

# BOYCE HYDRO POWER LLC

A W.D. Boyce Trusts Legacy Enterprise

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22 May, 2018

Ms. Kimberly Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, DC 20426

**Re: FERC Project No. P-10808, Edenville Dam & Licensee's Response to MDNR Letter Concerning Temperature Measurements For Water Quality Monitoring Compliance**

Secretary Bose:

This letter responds to the MDNR's 1 May, 2018, letter signed by Kyle Kruger regarding the Edenville Dam project license compliance matters, concerning the protocol for measuring water temperatures as specified under License Article 404. The May 1<sup>st</sup> letter questions the appropriateness of the licensee's protocol for measuring water temperatures as implemented under the approved Water Quality Management Plan, and asks the commission to provide clarification of the details as to what is an acceptable method for measuring water temperatures at the project.

The content of the MDNR letter was regarded to be very troubling to the licensee, suggesting that there was a motivation behind the letter that is not innocently predicated on a pure interest in biological science as purported by the author. Accordingly, Boyce Hydro Power, LLC has engaged a second opinion on the subject matter from a properly qualified professional source, Affiliated Researchers. The second opinion is transmitted herewith for the Commission's consideration.

Given the independent nature of the professional reviewer, and given the fact that the reviewer is not on public record as personally desiring that hydroelectric dams in Michigan should be removed in deference to the re-establishment of nature's perfect natural order of free flowing rivers, the Commission should give proper and reasoned consideration to the facts presented by Affiliated Researchers. The conclusion that the licensee's water temperature measuring protocol is both valid and compliant with the Water Quality Plan should be affirmed.

Sincerely yours,



Lee W. Mueller, Co-Member Manager  
**Boyce Hydro Power, LLC**

Encl.

Cc: Stephen B. Hultberg  
John Clements  
Rollin Reineck  
Kyle Kruger



21 May 2018

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**RE: RESPONSE TO CONCERNS OFFERED BY MR. KYLE KRUGER, MDNR.**

Dear Mr. Mueller:

I have reviewed Mr. Kruger's recent correspondence to Boyce and to FERC, both dated 1 May 2018 regarding water temperature protocols at the Boyce projects.

#### **BIOLOGICAL THRESHOLD**

Mr. Kruger's stated concern is based upon the premise that water temperature of 39°F is an important biological threshold for northern pike and yellow perch.

*The purpose for seeking the requirement to have the impoundments refilled by the time water temperature reaches 39°F is biological. Primarily for northern pike and yellow perch spawning which occurs at that temperature. These species utilize the shallow margins of the impoundments, which need to be wetted for optimal spawning success. Failure to have the impoundments at normal pool diminishes their success.*

The 39°F threshold is also stipulated in the FERC license agreement.

*The Licensee shall complete the refill of the reservoir, thus ending the winter drawdown period, prior to the surface water temperature of the reservoir reaching 39°F. (Article 404 for Edenville, Article 403 for Smallwood, Article 411 for Sanford, and Article 403 for Secord)*

With respect to northern pike spawning, Mr. Kruger's stated concern that "northern pike and yellow perch spawning which occurs at that temperature" might be in error by a few degrees, according to information provided in the Michigan Department of Natural Resources (MDNR) publications.

*Northern pike are among the earliest species to spawn, typically soon after the spring thaw when water temperatures range from 40 to 45 degrees. Pike scatter their eggs in shallow water, usually in a marsh-type environment.<sup>1</sup>*

The 39°F threshold set forth in the FERC license agreement is actually 1°F lower than the low-end of the temperature range for northern pike spawning, according to the MDNR publication.

With regards to yellow perch spawning, Mr. Kruger concerns with the water temperatures might be even more overstated according to the information provided in MDNR publications.

*Yellow perch spawn once a year, beginning when spring water temperatures reach the 50s°F<sup>2</sup>.*

#### SHALLOW WATER VS THE UPPER 10-20 FEET OF THE WATER COLUMN

Furthermore, Mr. Kruger's stated idea (shown below) seems to be inconsistent with his previous statement as well as with the MDNR's published information regarding northern pike spawning.

*We believe that the tail race temperatures represent an average temperature of the water mass moving through the impoundments. The project's withdrawal zones are the upper 10-20 feet of the water column. It is our opinion that the average of the water column is a more appropriate representation of the temperature of the impoundment than measurements taken next to the gates, which could be subject to cooling and localized depression in temperatures and not representative of the impoundment as a whole.*

Mr. Kruger statement, "...that the upper 10-20 feet of the water column is a more appropriate representation of the temperatures of the impoundment" might be true. However, this bit of information seems irrelevant and inconsistent with his concerns regarding the biological requirements for northern pike spawning.

With regards to northern pike spawning, Mr. Kruger states: "These species utilize the shallow margins of the impoundments." His statement about shallow water is consistent with the information provided in MDNR publications<sup>2</sup>, which states: "Pike scatter their eggs in shallow water, usually in a marsh-type environment."

<sup>1</sup> [https://www.michigan.gov/documents/dnr/Northern\\_Pike\\_Information\\_for\\_Web\\_-\\_final\\_364182\\_7.pdf](https://www.michigan.gov/documents/dnr/Northern_Pike_Information_for_Web_-_final_364182_7.pdf). May 2018.

<sup>2</sup> Schneider, J. C., R. P. O'Neal, and R. D. Clark, Jr. 2007. *Ecology, Management, and Status of Walleye, Sauger, and Yellow Perch in Michigan*. Michigan Department of Natural Resources, Fisheries Special Report 41, Ann Arbor.

If the emphasis for northern pike spawning is based on “*shallow water*”, then it would seem that the emphasis for temperature monitoring should be with surface water...not waters 10-20 feet down.

Based upon my experience, and according to data we have collected over the years, water temperatures in “*the upper 10-20 feet of the water column*” are not likely be the same as temperatures in the “*shallow margins of the impoundments*” or the “*marsh-type environment*” where pike are said to “*scatter their eggs*”.

We researched our archives and found temperature data that we had collected during the winter months, at depth, in Badger Lake, Alcona County, which is located about 80 miles north of the Edenville project (Table 1). These data show the water temperatures are the coolest near the surface, and rise slightly with depth.

Water Depth	Water Temperature °F		
	18-Jan-04	19-Feb-04	23-Apr-04
1 ft	35.4	33.8	52.0
5 ft	38.1	38.6	49.8
10 ft	39.0	38.8	49.5
15 ft	39.3	39.5	49.1
20 ft	39.3	39.5	49.1
25 ft	39.6	39.7	47.8
30 ft	39.7	39.9	45.7
35 ft	39.9	40.1	44.2
40 ft	40.3	40.3	43.9

**Table 1.**  
**Water temperatures during winter months, at depth, Badger Lake, Alcona County, Michigan.**

It is hard to understand why Mr. Kruger believes, “...*the upper 10-20 feet of the water column...*”, will be consistent with, and/or a better protocol for northern pike spawning habitat than the monitoring of surface water temperatures (as has been provided in the FERC license agreement). I also don’t understand why Mr. Kruger thinks there needs to be “*a more specific definition for the protocol to determine the ‘surface water temperature’*”.

It may be that Kyle is aware of this winter time phenomena, of water temperatures increasing with depth (Table 1), and has requested a change of the “protocol” requiring the water temperatures be measured in “*the upper 10-20 feet of the water column*” in order for the impoundment to refill sooner and thereby accommodate the complaints.

## RECOMMENDATIONS

In my opinion, a simple solution that would meet the criteria described in the FERC license agreement, would be to install a temperature recorder in the impoundment, set at depth near the water's surface but below the depth of the occurring ice (i.e. at a depth of approximately 3-4') to document when the "*surface water temperature*" reaches 39°F.

Furthermore, it is my understanding based upon communications with the dam operators, installing water temperature monitoring devices in the tailrace would be problematic during the winter draw-down period. During the winter draw-down, the water depths in the tailraces can be less than 4 feet deep which could expose the monitoring devices to high water velocities when the turbines are running. Additionally, when the turbines are not running during the winter draw-down period, the temperature monitoring devices installed in the tailrace could be exposed to the air at times when the tailraces are nearly dry.

Please let me know if you have any further questions.

Thank you,



Rollin C. Reineck, Jr.  
Director  
Principal Scientist

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