906-563-9961 - Fax 906-563-7502 - norwaymi.gov

October 18, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: Article 406 – Invasive Plant Monitoring Report for 2018
Sturgeon Falls Project, FERC No. 2720

Dear Secretary Bose:

Pursuant to the requirements of Article 406 of the Order Issuing New License dated January 6, 2005, as amended by Order Amending License dated December 8, 2006 and the Order Modifying and Approving Invasive Plant Monitoring Plan Pursuant to Article 406 dated May 18, 2006, the City of Norway, Michigan (City) as the licensee of the Sturgeon Falls Hydroelectric Project (FERC Project No. 2720) is providing a copy of the biennial monitoring report for the even-numbered year 2018.

Attachment 1 to this letter includes the report for the 2018 monitoring year. The report was provided to the Michigan Department of Natural Resources (MDNR) and the U.S. Fish and Wildlife Service (FWS) for comments. Neither consulted party responded with comments. Documentation of Consultation is included in Attachment 2 of the letter.

Should you have any questions relative to this information, please do not hesitate to contact me at (906) 563-9961.

Sincerely,

Ray D. Anderson
City Manager

Attach.

cc: Sturgeon Falls Project, FERC No. 2720
Mr. Tim Brew – City of Norway
Ms. Elle Gulotty – MDNR
Mr. Nick Utrup – FWS

Attachment 1
2018 Monitoring Report

Invasive Watermilfoil and Aquatic Vegetation Monitoring Survey Report for Sturgeon Falls Hydroelectric Project Area

Prepared for:

City of Norway
Department of Power and Light
1000 Saginaw St.
Norway, MI 49870

Prepared by:

Kyle Hafeman & Lindsay Peterson
Dickinson Conservation District
420 North Hooper St.
Kingsford, MI 49802

September 5th, 2018

1.0 Introduction

The City of Norway, Department of Power and Light, has contracted the Dickinson Conservation District to survey and quantify the Invasive Watermilfoil (*Myriophyllum spp.*) and the native aquatic vegetation in the Sturgeon Falls Hydroelectric Project area of the Menominee and Sturgeon Rivers. The survey of milfoil and native vegetation densities is done as part of the City of Norway's FERC (Federal Energy Regulatory Commission) compliance. Surveyors also monitor for the wetland invasive, Purple Loosestrife (*Lythrum salicaria*), along the shoreline areas as well.

2.0 Survey Area

The stretch of river involved in the survey constitutes much of the border between Dickinson County in Michigan and Marinette County in Wisconsin. The Menominee River composes most of the survey area with the exception of about 1.5 miles of the Sturgeon River preceding where the two rivers join. The survey area spanned from Piers Gorge, upstream on the Menominee, to the hydro dam downstream on the Menominee and to an impasse on the Sturgeon where the river narrows and many islands develop, totaling approximately 6.5 miles and 400 surface acres.

3.0 Methods

Surveying methods involved visually inspecting all aquatic vegetation beds or areas of the river where milfoil fragments or uprooted plants could become hung up or settle out and potentially develop into a new infestation. At every site where milfoil was located, GPS coordinates were marked, density ratings were assigned, the area was calculated, and native vegetation was identified and rated for density as well.

Density ratings were based on an approximate percent cover range, as seen in Table A. Both milfoil and native vegetation were rated on the same scale.

Table A. Relative density ratings and approximate percent cover

Density Rating		Percent Cover Range
1	Found	1-10%
2	Sparse	11-30%
3	Moderate	31-60%
4	Dense	61-100%

In a majority of areas, the plant beds were clearly defined and/or the water wasn't deep enough to conceal plants visually. Therefore, as in the 2016 survey, the rake sampling technique was generally avoided. This method, which involves tossing a rake head attached to a rope over the side of the boat to catch and pull up plants, tends to break up milfoil during

sampling and can cause fragmentation. This can lead to the spread and further distribution of the invasive, especially in current systems such as rivers.

4.0 Results

4.1 Milfoil Survey Results

Quantitative milfoil surveying was conducted over a three-day period in August 2018 (the 7th, 8th, and 10th). In total, 74 individual beds, equating to approximately 70 acres of milfoil, were mapped throughout the Sturgeon Falls Project area, accounting for about 17.57% of the total surface acres, which is an approximately 0.5% decrease from 2016 (Appendix A - Figure 1). Of the 70 acres of milfoil, about 15.59 acres were at the 'found' density level, while 27.901 acres were at the dense category. The largest density level in total acres came from the 'dense' density level (Table B and Appendix A - Table 1). Many of the larger beds varied in their densities throughout the entire area. Therefore, to more accurately represent the populations found, larger beds were broken up and may be assigned multiple densities for different parts but are considered a single bed overall.

Table B. Acreage of milfoil by density

Density	Number of Sites	Total Acres	Percent of Total Acreage
Found	30	15.591	3.89%
Sparse	16	12.635	3.16%
Moderate	17	14.153	3.54%
Dense	11	27.901	6.98%
Totals	74	70.28	17.57%
Total Project Area Acreage = approx. 400 surface acres			
* Note: 'Number of Sites' includes every individual density rating. Many larger beds were assigned multiple density ratings. There were 43 individual beds.			

Many of the milfoil beds mapped in 2018 were mostly unchanged since 2016 except for the density of milfoil that was present. The number of sites where milfoil was present this year is lower than the 2016 survey. This is due to a number of previously identified milfoil beds having no signs of milfoil present at the time of the survey. However, three new beds were found to have milfoil present in them that had not been previously identified during past years' surveys.

4.2 Native Vegetation Survey Results

Throughout the project area, 22 different native aquatic plant species were identified. The most dominant species were Wild Celery (*Vallisneria americana*), Invasive Watermilfoil (*Myriophyllum spicatum X M. sibiricum*), White water lily (*Nymphaea odorata*), and Clasping Leaf Pondweed (*Potamogeton richardsonii*) (Appendix A - Figure 3). While it was not the most dense plant, invasive watermilfoil was found at 80.43% of sites (Appendix A - Table 2), which is fitting seeing as it was the focus of the survey and not all plant beds were surveyed if milfoil was not present.

Native vegetation was dense and there was a great deal of algae coating the plants, more in some areas than others. Overall the native plant community appears healthy, diverse, and productive despite the infestation of invasive milfoil throughout the community. It appears that native plant species, such as Wild Celery and coontail, can in habit a wider range of flow conditions than the invasive milfoil can. This limits where the milfoil can grow effectively and may be the reason we observed the changes in density and location of milfoil beds during the 2018 survey.

4.3 Terrestrial Invasive Species Monitoring

During the course of the milfoil survey, staff continuously monitored the shoreline for other potentially problematic invasive species that may invade the project area. Primary targets for this surveying effort were Purple Loosestrife (*Lythrum salicaria*) and Non-Native Phragmites (*Phragmites australis*). Neither of these species was noted during the 2018 survey of the project area.

5.0 Discussion

Riverine systems are subject to an extensive variety of influences, both natural and anthropogenic. These factors all have impacts on the biological function of the river, including invasive species such as milfoil. Furthermore, the flow of rivers creates a corridor of transport for invasive species which leads to the spread and expansion of that species. Invasive milfoil was distributed throughout most of the Sturgeon Falls project area, with a majority of the infestations being of dense concentrations. There were observable natural shifts in the plant communities and the distribution and density of milfoil as compared to past surveys. Many of the previously identified milfoil beds were found to have no visible plants present. However, many of the milfoil beds were found to be at much higher densities during the 2018 survey than in past surveys. Overall, the milfoil could be classified as a moderately dense infestation within the project area.

The healthy, productive state of the native plant community in the Sturgeon Falls project area is quite encouraging. The plants fill a niche that would otherwise be overtaken by milfoil due to its invasive nature. This becomes very apparent in a number of the beds where

the milfoil is patchy, growing only in disturbed areas, along the edges of plant beds, or in the only gaps it can find. There are also numerous plant beds where no milfoil was found.

Yet the fact that milfoil can quickly dominate disturbed areas is a concern. Any changes in water level can create habitat or destroy it. Erosion and sedimentation can disrupt native vegetation and milfoil could overtake an affected area quicker than native vegetation could recover. This is of particular concern with hybridized milfoil species, which is what most of the milfoil in the project area is, because it has been proven to germinate faster than native or Eurasian milfoil and tends to utilize more of the growing season that native species, giving it a head start in the spring and even leading to the shading of other species that begin to come in later in the season.

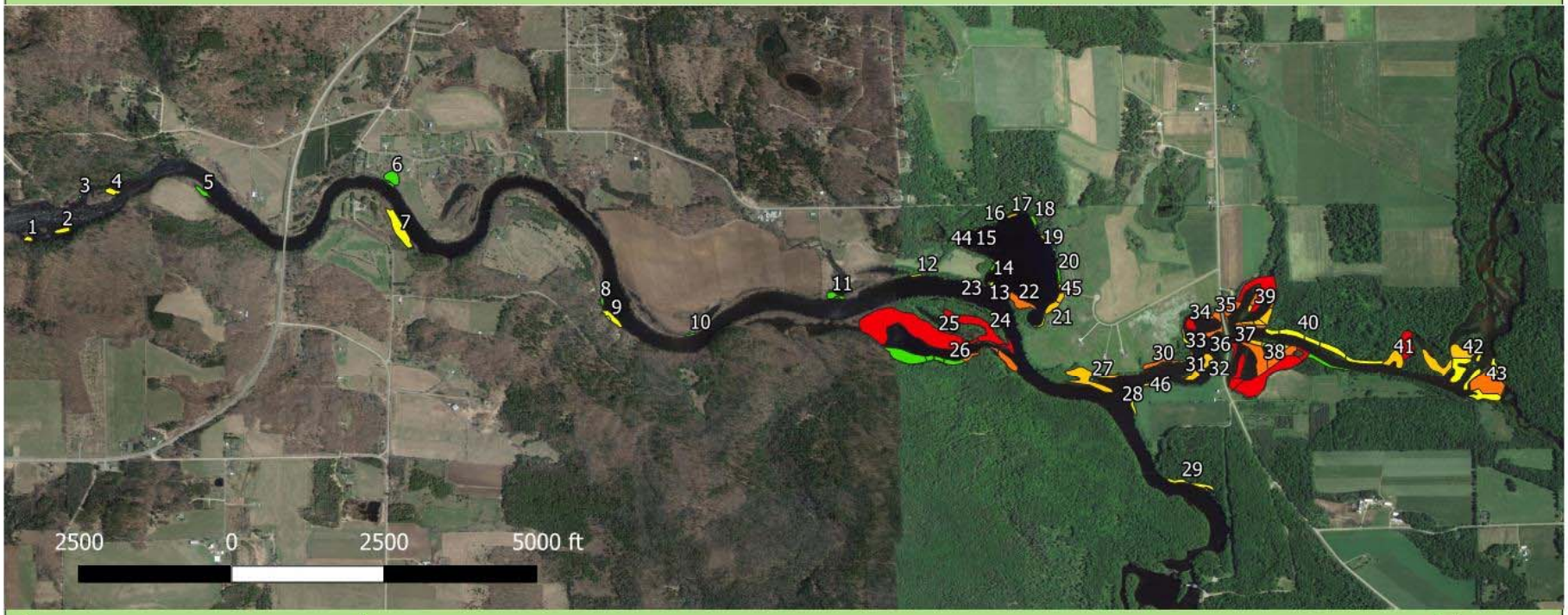
In some areas, recognition of plants was made difficult by the amount of algae present, which obscured plant structures and appearances that are key for identification. This was likely due to the warm temperatures experienced during this year's growing season and warm waters early in the spring. Many of the milfoil beds within the project area are not very large or are composed of very sparse, patchy populations. Ultimately, it is suggested that monitoring of both the milfoil and the natural plant community continue.

Appendix A

2018 Data

Map of Milfoil Bed Location and Density – Figure 1
Attributes of Sturgeon Falls Milfoil Beds – Table 1
Aquatic Vegetation Analysis – Table 2, Figure 2

Sturgeon Falls Hydroelectric Project Area: Milfoil Bed Locations and Densities



Milfoil Density

- None Found
- Found
- Sparse
- Moderate
- Dense

The above map shows the location of all surveyed aquatic plant beds, highlighting the extent and desnsity of milfoil where it was documented. The density is categorized by color according to the legend.

N

Map prepared by Kyle Hafeman, Dickinson Conservation District, September 5th, 2018. Information presented is based on data collected during the aquatic vegetaion and invasive milfoil survey cinducted in 2018.

Eurasian Watermilfoil and Aquatic Vegetation Survey of Sturgeon Falls, Sturgeon River, MI

City of Norway, Department of Power and Light

	Start: 7:30 am	**Start: 7:40 am**
Date: 8/7/2018 and 8/8/2018	**End: 3:00 pm**	**End: 1:30 pm**

Weather Conditions: Partly cloudy, lots of algae. Overcast and foggy in morning. Full sun in afternoon.

Samplers: Lindsay Peterson and Kyle Hafeman

Location #	*Old Site #*	*Latitude*	*Longitude*	*Estimated Area*	*Acres*	*Density*
1	1	45.75711312	-87.9384308	1	0.209	1%
2	2	45.75748703	-87.9361799	0	0.386	1%
3	3	45.75898266	-87.9350544	0	0	0%
4	4	45.75916961	-87.9330179	1	0.415	5%
5	5	45.75913222	-87.9271228	0	0	0%
6	6	45.7599174	-87.91501094	0	0	0%
7	7	45.75733746	-87.91447501	2	2.234	2%
8	8	45.75434608	-87.90161287	0	0	0%
9	9	45.75352343	-87.90091617	2	0.753	1%
10	10	45.75285033	-87.8958785	0	0	0%
11	11	45.75457044	-87.88676782	0	0	0%

12	12	45.75544917	-87.88130141	2	0.145	1%
13	13	45.75509394	-87.87666568	1	0.113	5%
14	14	45.7558044	-87.87642451	0	0	0%
15	15	45.75754312	-87.87752315	1	0.064	1%
16	16	45.75774877	-87.87631733	1	0.052	1%
17	17	45.75814137	-87.87524548	3	0.161	25%
18	18	45.75793572	-87.8737717	0	0	0%
19	19	45.7571879	-87.87323577	1	0.061	1%
20	20	45.75558005	-87.87221752	0	0	0%
21	21	45.75399085	-87.87261946	3	1.153	25%
22	22	45.75421521	-87.87476315	4	1.21	40%
23	23	45.75438348	-87.87846102	0	0	0%
24	24	45.75384127	-87.87661209	0	0	0%
25	25	45.75279424	-87.87990801	5	16.561	80%
26	26	45.75159761	-87.87921131	4	1.622	40%
27	27	45.75075622	-87.87004704	3	3.298	30%
28	28	45.74959694	-87.86744781	2	0.258	1%

29	29	45.74621246	-87.86428587	2	0.859	1%
30	30	45.75146673	-87.8661348	3	1.025	40%
31	31	45.75096189	-87.8633748	2	0.556	15%
32	32	45.7516724	-87.86254412	2	0.958	15%
33	33	45.75255118	-87.8640447	1	0.28	2%
34	34	45.75329906	-87.86377674	2	0.078	70%
35	35	45.75363561	-87.86214218	2	0.587	40%
36	36	45.75290643	-87.86230295	3	0.535	60%
37	37	45.75230812	-87.86088276	2	0.334	80%
38	38	45.75152282	-87.85900703	4	10.374	60%
39	39	45.75400954	-87.85959655	5	6.192	40%
40	40	45.75283164	-87.85683654	2	3.4	25%
41	41	45.75176589	-87.85067344	3	3.513	50%
42	42	45.75174719	-87.84622528	4	5.598	20%
43	43	45.75053184	-87.8447247	4	6.243	25%
44	14	45.7570779	-87.8786593	1	0.01	5%
45	20	45.7550743	-87.8721831	1	0.12	5%

46	N/A	45.7505939	-87.8662266	1	0.203	1%

Table 1. Attributes of the milfoil beds throughout the Sturgeon Falls Project area

Bed ID	Density	Density %	Density % 2016	Density % Change from 2016 to 2018	Acres
1	Found	1%	10%	-9%	0.209
2	Found	1%	15%	-14%	0.386
3	N/A	0%	1%	-1%	0
4	Found	5%	30%	-25%	0.415
5	N/A	0%	30%	-30%	0
6	N/A	0%	35%	-35%	0
6	N/A	0%	35%	-35%	0
7	Found	2%	45%	-43%	2.234
8	N/A	0%	20%	-20%	0
9	Found	1%	45%	-44%	0.686
9	Found	1%	45%	-44%	0.067
10	N/A	0%	10%	-10%	0
11	N/A	0%	20%	-20%	0
12	Found	1%	5%	-4%	0.145
13	Found	5%	60%	-55%	0.113
14	N/A	0%	40%	-40%	0
15	Found	1%	10%	-9%	0.064
16	Found	1%	10%	-9%	0.052
17	Sparse	25%	15%	10%	0.161
18	N/A	0%	10%	-10%	0
19	Found	1%	10%	-9%	0.061
20	N/A	0%	5%	-5%	0
21	Sparse	30%	5%	25%	0.344
21	Found	10%	10%	0%	0.228
21	Sparse	30%	20%	10%	0.581
22	Moderate	40%	40%	0%	1.21
23	N/A	0%	0%	0%	0
24	N/A	0%	5%	-5%	0
25	Dense	80%	35%	45%	0.431
25	Dense	80%	40%	40%	3.396
25	Dense	80%	30%	50%	0.35
25	Dense	80%	25%	55%	12.384
26	Moderate	40%	60%	-20%	0.418
26	Moderate	40%	35%	5%	0.248
26	Moderate	40%	35%	5%	0.956
26	N/A	0%	30%	-30%	0
26	N/A	0%	20%	-20%	0
26	N/A	0%	15%	-15%	0
26	N/A	0%	30%	-30%	0
27	Sparse	30%	30%	0%	3.298
28	Found	1%	5%	-4%	0.258
29	Found	1%	5%	-4%	0.859

30	Sparse	20%	5%	15%	0.072
30	Sparse	15%	15%	0%	0.156
30	Moderate	50%	45%	5%	0.117
30	Moderate	50%	45%	5%	0.68
31	Sparse	15%	35%	-20%	0.556
32	Sparse	15%	15%	0%	0.958
33	Found	2%	15%	-13%	0.28
34	Dense	70%	15%	55%	0.078
35	Moderate	40%	10%	30%	0.076
35	Moderate	40%	50%	-10%	0.153
35	Moderate	40%	15%	25%	0.358
36	Moderate	60%	45%	15%	0.535
37	Dense	80%	15%	65%	0.334
38	Dense	80%	80%	0%	0.897
38	Moderate	40%	45%	-5%	3.504
38	Dense	80%	15%	65%	4.384
38	Sparse	25%	15%	10%	0.365
38	Dense	80%	30%	50%	0.25
38	Found	5%	25%	-20%	0.974
38	N/A	0%	30%	-30%	0
39	Sparse	20%	75%	-55%	0.245
39	Moderate	40%	40%	0%	0.175
39	Sparse	25%	35%	-10%	0.177
39	Moderate	50%	50%	0%	0.857
39	Sparse	15%	35%	-20%	0.666
39	Sparse	25%	25%	0%	0.289
39	Moderate	35%	15%	20%	0.327
39	Moderate	50%	25%	25%	0.341
39	Moderate	35%	25%	10%	0.617
39	Dense	80%	75%	5%	3.218
40	Found	10%	10%	0%	0.368
40	Found	10%	5%	5%	0.841
40	Found	10%	35%	-25%	0.455
40	Found	5%	25%	-20%	0.922
40	Found	10%	30%	-20%	0.814
41	Dense	70%	10%	60%	2.179
41	Sparse	25%	10%	15%	1.334
42	Found	10%	35%	-25%	1.79
42	Sparse	25%	50%	-25%	1.864
42	Found	10%	35%	-25%	0.157
42	Found	10%	0%	10%	0.218
42	Sparse	25%	0%	25%	1.569
43	Found	5%	10%	-5%	0.667
43	Moderate	40%	50%	-10%	3.581
43	Found	10%	45%	-35%	0.712
43	Found	5%	N/A	N/A	1.283
44	Found	5%	N/A	N/A	0.01

45	Found	5%	N/A	N/A	0.12
46	Found	1%	N/A	N/A	0.203
Total Acres: **70.28** = **17.57%** of total surface acreage of project					

Table 2. Aquatic Vegetation of the Sturgeon Falls Project Area

Common Name	*Scientific Name*	Average Density	Relative Frequency
Wild celery	*Vallisneria americana*	2.1522	69.57%
Invasive Watermilfoil	*Myriophyllum spicatum X sibiricum*	1.4783	80.43%
Clasping-leaf pondweed	*Potamogeton richardsonii*	1.1304	65.22%
White water lily	*Nymphaea odorata*	0.8696	41.30%
Coontail	*Ceratophyllum demersum*	0.6739	45.65%
Stargrass	*Heteranthera zosterifolia*	0.6304	32.61%
Flat-stem pondweed	*Potamogeton zosteriformis*	0.5000	32.61%
Yellow pond lily	*Nuphar spp.*	0.4130	28.26%
Large-leaf pondweed	*Potamogeton amplifolius*	0.4130	32.61%
White-stem pondweed	*Potamogeton praelongus*	0.3913	28.26%
Waterweed	*Elodea spp.*	0.2826	13.04%
Sago pondweed	*Stuckenia pectinata*	0.1522	15.22%
Common bladderwort	*Utricularia vulgaris*	0.1304	13.04%
Illinois pondweed	*Potamogeton illinoisis*	0.1087	8.70%
Duckweed	*Lemna spp.*	0.0870	6.52%
Cattails	*Typha spp.*	0.0652	2.17%
Water marigold	*Bidens beckii*	0.0435	4.35%
Floating-leaf pondweed	*Potamogeton natans*	0.0435	4.35%
River bulrush	*Scirpus fluviatalis*	0.0435	2.17%
Small pondweed	*Potamogeton pusillus*	0.0217	2.17%
Robbins Pondweed	*Potamogeton robbinsii*	0.0217	2.17%
Arrowhead	*Syngonium podophyllum*	0.0217	2.17%

Average Density: The average density is based on the number of observations for each density rating divided by the total number of sampling sites. The average density corresponds to the same density rating scale of 1-4 for Found - Dense.

Relative Frequency: The relative frequency is the percentage of sites out of the total number of sites where the plant was observed.

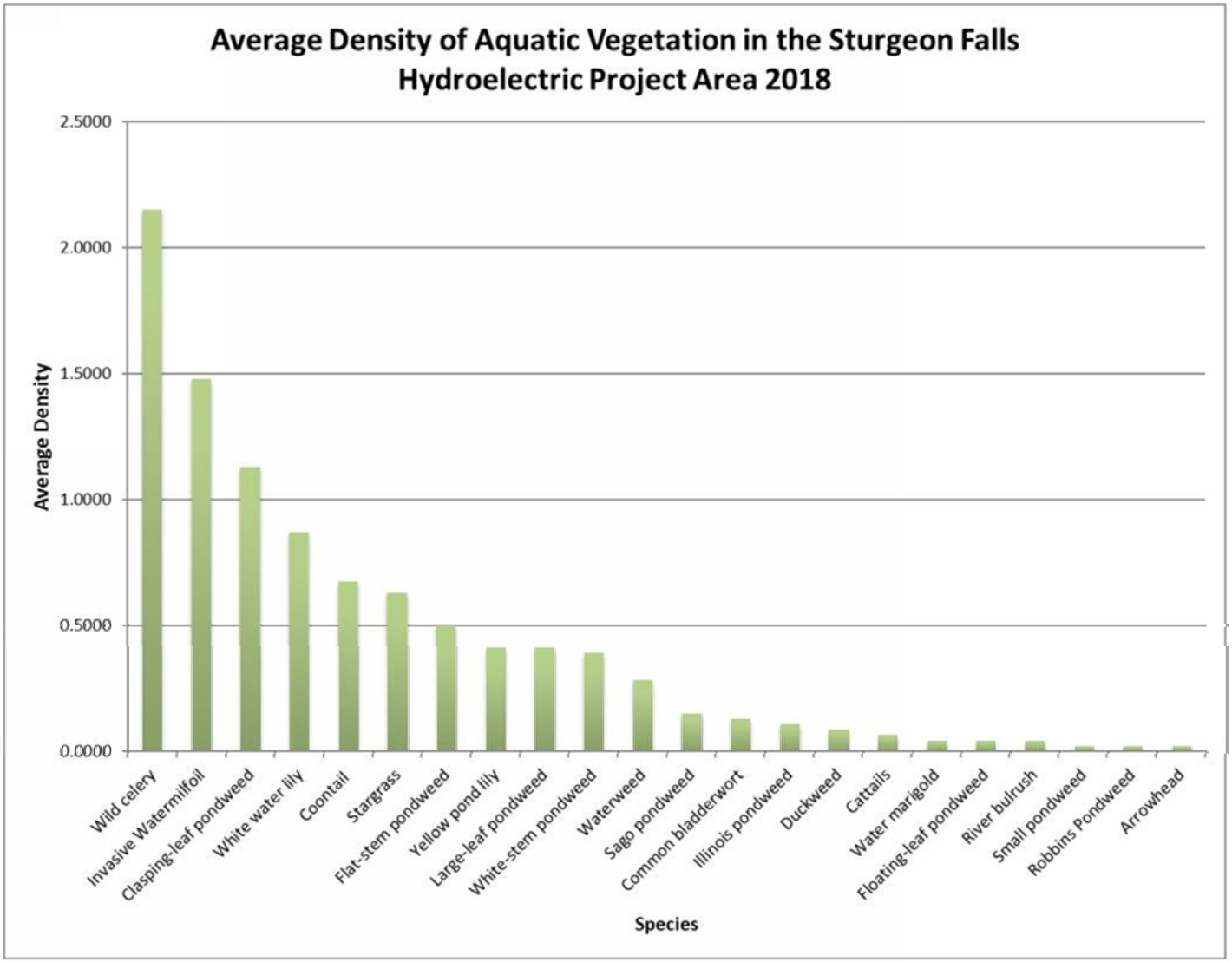


Figure 2. Average density of aquatic vegetation in the Sturgeon Falls Project area in 2016.

Attachment 2
Documentation of Consultation

Shawn Puzen

From:	Shawn Puzen
Sent:	Monday, September 17, 2018 12:20 PM
To:	Utrup, Nick; 'Elle Gulotty'
Cc:	Ray Anderson; Shawn Puzen
Subject:	2018 Invasive Species Monitoring Report for Your Review and Comment-Sturgeon Falls
Attachments:	Bed Locations.pdf; Milfoil Attributes 2018.pdf; MilfoilSurveyReport2018.pdf; Final Map 2018.pdf

Hi Elle and Nick,

Enclosed for your comment is the 2018 Invasive Species Monitoring Report for the Sturgeon Falls Hydroelectric Project. Monitoring is required in the even years.

The monitoring was conducted on August 7 and 8, 2018 by the Dickinson County Conservation District.

Please provide your comments within 30 days. If we do not receive a response within 30 days, we will assume you do not have any comments.

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

Thanks,

Shawn Puzen | FERC Licensing & Compliance
Mead & Hunt | 1702 Lawrence Drive | De Pere, WI 54115
Direct: 920-593-6865 | Mobile: 920-639-2480
shawn.puzen@meadhunt.com| meadhunt.com
https://www.linkedin.com/in/shawnpuzen

The Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service did not respond with comments.

The report provided for their comment is identical to the report currently being filed. Therefore, to reduce the file size, it has not been included a second time.