

**Schoolfield Hydroelectric Project  
(FERC No. 2411)**

**FINAL**  
**Application for New License Major Water  
Power Project 5 Megawatts or Less**

**Attachment 2**

**Final Study Plan**

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# FINAL STUDY PLAN

## SCHOOLFIELD HYDROELECTRIC PROJECT (FERC No. 2411)

July 2020



Prepared for:

STS Hydropower, LLC  
a subsidiary of



&

City of Danville,  
Virginia



Prepared by:



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## **1.0 INTRODUCTION**

STS Hydropower, LLC (STS), a subsidiary of Eagle Creek Renewable Energy, and the City of Danville, VA are co-Licensees (Licensees) and are licensed by the Federal Energy Regulatory Commission (FERC or Commission) to operate the 4.5-Megawatt (MW) Schoolfield Hydroelectric Project (Project, FERC No. 2411) located on the Dan River in Pittsylvania County, Virginia. The current license to operate the Project was issued on August 26, 1994 for a 30-year term. Therefore, the current license expires on July 31, 2024.

The Licensees are currently relicensing the Project following FERC's Traditional Licensing Process (TLP), and is in the study planning and implementation phase of the process. On March 26, 2020 the Licensees distributed to interested parties a Draft Study Plan (DSP) that contained a suite of site-specific study plans for those studies proposed and adopted by the Licensees. The DSP also presented the rationale for adopting, adopting with modification, or not adopting those studies requested by the resource agencies. The Licensees then held a conference call meeting with stakeholders to discuss the DSP on April 23, 2020. Comments letters were then received from the Virginia Department of Environmental Quality (VDEQ), the U.S. Fish and Wildlife Service (FWS), the North Carolina Wildlife Resources Commission (NCWRC), and the Virginia Department of Game and Inland Fisheries (VDGIF). Copies of these comment letters are provided in Appendix A.

There is no requirement to prepare a formal study plan, as is required by the Integrated Licensing Process (ILP), and; therefore, there is no subsequent study plan determination by FERC. The purpose of this Final Study Plan (FSP) is to: (1) address comments received from the resource agencies on the DSP; and, (2) provide the resource agencies a revised set of individual study plans for those studies adopted by the Licensees. To support these goals, Section 2 of this FSP presents the Licensees response to comments received from the stakeholders on the DSP, and in Section 3, the Licensees provide revised individual study plans for those studies adopted by the Licensees.

## **2.0 RESPONSE TO COMMENTS ON THE DRAFT STUDY PLAN**

STS and the City distributed the Draft Study Plan (DSP) to interested stakeholders on April 16, 2020 for review and comment and hosted a conference call to review the DSP on April 23, 2020. Comment letters in response to the Licensees DSP were received from the VDEQ, FWS, NCWRC, and the VDGIF (Appendix A). The letters contain both general comments on the DSP as well as specific comments and recommendations on studies not adopted and adopted by the Licensees. In Table 2.0-1, the Licensees provide responses to the comments received on the DSP. In response to these comments, STS and the City have incorporated changes to the level of effort associated with the mussel study, committed to recording incidental fish observed during the RLP survey; agreed to consultation associated with the operations and flow assessment study, and the added parameters and duration of the field effort to the water quality study.

**Table 2.0-1: Licensees response to comments received on the Draft Study Plan.**

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
<b>Comments on Studies Not Adopted</b>			
<i>Aquatic Fauna Survey and Fish Survey</i>			
1	FWS/ May 12, 2020	<p>FWS disagrees with STS position that existing data is sufficient and clarifies that Duke Energy did not conduct fish surveys immediately above the reservoir or in the tail water below the dam. FWS noted that the area immediately below the dam between the Project dam and the Union Mills dam lacks fish surveys necessary for an assessment of Projects impacts downstream. The closest upstream transect is located about 8 miles upstream.</p>	<p>The FWS is correct that Duke did not sample the Dan River downstream of the Project Dam. Nonetheless, the Duke report definitively showed a longitudinal succession of fish species assemblages, with sites spatially closer to each other (by stream distance) have similar fish communities than those that are further apart. The findings by Duke are also corroborated by Rhode et al. 2001, whom compiled and analyzed fish assemblage data in the Dan River from 1968 through 2000 over the same geographic extent as Duke. Therefore, given the findings by Duke and Rhode et al. (2001) a reasonable inference can be made that the fish community downstream of the Project dam is similar to that of the Project’s reservoir and the downstream impoundment. This is because the area downstream of the Project dam can only be colonized by fish that become entrained by the Project and survive turbine passage, spill over the dam, or move upstream from the downstream impoundment. In addition, we also note that fish community downstream of the Project dam would be comprised of those species that are not “reservoir” specialists because the area downstream of the Project is riverine. As such, those species present in the Project reservoir that are habitat generalists would most likely be found downstream of the Project. Overall, the Licensees respectfully decline to perform a dedicated fish survey downstream of the Project dam in order to determine those species that are present because sufficient</p>

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
			information exists to make a reasonable inference as to what fish species comprise the fish community downstream of the Project. With regard to the nearest upstream Duke sample site, the Licensee would like to clarify the nearest Duke site is 3.8 river miles upstream of the Project reservoir.
2	FWS/ May 12, 2020	FWS recommends the area immediately above the reservoir should also be surveyed for fish as an upstream reference to assess impacts of the Project on fish populations.	The Licensees have not adopted the FWS recommendation to sample the fish community upstream of the Project for the reasons discussed in Section 2.1.3 of the DSP. In addition, the approach the FWS recommends is a comparison to a reference site to assess Project effects. That approach seeks to recreate pre-project conditions in order to assess project effects. The Commission’s baseline for evaluating Project effects is the environment as it exists at the time of licensing. This does not include pre-Project conditions, which the courts have affirmed (See <i>American Rivers v. FERC</i> , 187 F.3d 1007, amended and rehearing denied, 201 F.3d 1186 (9th Cir, 1999); <i>Conservation Law Foundation v. FERC</i> , 216 F.3d 41 (D. C. Cir. 2000).
3	VDGIF/ May 14, 2020	We agree that the data cited by the applicant [Duke 2019] are a useful starting point, and may be sufficient for describing the fish community of the impoundment. However, they are completely inadequate for describing the fish community below the dam, in the reach impacted by project operations. The data being cited to assess downstream impacts came from an area many miles downstream, from a reach with very different habitat conditions.	The Licensees disagree with VDGIF for the reasons discussed in section 2.2.1 of the DSP and in comment 2 above. We would like to clarify that the Licensees never stated the data to be used to describe the downstream fish community would be those collected by Duke (2019) more than 50 miles downstream of the Project. As such, Licensees affirm existing information is sufficient for the purposes of relicensing the Schoolfield Project because Licensees are not proposing any changes from the current run-of-river operations and will be

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
			noting the observed as part of the field investigation for the Roanoke Logperch, discussed in section 3.
<i>Fish Passage and Protection Assessment</i>			
4	FWS/ May 12, 2020	The FWS comment that although there are no diadromous fish species in the Project area, there is potential for the non-diadromous fish known to exhibit migratory behavior in the Project area, some of which serve as freshwater mussel host fish. FWS suggests the Project may represent a barrier to mussel dispersal preventing fish passage, but understands it is premature to draw conclusions regarding these possible Project effects. The FWS requests inclusion in the entrainment analysis, an assessment of time of year and frequency of spillage over the dam as a possible downstream alternative to passage through the powerhouse, and a characterization of the adequacy of safe passage (e.g., is there an adequate plunge pool below the dam) and viability of this route.	The Licensees understand the FWS’s concern regarding analyzing possible downstream passage routes. Licensees believe that such an analysis, as recommended by the FWS, is outside the scope of the proposed desktop entrainment and turbine mortality study. However, the Licensees believe a more appropriate document for such an analysis is the Draft License Application (DLA). Therefore, the Licensees will include in the DLA an assessment of time of year and frequency of spillage over the dam, and a characterization of the adequacy of safe passage and viability of that route.
<i>Recreation Use and Enhancement Assessment Study</i>			
5	FWS/ May 12, 2020	The FWS disagrees with the Licensees statement that there is no need to study recreation use and access at the Project. The FWS notes an increased interest in river recreation since the last relicensing and believes a study is warranted to study how recreation can be accommodated and/or enhanced at the Project.	The Licensees affirm that there is no need for a recreation use and access study for the reasons described in section 2.2.3 of the DSP. The Licensees also believe the interest of increased recreation needs of the area has been met by the City of Danville (co-Licensee) through the improvements and maintenance of Abreu-Grogan Park that provides access to Project lands and waters by a fishing platform, shoreline fishing, a boat ramp, picnic area, kayak rental, and kayak launch, the construction of a river walk trail downstream of the Project, and a proposed Riverfront Park downstream of the Project.

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
6	FWS/ May 12, 2020	The FWS recognizes that while portage around the dam may not be feasible, the FWS states there may be other opportunities to enhance recreation use in the area. The FWS supports the VDGIF recommendation on this issue including to evaluate the need for boat access in the upper part of the reservoir.	The Licensees agree with the FWS assessment that canoe portage around the dam is not feasible and conditions have not materially changed since the last relicensing to warrant another investigation into portage. The Licensees disagree regarding the need to evaluate the need for boat access to the upper part of the reservoir for the reasons provided in section 2.2.3 of the DSP. In addition, the upper extent of the reservoir is 5.7 river miles upstream of the existing boat ramp and already is accessible by boat from the existing ramp; therefore, there is no need for boat access in the upper reservoir.
7	VDGIF/ May 14, 2020	VDGIF recognize the need for access facilities downstream from Schoolfield Dam, as well as the need for access immediately above the impoundment. The Applicant notes that the City of Danville may provide some unspecified level of access below the impoundment in some unspecified timeframe. Since no access is currently available between Schoolfield and Union Street dams, a need is clearly defined. Additionally, the Applicant has not addressed the need to measure access demands in the project area. Thus, no determination can be made regarding the sufficiency of current access facilities without an examination of need and potential enhancement options. Thus, a recreation study is necessary in order to evaluate current access facilities and potential mitigation options.	VDGIF is incorrect that there is no specified level of access downstream of the Project between Schoolfield and Union Street Dam. The City of Danville currently has a river walk trail along the river left bank that extends from the Piedmont Drive Bridge 0.1 miles downstream of the Project dam approximately 6 miles downstream, terminating at a boat ramp. This trail systems provide patrons with a paved trail for walking, running, cycling, and views of the river. VDGIF maybe referring to City’s proposed Riverfront Park, which would provide additional recreation downstream of the Project. The timeframe of this proposed park is unknown at this time. In regard to access above reservoir, see the response to comment 6. Overall, for the reasons discussed above, the Licensees believe the current recreation facilities in the Project area are sufficient.
<b>Comments on Studies Proposed and Adopted with Modification</b>			
<i>Water Quality Study</i>			

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
8	VDEQ/ May 8, 2020	VDEQ recommends water quality studies adhere as much as possible to DEQ's lake monitoring protocols in that VDEQ typically monitor lakes for a seven month period (April - October) so that VDEQ can track the seasonal changes in temperature, dissolved oxygen, nutrients, etc. from spring through fall.	The water quality study has been revised to include the collection of vertical profiles in the forebay area, Secchi disk measurements and pH monitoring, and to extend the monitoring period from June 1 through October 31. The monitoring period of June 1 through October 31 was selected because that is the time of year when effects of Project operations are most apt to be observed and when water quality conditions are most stressful to aquatic biota. The incorporation of nutrient sampling was not adopted because hydropower effects germane to nutrients are primarily limited to residence time effects related to storage and release hydropower operations, not run-of-river operations.
9	VDEQ/ May 8, 2020	In addition to the length of time each sampling year, DEQ samples reservoirs for a minimum of two consecutive years during each assessment cycle. One reason VDEQ does is to have a minimum of 12 data points for the 305(b) assessment. Another reason is that VDEQ knows from experience that rarely do we have two or more consecutive years of average rainfall and streamflow. VDEQ have recently seen the low flows in fall 2017 were followed by record rainfall and high flows for all of 2018 into the spring of 2019. A similar pattern was seen (at least in BRRO) in the drought that occurred around 1999 - 2001 which was followed by high rainfall and flooding in late 2002-2003. Therefore, VDEQ suggest a minimum of two consecutive years of monitoring.	The Licensees believe one season of water quality data collection from June through October is sufficient to document the existing condition of water quality of the Dan River in the Project area. The Licensees understand VDEQ has EPA reporting requirements and sometimes capitalizes on the efficiency of requesting licensees of hydroelectric projects to collect data to support their own regulatory reporting requirements. However, relicensing studies are intended to document the existing condition to support an analysis of Project effects; therefore, the water quality study was designed following standard scientific practices to support such an analysis. Furthermore, the Licensees understand the weather and flow conditions may not be "average" for this study year. However, FERC would likely not require a licensee to repeat a study simply because the data collected wasn't collected during an "average" year. FERC would require a licensee to repeat a study if the data collected occurred during anomalous environmental conditions or the

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
			environmental conditions have changed in a material way. Therefore, the Licensees have not incorporated a second year of data collection into the water quality study.
10	VDEQ/ May 8, 2020	The Schoolfield impoundment has other dams above and below it, which makes establishing true upstream reference and downstream impact stations difficult. There is no way around locating better upstream stations: however, the downstream stations being located almost directly in the turbine discharge reach is problematic. Low flow can be critical below dams therefore VDEQ suggests a fourth T/DO station in the main channel at a point before the river becomes impounded by the downstream dam.	The monitoring station in the tailrace - where the majority of the flow of the river occurs - would detect whether waters depleted of dissolved oxygen are being passed from the reservoir to downstream reaches. Therefore, the licensee respectfully does not adopt incorporating into the study another downstream station.
11	VDEQ/ May 8, 2020	A more thorough look into the impact of the dam on water quality would be to add a monthly temp/DO profile in the middle of the forebay or another deep location above the dam which would have to be done from a boat. This would include our methods of measuring temp, DO, pH and SpC at 0.3 meters below the surface and every meter down to the bottom.	The Licensees added a bi-weekly water temperature and DO vertical profile to the study. A pH vertical profile would also be collected monthly. Specific conductivity will not be collected because there is no state surface water quality standard for specific conductivity and no nexus to the Project has been demonstrated.
12	VDEQ/ May 8, 2020	pH is an important parameter since high temperatures, high primary production and high DO can result in pH values over 9 which can be stressful to fish.	See response to comment 11.
13	FWS/ May 12, 2020	Section 2.1.1, Studies Adopted with Modification by the Licensees, Water Quality Study of the DSP indicates water quality data will be collected from June 1 until September 30. According to the flow duration curves in the PAD, October is part of the low flow season when	The water quality study has been extended through October.



No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
		Project effects on water quality are most likely to occur; therefore, the FWS recommends that water quality data collection be extended through October until October 31.	
14	FWS/ May 12, 2020	The DSP states one water quality logger will be deployed in the forebay at approximately 25% depth from the water surface. An additional water quality logger should be placed deeper in the water column to capture any potential differences in water quality resulting from potential stratification of the reservoir. To even out the distribution of the two loggers in the water column, upper and lower set points for the data loggers should be at approximately one-third and two-thirds depth below normal pool elevation, respectively.	Water temperature, dissolved oxygen, and pH vertical profiles have been incorporated into the study to determine if and for how long the reservoir may stratify; therefore, there is no need to deploy continuous datalogger at separate set points.
15	FWS/ May 12, 2020	In addition to continuous monitoring of temperature and DO, once per calendar month (June through October), in situ water quality measurements of temperature, dissolved oxygen (DO), pH, and specific conductance should be collected at each of the water quality logger locations to better characterize water quality in the river.	Separate water temperature and dissolved oxygen discrete data measurements at each of the continuous monitoring stations is not needed because those data would be redundant. However, monthly discrete pH measurements at each of the continuous water quality monitoring stations has been incorporated into the study. Specific conductivity has not been incorporated into the study because there is no state surface water quality standard for specific conductivity and no nexus to Project operations has been demonstrated.
16	FWS/ May 12, 2020	At the forebay monitoring location, a depth profile of temperature and DO should be collected each month. The depths of the forebay data loggers should be adjusted, if necessary to capture any stratification, during the study period based on a comparison of the continuous temperature and DO results with the monthly depth profile measurements.	Vertical profiles of water temperature and dissolved oxygen on a bi-weekly basis has been incorporated into the study whereas pH vertical profiles have been incorporated into the study on a monthly basis. The forebay logger will be deployed at either 25% depth if the water column is not thermally stratified. If the water column is thermally stratified, the logger will be placed at

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
			the bottom of the epilimnion.
17	FWS/ May 12, 2020	Individual water quality measurements (temperature, DO, pH, conductivity) should also be collected during fisheries (including RLP surveys) and mussel field sampling events.	Separate measurements of water quality have not been incorporated into the Roanoke Logperch study because the water quality study is designed following accepted scientific methods and practices to document the baseline water quality conditions of Project affected reaches of the Dan River.
18	FWS/ May 12, 2020	Weather, river flow, and operations data will also be collected to add context to the water quality data, and that operations data used as part of the analysis will include turbine discharge and power generations. Analysis should also address how water quality is affected by different river flows and flow allocations (through the turbines versus over the dam crest). Of particular interest is whether water quality is affected during periods of no spillage over the dam crest.	The analysis of the river flow and operations with water quality will include a discussion of whether water quality is affected by spill and non-spill operations.
<i>Operations and Flow Assessment Study</i>			
19	FWS/ May 12, 2020	The Licensees proposed to collect the elevation data from June 1 through September 30, concurrent with other field studies. However, per the original study request by the North Carolina Wildlife Resources Commission (NCWRC), the data should be collected for at least 12 months to capture a variety of flow conditions.	The Licensees selected the proposed four month period of flow data collection after review of the hydrologic record indicates variable flows that are representative of the calendar can occur from June through September; therefore, capturing the range of flows of interest to the stakeholders. To ensure the data does capture the variability NCWRC alludes to, STS and the City will share the data and consult with the stakeholders as recommended. The most appropriate time for this consultation will be at the end of September. The data loggers will remain in place through the water quality study schedule (end of October) at a minimum.

<b>No.</b>	<b>Agency/ Date of Letter</b>	<b>Summary of Comment/Recommendation</b>	<b>Licensees Response</b>
20	NCWRC/ May 13, 2020	While we agree that Project impacts on downstream streamflow occur when streamflows are less than 2,000 cfs, such events are not limited to summer and fall months. As we illustrated in our study request, flow fluctuations have occurred in February, March and November. As our examples point out, some of the flow fluctuations are rapid declines, others are flow dampenings, while others are peaking events. The months the data are collected is less important than providing sufficient monitoring to capture enough of those events to be able to discern whether the cause is due to fluctuations from upstream sources, the Project, or a combination of the two. Also, the summer of 2020 may not provide flows less than 2,000 cfs. For these reasons, that is why we requested that the data be collected for at least 12 months to capture a variety of flow conditions resulting from ambient conditions and flow manipulation by upstream entities.	Please see our response to Comment 19.
21	NCWRC/ May 13, 2020	NCWRC recommends the title of the study be adjusted to “Operations and Flow Assessment Study” because the intent is not to just assess inflow, but inflow to and outflow from the Project.	The Licensees changed the title of study as recommended.
22	NCWRC/ May 13, 2020	NCWRC points out that the downstream monitor should be located upstream of any backwater effect from the Union Street Dam impoundment.	The Licensees will deploy the monitoring equipment upstream of the effects of the downstream impoundment.
23	NCWRC/ May 13, 2020	NCWRC recommends the study not limit the duration of data collection to four months, June-September, but expanded up to 12 months. NCWRC does recognize that if sufficient examples of flow fluctuations can be obtained in less time, they are agreeable to reducing the	Please see the response to Comment 19

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
		term of the study. NCWRC recommends that the data be downloaded and reviewed regularly and shared with the stakeholders for consultation on when the study can end.	
<i>Mussel Survey</i>			
24	FWS/ May 12, 2020	The DSP Section 2.1.3, Studies Adopted with Modification by the Licensees, Mussel Surveys: This section states because the Dan River upstream of the Project reservoir is not influenced by Project operations, but rather by other non-Project related activities, no mussel surveys will be conducted upstream of the project. The FWS does not agree with this approach. Mussel surveys upstream of the reservoir would be used as a reference to assess the impact of the project on mussel populations downstream of the dam. Mussels located upstream can also be impacted by the project as juvenile mussels from upstream areas can be washed downstream into the reservoir or glochidia can be released from host fish into the reservoir. Because the reservoir provides lower quality habitat for many mussel species, recruitment of mussels into the population could be affected by the Project. Therefore, the FWS recommends that suitable habitat upstream of the reservoir be surveyed for mussels.	The Licensees have not adopted the FWS recommendation for the reasons discussed in Section 2.1.3 of the DSP. In addition, the approach the FWS recommends is a comparison to a reference site to assess Project effects. That approach seeks to recreate pre-project conditions in order to assess project effects. The Commission's baseline for evaluating Project effects is the environment as it exists at the time of licensing. This does not include pre-Project conditions, which the courts have affirmed (See <i>American Rivers v. FERC</i> , 187 F.3d 1007, amended and rehearing denied, 201 F.3d 1186 (9th Cir, 1999); <i>Conservation Law Foundation v. FERC</i> , 216 F.3d 41 (D. C. Cir. 2000).
25	FWS/ May 12, 2020	The level of effort is insufficient to determine whether rare or state listed or federally listed mussel species are present as the detection probability of these species is low. All mussel habitat below the dam should be surveyed with sufficient effort to confidently determine whether these species are present or not. In addition, the large area of the reservoir necessitates a much larger survey area. The higher quality habitat downstream of the	The Licensees have contracted with Alderman Environmental Services Inc. (Alderman) to perform the mussel surveys. Alderman is extremely familiar with the Dan River and mussel species that occur, or are likely to occur, throughout the region. As part of the informal consultation associated with securing a state sampling permit associated with this work, Alderman invited the state biologist, Brian Watson, to assist with the survey

<b>No.</b>	<b>Agency/ Date of Letter</b>	<b>Summary of Comment/Recommendation</b>	<b>Licensees Response</b>
		<p>dam also necessitates a more thorough survey to detect if these mussel species are present. Therefore, the FWS recommends an approach that involves increasing the number of transects and associated survey effort, sufficient to allow development of a species richness curve, where search effort continues until no new species are found. As stated previously, a mussel survey upstream of the reservoir is needed as a reference to assess impacts from the Project. This increased level of effort is justified because federally listed mussel species may occur in this part of the Dan River and FERC will need to make a Section 7 effects determination for any federally listed species when they prepare their Environmental Assessment. It may not be possible to make an informed effects determination unless a more comprehensive mussel survey is performed downstream of the dam. The FWS recommends that mussel survey methods be approved by the VDGIF prior to implementation, and the FWS defers to VDGIF for determining the appropriate level of effort.</p>	<p>and committed Alderman’s survey team will conduct 90 person hours of active survey time in areas most likely to support mussels, including downstream of Schoolfield dam. These proposed changes to the study plan were satisfactory to VDGIF at the time the permit was issued. As such, the Licensees have refined the methodology in this FSP to remove any discussion of transects; confirm invitations to agency mussel specialists will be sent and field dates will be jointly coordinated so the biologists can work side by side with Alderman during the survey; and the survey will include 90 person hours of active survey time within the reservoir and downstream areas.</p>
26	VDGIF/ May 14, 2020	<p>We have determined that the mussel survey proposed in the DSP is inadequate to fully describe the mussel fauna present within the project impact area. The applicant is proposing to sample 2 x 100 m transects (one in the reservoir and one below the dam) to determine the presence/abundance of mussel species. Based upon detection probability estimates performed by VDGIF and others (based upon detection probability of individual mussels and the density of rare mussel species), the level of effort needed for this work would be 15-20 x 100 m transects for each area (above and below the dam). This would provide an approximately 95+% probability of</p>	<p>Please see the response to Comment 25.</p>

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
		<p>detecting rare species. The Applicant may wish to stratify these sampling transects by area in order to reduce sampling variability. We are willing to assist the applicant with selection of sampling transect locations in order to get adequate coverage of the project area. In order to determine the presence of rare mussel species, a significantly more robust sampling effort is needed. The level of effort proposed by VDGIF should provide an acceptable level of detail needed to determine project impacts and potential mitigation needs.</p>	
<i>Entrainment and Impingement Study</i>			
27	FWS/ May 12, 2020	<p>The FWS notes that one of the goals of the proposed study is to evaluate seasonal and annual fish entrainment and turbine mortality at the Project. Duke (2019) collected some seasonal data in the reservoir; however this data is not provided in their report. The FWS states that without the data from Duke it's unclear how the seasonal assessment will be performed as the FWS confirms their interested in how impingement and entrainment varies across seasons.</p>	<p>The seasonal component of the study depends on flow through the Project turbine, which the Licensees collect, and selected entrainment studies within the EPRI (1997) database. These data are used to develop average monthly and average seasonal entrainment rate estimates expressed as the number of fish entrained per cubic million feet of water passed through the tested turbine(s) in the EPRI database. This is done by multiplying the flow through the Project's turbines and the monthly and seasonal entrainment rates from the EPRI database. Seasonal fisheries data is not necessary to perform the study, but would likely result in a more robust analysis. Therefore, the Licensees proposed in the DSP to request such data from Duke.</p>
28	FWS/ May 12, 2020	<p>The FWS recommends the study should also consider whether a particular species/life stage may be motivated to move downstream at a certain time of year (e.g., fall migration period; young-of-year dispersal); swim speed/ability (i.e., ability to escape the powerhouse intake</p>	<p>The study plans states entrainment susceptibility will also be based on life history. Implicit in this aspect of the study is life-stage and movement patterns. Therefore, the FWS recommendation is already incorporated into the study.</p>

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		flow) may not be the only factor determining whether a fish is susceptible to entrainment.	
<i>Roanoke Logperch Assessment</i>			
29	FWS/ May 12, 2020	The FWS raise issue with the licensees proposal in the DSP to not survey upstream of the Project reservoir. The FWS recognizes that FERC defines the baseline as the existing conditions at the Project at the time of relicensing, under the Endangered Species Act, the FWS considers both past and present impacts. If the RLP are present upstream of the Project, larval RLP could drift into and through the Project in the spring during spawning. Thus, the FWS asserts that the Project could have impact resources occurring upstream of the reservoir and the FWS recommends suitable habitat upstream of the reservoir be surveyed for RLP.	The Project does not directly or indirectly affect resources of the Dan River upstream of the upper extent of the Reservoir. Furthermore, once a resource, such as RLP drift downstream into the reservoir, that resource cannot be considered an upstream resource because those RLP are no longer located upstream. In summary, the Licensees affirm there is no nexus to RLP upstream of the Project for the reasons mentioned above and those discussed in section 2.1.5 of the DSP. Nonetheless, the Licensees added additional survey effort to survey the upstream most riffle section of the upper reservoir to discern if RLP is present in Project-affected waters upstream of the Project dam. The Licensees also anticipate adding as a target species for the entrainment study RLP. This would provide analysis of the effect that Project may have on RLP that pass through the Project.
30	FWS/ May 12, 2020	As stated previously, if the species does occur more immediately upstream of the Project reservoir, the Project may be directly impacting RLP larvae that may drift into the reservoir and die because habitat is not suitable, or that may pass through the Project powerhouse and be injured or die from entrainment, either of which requires Section 7 consultation with the Service under the ESA.	Please see the response to Comment 29.
31	FWS/ May 12, 2020	This section states the Licensees have retained Alderman Environmental Services, Inc. (AESI) who employs biologists that have collected RLP in the past and qualify as an approved surveyor. No one from AESI is currently	The Licensees appreciate the FWS sharing the approval information. The Licensees contractors have received the necessary approvals and are in possession of a sampling permit. Informal consultation between the contracted

<b>No.</b>	<b>Agency/ Date of Letter</b>	<b>Summary of Comment/Recommendation</b>	<b>Licensees Response</b>
		<p>on the list of approved surveyors for RLP in Virginia. The list of approved surveyors for RLP and instructions for adding individuals to the approved surveyor list can be found at <a href="https://www.fws.gov/northeast/virginiafield/endangered/surveyors.html">https://www.fws.gov/northeast/virginiafield/endangered/surveyors.html</a>. The qualifications of the individual seeking approval as a surveyor should be provided to the Service at least 60 days prior to the start of the survey.</p>	<p>biologists and the state biologists during pursuit of the permit solidified the methods that if RLP were observed during snorkeling then no further surveys are needed.</p>
32	FWS/ May 12, 2020	<p>FWS raises concerns that the proposed methodology in the DSP will not be sufficient to assess effects to RLP during the Section 7 consultation process or the FERC NEPA process. FWS specifically notes that if RLP is present downstream, within the potentially affected area, there is potential for Project operations to affect RLP spawning and nesting (e.g., adults could be pushed off of preferred riffle habitats, or shear stress related to Project discharge could disturb nests and push eggs downstream). FWS specifically recommends the Licensees work with the resource agencies to develop a RLP survey methodology that is adequate to detect the species and quantify the population so that an appropriate assessment of effects can be performed.</p>	<p>The Licensees are proposing approximately 90 hours of survey time using methods accepted by the scientific community as appropriate for RLP surveys. The Licensees appreciate the FWS concerns for better understanding the presence/absence and abundance of the RLP in the Dan River; however, the study is intended to support the Section 7 consultation process, which is based on the presence/absence of suitable habitat and the species, not quantify the population; therefore, the level of effort and the methods the Licensees believe is commensurate with the purpose of the study.</p>
33	FWS/ May 12, 2020	<p>FWS recommends that the study should also include information on presence/absence of the species immediately upstream of the Project reservoir. In the absence of data for the reach of the Dan River immediately upstream of the reservoir, the FWS assumes the species is present upstream of the Project, in which case an additional larval drift study will be recommended.</p>	<p>Please see the response to Comment 32.</p>



<b>No.</b>	<b>Agency/ Date of Letter</b>	<b>Summary of Comment/Recommendation</b>	<b>Licensees Response</b>
34	FWS/ May 12, 2020	The FWS notes that the DSP proposes to calculate habitat suitability index scores from the habitat assessment and that the proposed habitat assessment methodology is not systematic or rigorous enough to achieve this objective. FWS recommends a more comprehensive analysis of the habitat conditions in the river will be needed to accomplish this.	The Licensees will calculate Habitat Suitability Index scores based on existing Habitat Suitability Indices published in the scientific literature. The licensees will obtain multiple replicate depth, velocity, substrate, and silt cover observations at each area where the qualified survey determines is most appropriate for survey, both within the upper reservoir and downstream of the Project. Therefore, habitat suitability at each location will not be based on one measurement of each variable. The survey is planned for four days targeting baseflow for safety reasons and to have optimal water clarity for observation, which would enhance the probability of observing RLP, which is consistent with generally accepted scientific practice.
35	FWS/ May 12, 2020	The FWS recommends the RLP surveys occur after June 30 to protect RLP during breeding.	The Licensees will adjust the proposed sampling schedule and not sample prior to June 30 to protect potential RLP during spawning.
36	NCWRC May 13, 2020	We note that Roanoke Logperch are difficult to collect without using appropriate gear specifically targeted in their preferred habitats. We also indicated in our study request letter that Roanoke Logperch were collected since 2017 in the North Carolina portion of Dan River upstream of the Project. More specifically, the species was observed by NCWRC biologists using snorkeling gear in October 2017 approximately 2 miles upstream of the North Carolina-Virginia border near the town of Berry Hill, VA.	The Licensees requested clarification regarding the occurrence of RLP upstream of the Project from NCWRC. NCWRC responded by e-mail dated May 19, 2020, which confirmed that one RLP was observed 2 miles upstream of the VA-NC border near Berry Hill, VA. The communication indicated the observation was incidental during a mussel survey in October 2017 during low flow, and no voucher photographs were obtained.
37	VDGIF May 14, 2020	Since the Roanoke Logperch is a small, cryptic, and rare species; a considerable amount of sampling may be necessary in order to accurately determine the status of	The level of effort of the study has been increased to 90 survey hours over 4 days after consulting with a qualified RLP surveyor.

No.	Agency/ Date of Letter	Summary of Comment/Recommendation	Licensees Response
		the species in the project area. We recommend that capture (detection) probabilities be utilized to determine the appropriate level of effort. These probabilities can be generated in consultation with Roanoke Logperch experts.	
38	VDGIF May 14, 2020	In addition, the Applicant does not propose to sample for this species above the impoundment. We agree that the presence of Roanoke Logperch is unlikely in the impoundment, but suitable habitat exists immediately upstream from the impoundment. Any logperch present could potentially utilize the upper impoundment on an intermittent basis. In addition, larval or juvenile logperch could migrate into the impoundment (or be washed in during high flow events). Given the habitat conditions in the impoundment, anything other than short-term residence time for this species in the impoundment could lead to high levels of mortality. Thus, the status of this species above the impoundment needs to be assessed in order to evaluate the impacts of project operations on this listed species, as well as to determine appropriate mitigation measures, if needed.	Please see the response to Comment 29.
40	NCWRC/ May 13, 2020	NCWRC notes that although RLP are difficult to collect without using appropriate gear specifically targeted in their preferred habitats; NCWRC biologists using snorkeling gear in October 2017 observed RLP in the Dan River in North Carolina near the town of Berry Hill, VA.	The licensees contracted biologists are familiar with the RLP preferred habitats and methods to collect them and continue to propose snorkeling as the primary survey method. The licensees are not proposing to survey upstream of the reservoir.
<i>Bald Eagle Nest Survey</i>			
39	FWS/	The FWS expressed appreciation for the licensees proposing to survey for Bald Eagle nests in the DSP;	The licensees plan to reallocate the modest amount of resources dedicated to the Bald Eagle surveys to other

<b>No.</b>	<b>Agency/ Date of Letter</b>	<b>Summary of Comment/Recommendation</b>	<b>Licensees Response</b>
	May 12, 2020	however the FWS recommends the resources for conducting this survey be reallocated in support of their recommendations for expanding or conducting studies of other resources. Specifically, the FWS recommends the funds be used to support (1) increased effort during mussel surveys; (2) increased effort during the RLP survey; (3) expansion of the general fisheries study downstream of the powerhouse; (4) extending the water quality study period; and (5) extending the flow study effort.	study efforts most notably by expanding the level of effort for the mussel and RLP surveys.

### **3.0 FINAL STUDY PLANS**

#### **3.1 Baseline Water Quality Monitoring Study**

##### *3.1.1 Goals and Objectives*

The goals of the study are to 1) collect baseline water temperature and dissolved oxygen data to document the existing water quality conditions of the Dan River in the Project area; and, 2) determine whether the water quality of Project-affected reaches of the Dan River are consistent with Virginia water quality standards and designated uses. To accomplish these goals the study would have the following objectives:

- 1) Collect continuous baseline water temperature and dissolved oxygen data at representative locations within a riverine area of the upper reservoir, forebay area, and tailrace from June 1 through October 31;
- 2) Collect on a bi-weekly basis vertical profiles of water temperature and dissolved oxygen within the forebay area to determine whether the Project reservoir undergoes thermal and dissolved oxygen stratification from June 1 through October 31;
- 3) Collect on a bi-weekly basis Secchi disk transparency measurements within the forebay area to document the depth of the euphotic zone and trophic state of the Project reservoir;
- 4) Collect on a monthly basis single grab measurements of pH at the upstream riverine and tailwater areas, and a vertical profile of pH within the forebay area;
- 5) Characterize the baseline water quality data collected in Project area;
- 6) Analyze the continuous water temperature and dissolved oxygen data in comparison to Virginia surface water quality standards, inflow, and Project operations (headwater and tailwater elevation (ft), and generation (cfs and kW)).

##### *3.1.2 Existing Information and Need for Additional Information*

Existing water quality information in the Project area consists of various grab sample data and some continuous water temperature and specific conductivity data. The existing grab sample data is not collected at a frequency sufficient to assess effects of Project operations. Furthermore, the continuous data was collected downstream of the Project reservoir; thus those data do not lend themselves to an assessment of Project operations. Therefore, a need exists to collect water quality data at a frequency sufficient to assess effects of Project operations, and determine consistency with state surface water quality standards.

##### *3.1.3 Project Nexus*

Operation of the Project results in the discharge of waters impounded by the Project dam for the purpose of electrical generation, which may affect water quality within Project-affected reaches.

### 3.1.4 *Methodology*

#### Study Area

The proposed study area includes Project reservoir downstream to the Project tailwater. Figure 3.1.4-1 depicts the proposed monitoring station locations within the proposed study area.

#### Continuous Water Temperature and Dissolved Oxygen Monitoring

Continuous water quality data will be collected in situ at 15-minute intervals by deploying U26-001 HOBO® Dissolved Oxygen Loggers (Onset Computer Corporation). Parameters to be measured include: water temperature (°C) and dissolved oxygen (mg/L and percent saturation). Calculation of dissolved oxygen percent saturation requires barometric pressure; therefore, a data logger that records barometric pressure, such as the U20L HOBO® Water Level Recorder (Onset Computer Corporation), will be installed at the Project powerhouse. Each logger will be calibrated following the manufacturer's instructions and deployed at a representative location in the vicinity of the proposed sampling stations: one station upstream, forebay, and tailrace (Figure 3.4.4-1). The upper reservoir and tailrace loggers will be tethered to shore and anchored, whereas the forebay logger will be deployed at approximately 25% depth from the water surface when set, and suspended from a buoy that is anchored to the riverbed. If the forebay area becomes stratified, the logger will be suspended approximately near the bottom of the epilimnion but above the metalimnion. The instruments will be deployed during a five-month period from June 1 through October 31 to document baseline water quality conditions during the summer period and low flow period.

Each station will be visited every two weeks to download data; perform replicate fouling and calibration measurements per the manufacturer's instructions to assist in data correction; and clean, inspect, calibrate, and redeploy the instruments. It may be necessary to visit the stations to service the instruments weekly depending on the degree of fouling; however, we assume bi-weekly sampling would be sufficient. Fouling and calibration measurements will be collected using a recently calibrated water quality meter (e.g., YSI ProSolo or similar). Prior to redeployment, the data series will be visually examined in the field for any aberrant measurements that would indicate an instrument is malfunctioning, warranting further troubleshooting and/or replacement. All data will be recorded on field datasheets or recorded within the instruments' internal memory.

#### Water Temperature and Dissolved Oxygen Vertical Profiles

Concurrent with the maintenance of the continuous water temperature and dissolved oxygen data loggers, a water temperature and dissolved oxygen vertical profile will be collected bi-weekly at the forebay station from June 1 through October 31. The vertical profile will be collected using a recently calibrated portable temperature and dissolved oxygen meter (YSI ProSolo or similar) with a data cable of sufficient length to reach the reservoir bottom (~35-feet ft). At the forebay station the vertical profile will be collected from a boat that is allowed to drift downstream to control the depth of the instrument and sample the same parcel of water as the instrument is lowered through the water column. Starting at the water surface (~0.3 m depth), the profile will be collected by taking temperature and dissolved oxygen measurements at 1-meter depth

increments, with the last reading taken approximately 0.5 m above the river bottom. Depth of the station would be determined using a HONDEX® portable depth sounder. Readings will be allowed to stabilize before a measurement is taken and before proceeding to the next depth increment. At least once per profile a replicate measurement will be collected at a random depth interval selected *a priori*. All data, along with approximate locations of the thermocline (if present), will be recorded on field datasheets or recorded within the instruments' internal memory.

#### pH Monitoring

A recently calibrated multiparameter meter (YSI 6920 v2 sonde or similar) equipped with a pH sensor and data cable of sufficient length to reach the reservoir bottom (~35-feet ft) to collect a vertical profile at the forebay station following the procedure described above for the water temperature and dissolved oxygen profile. In addition, grab measurements of pH will be collected at the upstream and tailrace stations. This effort would occur once per month over the proposed study period (June 1 through October 31). All data will be recorded on field datasheets or recorded within the instruments' internal memory.

#### Secchi Disk Transparency

A Secchi disk is a black and white patterned disk commonly used to measure the clarity of water based on the distance the disk can be seen when it is lowered into the water column. The Secchi disk measurement is used to estimate the euphotic zone depth, which is generally defined as two times the Secchi disk depth. This measurement would be collected at the same location as the vertical profile. The Secchi disk depth will be collected following the guidance described in EPA (2017). To collect the Secchi disk depth, the Secchi disk would be lowered on the shaded side of the boat until it disappears from view without the aid of sunglasses or view scopes. To record the disappearance depth, the depth of the lowering line (demarked in 0.1 m intervals) would be then be noted to the nearest 0.1 m in a field notebook or datasheet. The disk would then be lowered out of sight and then raised until it reappears. The reappearance depth would then be recorded in field notebook or datasheet. The depth of the euphotic zone would then be determined by multiplying the reappearance depth by two.

#### Weather, River Flow, and Operations Data

Weather, river flow, and operations data will also be collected to add context to the water quality data. Weather data will be obtained from NOAA Station USC00442245, located 4.0 miles ESE of the Project. River flow data would be obtained from USGS Gage 02075045 Dan River at STP near Danville, VA, located approximately 5.2 river miles upstream of the Project dam. Operations data, such as turbine discharge (cfs) and generations (kW), will be provided by the Licensees.

#### Data Analysis

All field-collected data will undergo a thorough QA/QC review process to ensure the accuracy and completeness of the dataset prior to analysis. Data quality targets for the continuous data include actual measurements obtained pre- and post-deployment in comparison to the field replicate data collected with a recently calibrated water quality meter should a relative percent

difference (RPD) of  $\leq 10\%$ ; and 80% of all measurements collected must pass the QA/QC process. For dissolved oxygen (mg/L), RPD would be calculated as:

$$\text{RPD} = [ | (a_i - b_i) | / ((a_i + b_i) / 2) ] * 100$$

where;

$a_i$  = actual measurement from the data logger at site visit  $i$

$b_i$  = side-by-side replicate reading from the handheld water quality meter at site visit  $i$

The continuous temperature and dissolved oxygen datasets will be initially reviewed and analyzed for outliers, aberrant measurements, and missing data to ensure the collected data are valid. Corresponding field calibration measurements will then be used to determine if data correction is required for a specific deployment period. Correction of the data will occur post-hoc and will be performed using the Dissolved Oxygen Assistant within the manufacturer's HOBOWare software. Any data point that does not pass QA/QC review and cannot be corrected will be flagged and removed from the final dataset prior to analysis.

The final water quality dataset will be summarized (e.g., mean, median, maximum, and minimum) and compared to applicable Virginia surface water quality standards. The final dataset will also be compared with Project operation data by plotting the continuous water temperature and dissolved oxygen time series with operations.

To characterize the trophic state of the reservoir a trophic state index (TSI) will be calculated following Wetzel (2001), such that:

$$\text{TSI}(SD) = 60 - (14.41 * \ln(SD))$$

where;

$SD$  = Secchi depth in  $m$ ;

Then, to define the trophic state of the reservoir, a TSI of  $< 30$  would indicate oligotrophy, a TSI between 30 and 50 would indicate mesotrophy, and a TSI  $> 50$  would indicate eutrophy (Wetzel, 2001).

### Reporting

Results of the Baseline Water Quality monitoring Study will be presented in a draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment. The report would provide the methods and results of the study.

#### 3.1.5 *Consistency with Generally Accepted Scientific Practice*

Data collection will be in accordance with methodology and instrumentation generally accepted by the scientific community. The data will be evaluated to determine Project effects on water quality.

3.1.6 *Study Schedule*

The Licensees anticipate this study would be implemented during the 2020 study season, between June 1 and October 31, during conducive and safe flow conditions. Further, the Licensees will provide the draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment.



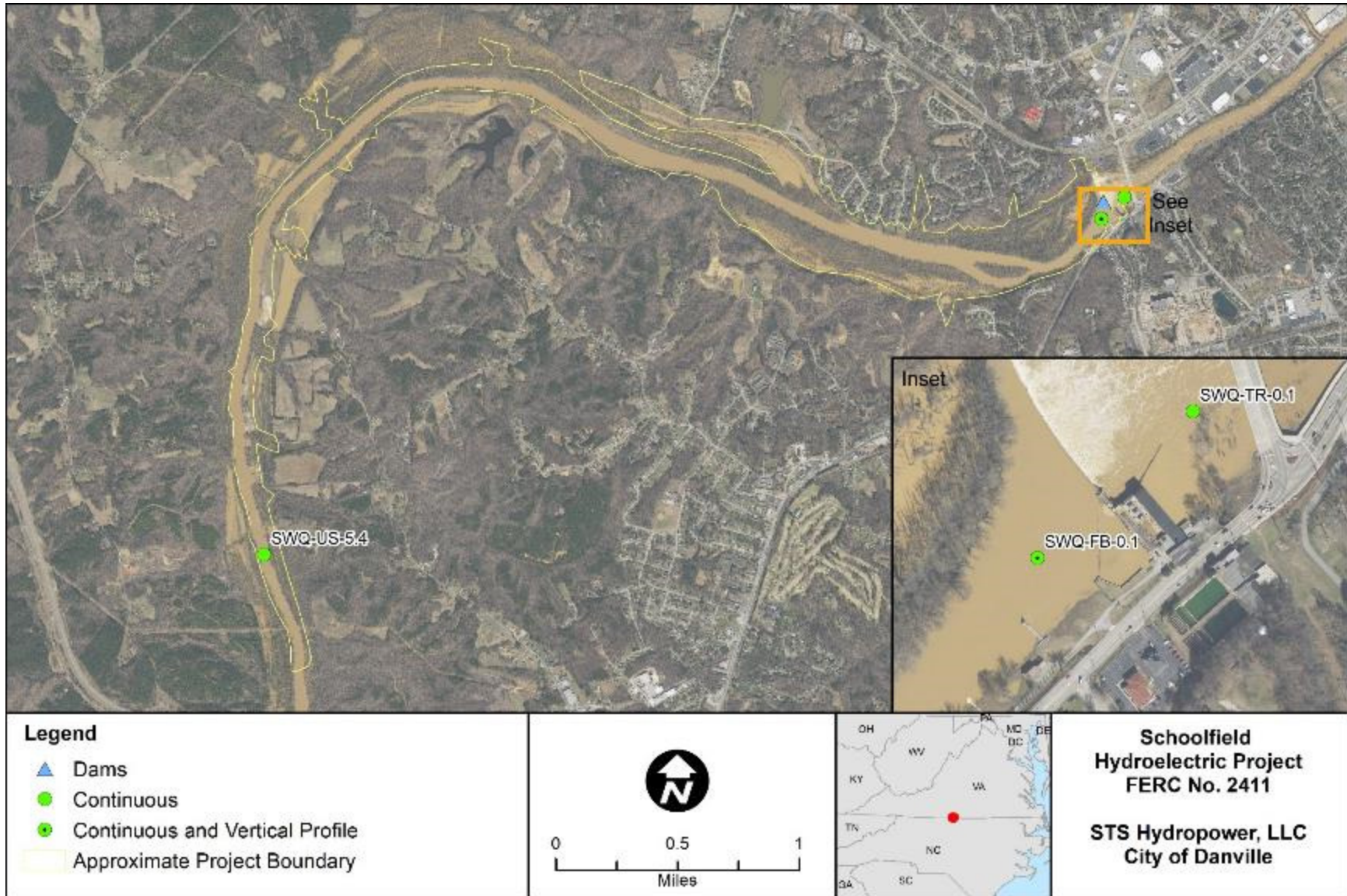


Figure 3.1.4-1. Proposed water quality monitoring study area and monitoring stations.

## **3.2 Operations and Inflow Assessment Study**

### *3.2.1 Goals and Objectives*

The goal of the Operations and Inflow Assessment Study is to document the effect inflows have on Project operations. To accomplish this goal, the study has the following objectives:

- 1) Describe how the Project's six fixed-output turbines and three generators are typically operated;
- 2) Collect continuous water level data at a representative location upstream of the Project reservoir, and downstream of the Project dam; and,
- 3) Characterize and compare water levels of the Dan River upstream of the Project reservoir, with operations and water levels downstream.

### *3.2.2 Existing Information and Need for Additional Information*

Downstream data collected at the USGS Gage 02075045 Dan River at STP near Danville, VA indicate that the Project potentially causes flows in the Dan River to fluctuate downstream of the Project. However, the apparent flow fluctuations may be an artifact of inflows to the Project and the nature of the Project's run-of-river operations. To discern the difference, a need exists to monitor water levels in the Project area.

### *3.2.3 Project Nexus*

Aquatic habitat downstream of the Project may be affected by Project operations and fluctuating discharges. Results from this study could be used to inform the development of protection, mitigation, and/or enhancement measures for aquatic resource protection in the Project tailwater.

### *3.2.4 Methodology*

#### Study Area

The proposed study area is the Dan River upstream of the Project reservoir through the Project tailwater (Figure 3.2.4-1).

#### Describe Existing Operations and Operations Data

The Project has three generators and six, fixed-output turbines. The Licensees will describe the operating regime of the six turbines and will summarize: headwater (ft), tailwater (ft), turbine discharge (cfs), and generation (kW) data for the study period June 1 through September 30.

#### Collect Water Level and Flow Data

The Licensees will collect upstream and downstream water level data on 15-minute continuous basis from June 1 through October 31. Exact site locations will be determined in the field, but the two water level monitoring locations will be located at sites that exhibit similar channel morphology (e.g., width, depth, etc.), so that upstream and downstream water levels would be

comparable. The upstream water level logger would be installed at a sufficient distance upstream of the influence of the Project reservoir. Similarly, the downstream water level logger would be installed no further downstream than the Dan River's confluence with the Sandy River (approximately 1.1 river miles downstream of the Project dam) to avoid backwater effects of the impoundment created by the Union Mills Dam. Water levels will be monitored *in situ* by deploying a U20-001 HOB0® Water Level Recorder at each station. Data from each water level recorder will be offloaded on a near bi-weekly basis (i.e., every two weeks) concurrent with other field studies. At the beginning and end of each deployment period (i.e., bi-weekly period) reference water level measurements will be made relative to a benchmark established in the vicinity of each station that has an arbitrary elevation of 100 feet. Because the selected water level recorders collect absolute water pressure data, which changes in response to variability in air pressure, a separate water level recorder will be installed at the powerhouse to collect atmospheric barometric pressure data so water levels will be accurate.

#### Data Analysis

Water levels will be expressed as water surface elevations relative to the respective benchmark. Water surface elevation of each location and operations time series will be plotted at weekly intervals to depict spatial and temporal trends in water surface fluctuations and operations.

#### Reporting

Shortly before the scheduled conclusion of the study, the water levels data may be sent to the resource agencies to confirm no more additional water level data is needed. Results of the Operations and Inflow Assessment Study will be presented in a draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment. The report would provide the study methods and results.

#### 3.2.5 *Consistency with Generally Accepted Scientific Practice*

Water elevation data will be collected in accordance with methods generally accepted by the scientific community, and typically used in other hydroelectric project relicensing studies.

#### 3.2.6 *Study Schedule*

The Licensees anticipates this study would be implemented during the 2020 study season, and would target June 1 through September 30 for field work. Further, the Licensees will provide the draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment.



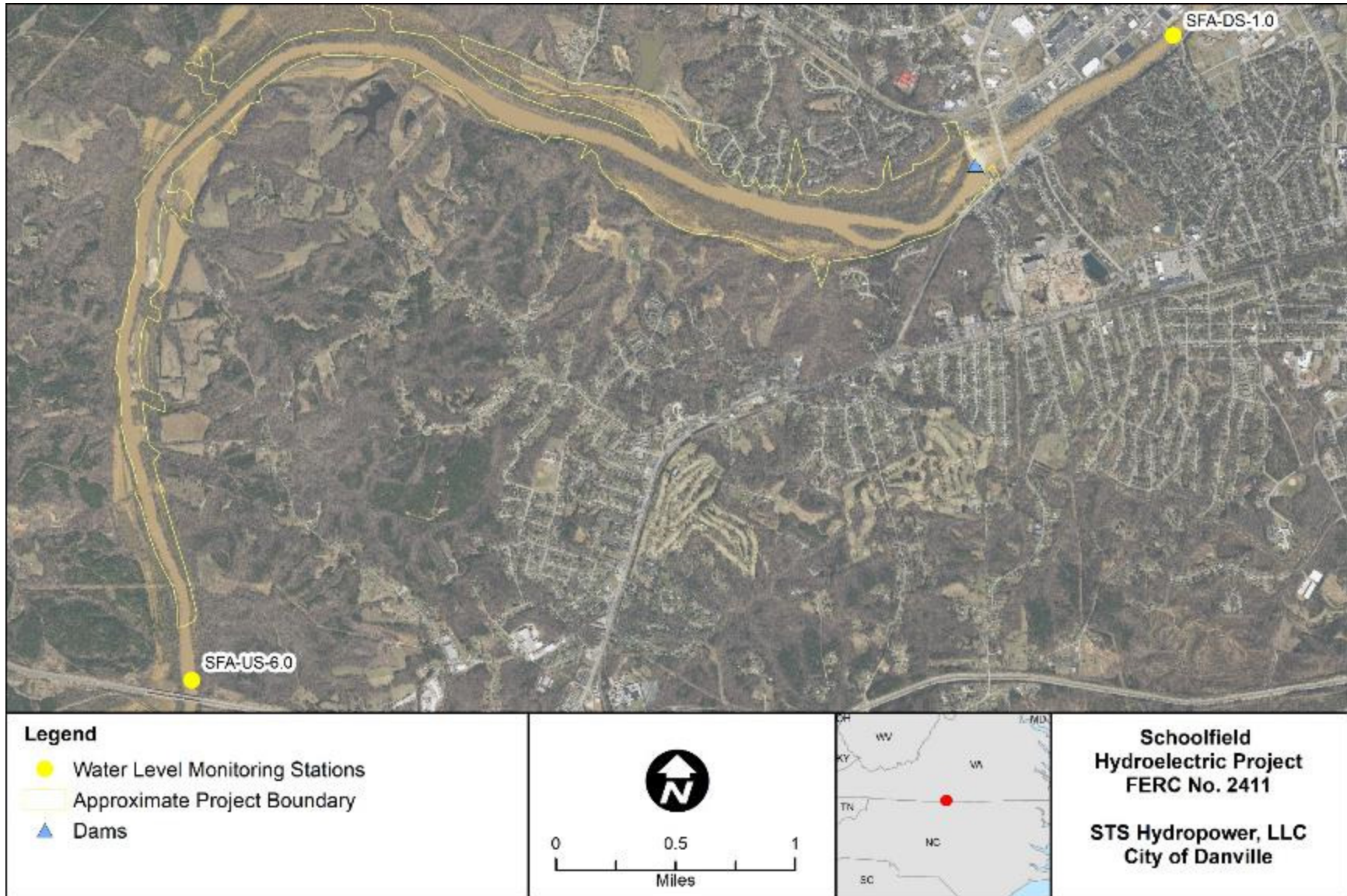


Figure 3.2.4-1. Operations and inflow assessment study area.

### **3.3 Desktop Entrainment and Turbine Mortality Study**

#### *3.3.1 Goals and Objectives*

The goal of the Desktop Entrainment and Turbine Mortality Study is to evaluate the seasonal and annual fish entrainment and turbine mortality at the Project. The goal of the study will be met by achieving the following objectives:

- 1) Describe the existing physical, operational, and environmental characteristics of the Project;
- 2) Characterize the species composition of the fish community in the vicinity of the Project;
- 3) Select target species and life-stages in consultation with the Agencies;
- 4) Describe species specific information that includes life-history and habitat requirements, and swimming performance criteria for the target species and life stages;
- 5) Qualitatively assess entrainment and impingement potential for each target species and life stage by comparing physical, operational and environmental attributes of the Project with species-specific information;
- 6) Estimate the potential seasonal and annual entrainment for each target species;
- 7) Estimate the seasonal and annual turbine mortality for each target species based on turbine mortality estimates from similar projects; and,
- 8) Discuss impacts to the fish community and populations of the Dan River resulting from entrainment, impingement, and turbine mortality.

#### *3.3.2 Existing Information and Need for Additional Information*

There is no known existing data that quantifies the level of impingement, entrainment and turbine mortality at the Project. A Desktop Entrainment and Turbine Mortality Study will fill this data gap.

#### *3.3.3 Project Nexus*

The fish community and population structure of the Dan River in the Project area may be affected by operation of the Project through entrainment, mortality from impingement or passage through the Project turbines. Results from this study could be used to inform fisheries protection, mitigation, and/or enhancement measures.

#### *3.3.4 Methodology*

##### Study Area

The proposed study area includes the Project reservoir, intake/forebay area, and powerhouse.

### Entrainment and Turbine Mortality Evaluation

The Entrainment and Turbine Mortality Study will follow a step-wise process:

- 1) Describe and discuss the Project characteristics that may influence entrainment and turbine mortality. This includes: the physical characteristics of the trashracks, turbines specifications, river hydrology, Project operations, and water quality and aquatic habitat near the intakes.
- 2) Characterize the existing fish community and select target species in consultation with the resource agencies. Characterizing the fish community typically involves summarizing existing fishery survey data (species and abundance) collected by the agencies or the Licensees in the Project area. For the Dan River, this information is available from Duke (2019). After the species community is characterized, target species will be proposed and submitted to the agencies for their concurrence. The target species will typically be either those of ecological significance or recreationally important. The target species will be a suite of species that undergo the subsequent entrainment and turbine mortality evaluations.
- 3) Perform a qualitative entrainment and impingement evaluation to determine the overall susceptibility of the target species to entrainment and impingement on the trashracks. The purpose of this qualitative evaluation is to winnow down the number of target species that could be susceptible to entrainment. The information compared typically is the overall size, habitat requirements, life history, and swimming ability of the target species to the habit near the intakes, the intake velocity, and the trashrack configuration. Based on these factors, the susceptibility is qualitatively determined to be none, low, moderate, or high. Only those target species that have an entrainment susceptibility of low to high are considered for the quantitative entrainment and turbine mortality assessment.
- 4) Estimate the number of target species entrained at the Project on a seasonal and annual basis. This step is completed by first selecting representative projects within the EPRI 1997 entrainment database that are similar to the Project. The EPRI 1997 database has entrainment rates based on actual field studies, expressed as number of fish per unit volume passed through the turbine. These entrainment rates would then be used to estimate the number of fish by multiplying the entrainment rate of the selected projects by the flow through the Project turbines.
- 5) Estimate the number of target species that experience turbine mortality at the Project. The first step to determine number of fish that experience turbine mortality is to review the EPRI 1997 turbine survival database and select representative projects that are similar to the Project to obtain a turbine mortality rate. Then, the turbine mortality rate is multiplied by the entrainment estimate to yield the number of fish that would experience turbine mortality.

### Data Analysis and Reporting

Data analysis is implicit in the methods discussed above and would be detailed in the study report. Results of the Desktop Entrainment and Turbine Mortality Study will be presented in a

draft study report to the agencies during the first or second quarter of 2021 for a 30-day period of review and comment.

### 3.3.5 *Consistency with Generally Accepted Scientific Practices*

This study involves the application of known fish community data with entrainment and impingement data following the methods and procedures generally accepted by the scientific community.

### 3.3.6 *Study Schedule*

Because the study is a desktop exercise, the Licensees anticipate performing the study during the first or second quarter of the 2021 study season. Further, the Licensees will provide the draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment.

### **3.4 Roanoke Logperch Assessment**

#### *3.4.1 Goals and Objectives*

The goals of the Roanoke Logperch Assessment are to: 1) determine whether suitable RLP habitat is present downstream between the Project dam and the upper extent of the Union Mills dam impoundment; 2) evaluate the presence/absence of the RLP between the Project dam and the upper extent of the Union Mills dam impoundment; and 3) collect information to support the Endangered Species Act (ESA) Section 7 consultation process. To attain these goals, the study has the following objectives:

- 1) Examine aerial photography and recent site photographs to select target areas between the Project dam and the upper extent of the Union Mills Dam impoundment that may have potential RLP suitable habitat;
- 2) Perform a habitat assessment of the target areas identified in Objective 1; and,
- 3) Perform a reconnaissance-level survey for RLP at the targeted areas identified in Objective 1.

#### *3.4.2 Existing Information and Need for Additional Information*

Duke (2019) and Roberts (2012) indicate that RLP are very unlikely to occur in the Project area. Nonetheless there has been no survey for the RLP on the mainstem of the Dan River downstream of the Project dam. This information is needed to support the Section 7 ESA consultation process.

#### *3.4.3 Project Nexus*

If RLP are downstream of the Project dam, Project operations may impact the species and its habitat.

#### *3.4.4 Methodology*

##### Study Area

The proposed study area is the Dan River (1) the upper most riffle section of the upper Project reservoir (Figure 3.4.4-1) and (2) the 1.1 mile reach of river from the Schoolfield Dam downstream to the upper extent of the Union Mills dam impoundment (Figure 3.4.4-2).

##### USFWS Approved Surveyor

The Virginia Field Office of the FWS requires any habitat assessments and sampling for endangered species, such as the RLP, must be performed by an approved surveyor. The Licensees have retained Alderman Environmental Services, Inc. who employs biologists that have collected RLP in the past and would qualify as an approved surveyor.



### Obtain VA Threatened & Endangered Species Collections Permit

VDGIF issues Threatened & Endangered Species Collections Permit only for individual projects. The Licensees will apply for the required collections permit immediately after the development of the Final Study Plan to allow for VDGIF's three to four-week application processing time prior to any field sampling.

### Upstream and Downstream RLP Habitat Assessment

The purpose of this assessment is to determine if suitable RLP habitat is present within the first riffle section upstream of the Project reservoir, and within the 1.1 river mile stretch of river downstream of the Project dam. This assessment will be completed following a step-wise process. The first step would be to select potential habitat assessment sites based on RLP general habitat requirements. In the Roanoke River basin, RLP usually occupy runs and riffles greater than 20 cm in depth with exposed, silt-free gravel-boulder substrate (Lahey and Angermeier, 2006; FWS, 2010). This site selection would be done using aerial imagery and other site photographs (e.g., Google street view; obtained from other site-specific studies). The approved surveyor would then review existing aerial imagery and recent photographs of the respective river reaches to identify possible run and riffle areas that appear consist with RLP habitat requirements. At the targeted areas field staff and the approved surveyor will collect depth (ft), velocity (fps at 0.6 depth), substrate, and percent silt-covered at the targeted areas of potential suitable habitat. This sampling effort will target a 4-day period no sooner than June 30 and no later than October 31, when near suitable (base flow) and safe flow conditions (wadeable) (USGS, 2012; Anderson et al., 2014).

### RLP Reconnaissance Survey

Concurrent with the habitat assessment, the approved surveyor would perform a reconnaissance-level survey for the RLP, consisting of up to 90 person hours of effort over the same 4-day period. This would involve employing either snorkel, SCUBA, bathyscopes, and potentially electrofishing and seining to determine the presence/absence of the species. Observed species would be noted, but not measured or enumerated. Prior to this survey, VDGIF would be notified as per the VA Threatened & Endangered Species Collections Permit requirements and would be invited to assist in the field survey efforts.

### Data Analysis

Data analysis would consist of calculating habitat suitability index (HSI) scores from the habitat assessment and summarizing the list of fish species observed during the RLP reconnaissance survey. The calculated HSI scores for each potential habitat site would follow Anderson (2016), which consist of taking the product of the four preference values (from Appendix B in Anderson (2016)) for depth, velocity, substrate, and silt raising the product to the 0.25 power; and multiplying the outcome by 100. Then, associating the HSI score with the corresponding habitat suitability category: Unsuitable (HSI = 0), Poor (HSI = >0-25), Fair (HSI = >25-50), Good (HSI = >50-75) and Excellent (>75). Summarizing the fish observed from the RLP reconnaissance survey would involve a tally of the species observed by location and noting whether RLP are

present or absent downstream of the Project. In addition, the amount of effort extending searching for RLP would also be summarized.

### Reporting

The report will present the methods, analyses, and results of the study. Results of the Downstream Roanoke Logperch Assessment will be presented in a draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment.

#### 3.4.5 *Consistency with Generally Accepted Scientific Practice*

This study involves the survey of RLP habitat, and recording observation of RLP following methods and procedures generally accepted by the scientific community.

#### 3.4.6 *Study Schedule*

The Licensees anticipates this study would be implemented during the 2020 study season. The study will commence no sooner than June 30 so as not to disturb RLP during breeding season, and when flow conditions allow, and will continue through October. Further, the Licensees will provide the draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment.

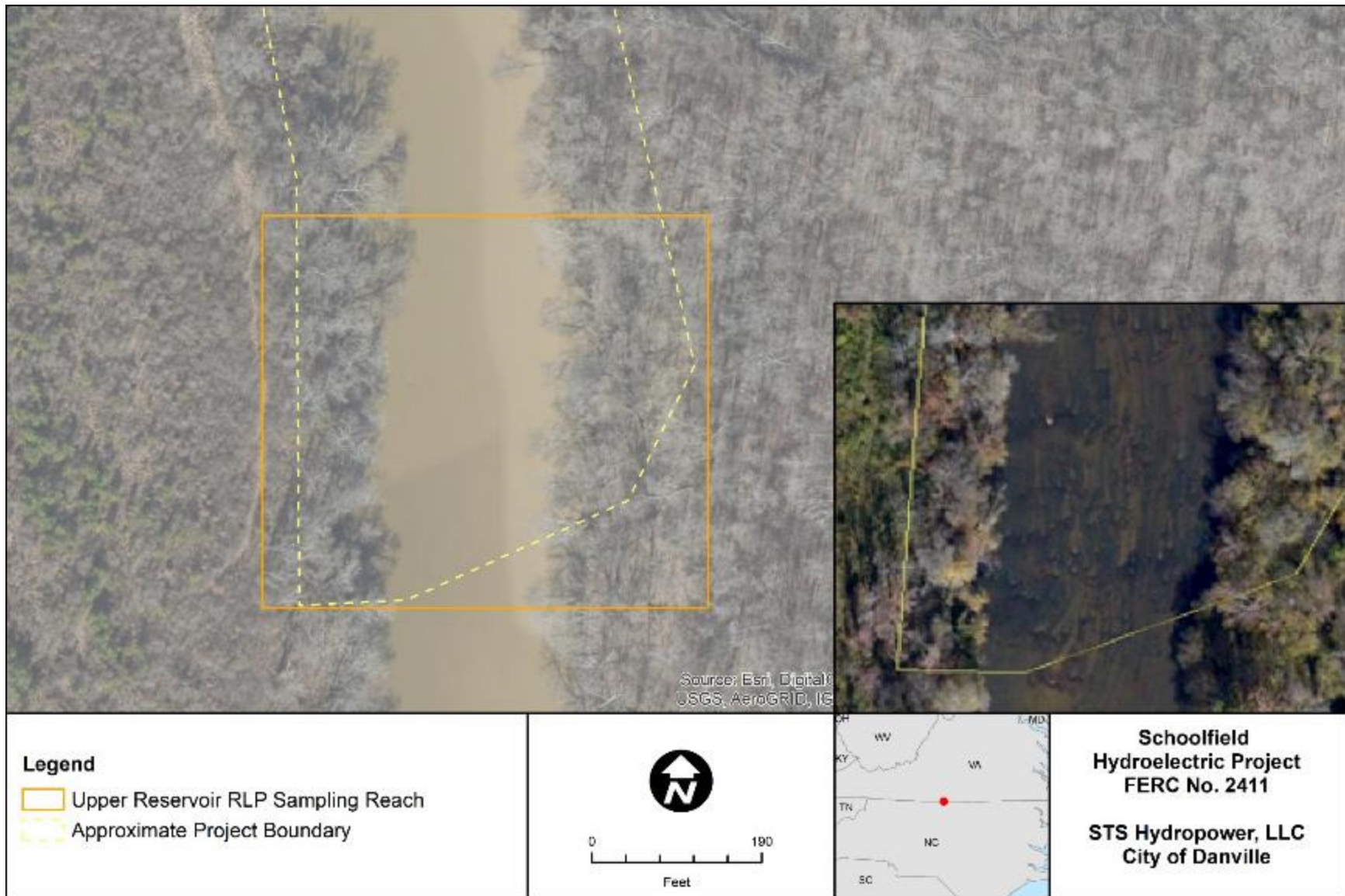


Figure 3.4.4-2. Proposed Roanoke logperch sampling reach within the upper Project reservoir.





Figure 3.4.4-2. Proposed Roanoke logperch sampling reach downstream of Schoolfield Dam.

### **3.5 Freshwater Mussel Survey**

#### *3.5.1 Goals and Objectives*

The goal of the Freshwater Mussel Survey is to document potential mussel habitat and determine the species of freshwater mussels present and their relative abundance in the Project area. These goals will be accomplished by achieving the following study objectives:

- 1) Conduct a literature review to determine those freshwater mussel species likely to occur within the Dan River in the vicinity of the Project and describe their physical habitat requirements;
- 2) Perform a survey of the Project reservoir periphery and tailwater for potential suitable mussel habitat and evidence of mussel presence;
- 3) Identify the freshwater mussel sampling areas within Project reservoir and Project tailwater;
- 4) Conduct a qualitative mussel survey to determine the presence and abundance of freshwater mussels in Project reservoir and Project tailwater at the selected sampling areas; and,
- 5) Summarize the mussel collections and describe the physical habitat surveyed.

#### *3.5.2 Existing Information and Need for Additional Information*

A freshwater mussel survey was performed throughout the Dan River by Alderman (2014) as a part of Duke Energy's coal ash spill response. However, the Alderman survey did not include the Project reservoir or the area downstream of the Project dam. Therefore, a need exists to document the existing mussel community within the Project reservoir and downstream of the Project dam.

#### *3.5.3 Project Nexus*

Freshwater mussel distribution and abundance is dependent on suitable habitat. Some mussel species, such as the Atlantic pigtoe, are sensitive to sedimentation, sediment scour, and water quality alterations that may result from hydropower operations. Operation of the Project impounds and utilizes flows of the Dan River for electrical generation, which may affect water quality and aquatic habitat suitable for freshwater mussels. Therefore, the distribution and abundance of freshwater mussels may be affected within Project-affected reaches of the Dan River.

#### *3.5.4 Methodology*

##### Study Area

The proposed study area includes the Project reservoir and the tailwater area downstream of the Project dam.

### Literature Review

A review of relevant scientific literature will be performed to identify and develop a list of the freshwater mussel species likely to occur in the Dan River in the Project area. For the freshwater mussel species identified, their habitat requirements will be described, which will guide field data collection efforts.

### Agency Survey Participation

Informal consultation between Alderman and Mr. Watson associated with the filing of the sampling permit application included an open invitation to Mr. Watson to assist in the field survey. Therefore, prior to mobilizing field crews Alderman Environmental Services, LLC (Alderman) will invite VDGIF's malacologist Mr. Brian Watson to participate in the survey.

### Survey of the Reservoir Periphery and Tailwater

A qualified malacologist from Alderman Environmental Services, LLC would survey of the reservoir periphery up to depths of 15-feet by kayak or boat for potential suitable mussel habitat. In addition, the reservoir shoreline would also be visually surveyed for evidence of mussels (e.g., relic shells or live individuals), which would be identified to species, if possible. This survey would cover both banks of the reservoir from the Projects boat barrier to the upper extent of the reservoir, or approximately 12.0 miles. Furthermore, reservoir tailwater area would also surveyed for mussel habitat and evidence for mussel in the same manner as above. The purpose of this survey would be to locate potential quality mussel habitat to assist in the selection of areas for the qualitative mussel survey below. During this survey effort, areas and stretches of quality mussel habitat, based upon the best possible judgement of the qualified malacologist, would be mapped. Photographs of quality mussel habitat observed would be taken and descriptions of the physical habitat observed (i.e., depth, substrate, flow) would be noted on field datasheets.

### Selection of Sampling Locations

Based upon the aquatic habitat surveyed along the reservoir periphery and tailwater, a qualified malacologist from Alderman Environmental Services, LLC would perform the survey. The survey would consist of up to 90 person hours of qualitative survey time based on habitat quality as determined by expert malacologists. The spatial expanse of the survey areas will be recorded using a handheld GPS.

### Qualitative Mussel Survey and Physical Habitat Descriptions

To perform the qualitative mussel survey, a scientific collections permit from VDGIF is required (USFWS and VDGIF, 2018). Therefore, the appropriate scientific collections permit would be obtained. Qualified malacologists from Alderman Environmental Services, LLC are retained to perform this component of the study.

Qualitative mussel surveys are presence/absence surveys using tactile and visual search methods, where a catch-per-unit-effort (CPUE) can be calculated based on the search area and time spent searching. A qualified malacologist will perform a qualitative survey for freshwater mussels when water conditions are of appropriate clarity and flow conditions are safe, especially in the

tailwater (Carlson et al. 2008; USFWS and VDGIF, 2018). The survey will be parallel to shore in waters no deeper than 15 feet. The qualitative survey will include a visual examination for dead shells along shorelines and exposed areas (Carlson et al. 2008). The survey will be conducted by visually examining the substrate and/or gentle probing (1 to 2 inches deep) and feeling the substrate for mussels. Depending on water depth, snorkeling or SCUBA will be used to examine the substrate; in general, water depths greater than one arm's length would require SCUBA (Carlson et al. 2008). All mussels discovered, either live or dead, will be identified to species and counted. The first 100 live individuals of each species encountered will be measured for total length, defined as the maximum distance between the posterior and anterior shell margins, with calipers to the nearest 0.1-mm and recorded (Carlson et al. 2008). Representative photographs of each species collected at each sampling location will be taken. All mussels (live or dead) that are collected will be re-bedded into the substrate in a posterior up position or gently placed on the substrate surface so as to allow the mussel to burrow and orient itself in the correct direction (Carlson et al. 2008). In addition, the total amount of time each person spent searching, weather, discharge at the beginning and end of sampling, and generation would be recorded.

Concurrent with the qualitative survey, the physical habitat along the survey will be described and representative site photographs will be taken. Physical habitat descriptions would consist of: the mesohabitat type (run, riffle, pool), approximate total area of run, riffle, and pool habitat, average depth, typical water velocity, and substrate (boulder, cobble, pebble, gravel, sand, silt and clay).

#### Data Analysis

Species richness will be determined for each sampling location, catch-per-unit-effort (CPUE) will be calculated for each species encountered by location. Basic summary statistics will be calculated based on the size data collected for each species and location. Length-frequency histograms will also be prepared to illustrate variations in species, size, and location.

#### Reporting

Results of the Freshwater Mussel Survey will be presented in a draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment. The report would provide the methods and result of the study.

#### *3.5.5 Consistency with Generally Accepted Scientific Practice*

This study involves the collection of freshwater mussel presence/absence and abundance data following the methods and procedures generally accepted by the scientific community.

#### *3.5.6 Study Schedule*

The Licensees anticipate this study would be implemented during the 2020 study season, targeting between June 1 and October 31, during conducive and safe flow conditions (USFWS and VDGIF, 2018). Further, the Licensees also anticipates to provide the draft study report to the agencies during the first quarter of 2021 for a 30-day period of review and comment.

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**APPENDIX A:  
AGENCY DSP COMMENT LETTERS**

## Burak, Matthew

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**From:** Cario, Anthony <anthony.cario@deq.virginia.gov>  
**Sent:** Friday, May 8, 2020 3:38 PM  
**To:** Burak, Matthew  
**Subject:** Reusens and Schoolfield Dam Hydroelectric Project Relicensing - Draft Study Plan

Hi Mathew, I realize these are quite late but one of our regional biologists provided comments on the water quality portion of the study plans for Schoolfield and Reusans dam. I have pasted them below for you to review and, if you are still able to, consider as you finalize the plan and/or conduct the monitoring. I apologize for not providing these earlier.

Thank you

Tony Cario

### Monitoring period and stations for both projects:

Since these are reservoirs I would suggest the water quality studies adhere as much as possible to DEQ's lake monitoring protocols in that we typically monitor lakes for a seven month period (April - October) so that we can track the seasonal changes in temperature, dissolved oxygen, nutrients, etc. from spring through fall. This was also suggested by the US Fish and Wildlife Service at the Schoolfield project. Since they are slated to begin monitoring this year it is too late to ask them to monitor in April and probably May as well; however, I would require them to sample into the month of October since that can be as critical a time of year as the warmer months due to low flows. EC has shown that they have researched data from the USGS gages at Holcomb's Rock on the James River and the Dan River at the STP near Danville. A simple query on the USGS website into flows from 2001, 2007, 2008 and 2017 show that flows at both locations were well below median into mid to late October.

In addition to the length of time each sampling year, DEQ samples reservoirs for a minimum of two consecutive years during each assessment cycle. One reason we do this is to have a minimum of 12 data points for the 305(b) assessment. Another reason is that we know from experience that rarely do we have two or more consecutive years of average rainfall and streamflow. As we have recently seen the low flows in fall 2017 were followed by record rainfall and high flows for all of 2018 into the spring of 2019. A similar pattern was seen (at least in BRRO) in the drought that occurred around 1999 - 2001 which was followed by high rainfall and flooding in late 2002-2003. Therefore, I suggest a minimum of two consecutive years of monitoring. A minimum of two years of study was also suggested by the USFWS.

Both impoundments have other dams above and below them which makes establishing true upstream reference and downstream impact stations difficult. I do not see a way around locating better upstream stations: however, I think the downstream impact stations being located almost directly in the turbine discharge reach is problematic. Low flow can be critical below dams therefore I suggest a fourth T/DO station in the main channel at a point before the river becomes impounded by the downstream dam. Additionally, a more thorough look into the impact of the dam on water quality would be to add a monthly temp/DO profile in the middle of the forebay or another deep location above the dam which would have to be done from a boat. This would include our methods of measuring T, DO, pH and SpC at 0,3 meters below the surface and every meter down to the bottom. A simple logger along the banks in the downstream section of the impoundment would not be a good indicator of the water quality in that section. Also, pH is an important parameter since high temperatures, high primary production and high DO can result in pH values over 9 which can be stressful to fish. Part of the reason for these suggestions is that in July 2018, our office investigated a small fishkill above Reusens Dam. No official cause was determined but it was likely due to heat stress as water temperatures were over 33C after several days of very high air temperature and decreasing flows in the James River.

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***Tony Cario***

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# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Virginia Field Office  
6669 Short Lane  
Gloucester, VA 23061



May 12, 2020

Ms. Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First St., N.E., Room 1A  
Washington, DC 20426

Re: Schoolfield Hydroelectric Project (FERC #2411),  
Danville, VA, Review of the Draft Study Plan

Dear Secretary Bose:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Study Plan (DSP) provided by Matthew Burak of WSP via email on April 16, 2020, on behalf of STS Hydropower, LLC (a wholly-owned subsidiary of Eagle Creek Renewable Energy) and the City of Danville (Licensees) for the Schoolfield Hydroelectric Project (Federal Energy Regulatory Commission [Commission; FERC] No. 2411) (Project). The Service also participated in the Joint Meeting and site visit held on September 18, 2019 in Danville, VA and in the DSP Agency Conference Call on April 23, 2020. The Project is located on the Dan River at approximately river mile 60.1 in the City of Danville, Pittsylvania County, VA. The Service filed comments on the Notice of Intent and Pre-Application Document (PAD), and Request for Studies, on November 15, 2019. The Service offers the following comments on the DSP.

**Section 2.1.1, Studies Adopted with Modification by the Licensees, Water Quality Study:** This section states water quality data will be collected from June 1 until September 30. According to the flow duration curves in the PAD, October is part of the low flow season when Project effects on water quality are most likely to occur; therefore, the Service recommends that water quality data collection be extended through October until October 31.

**Section 2.1.2, Studies Adopted with Modification by the Licensees, Flow Assessment Study:** This section states Project impacts on downstream river flow would only occur when the river flows are less than the Project's hydraulic capacity of 2,160 cubic feet per second. This typically occurs in the late spring, summer, and fall. Therefore, the Licensees proposed to collect the elevation data from June 1 through September 30, concurrent with other field studies. However, per the original study request by the North Carolina Wildlife Resources Commission (NCWRC), the data should be collected for at least 12 months to capture a variety of flow conditions.

**Section 2.1.3, Studies Adopted with Modification by the Licensees, Mussel Surveys:** This section states because the Dan River upstream of the Project reservoir is not influenced by Project operations, but rather by other non-Project related activities, no mussel surveys will be conducted upstream of the project. The Service does not agree with this approach. Mussel surveys upstream of the reservoir would be used as a reference to

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CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS  
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VIRGINIA, WEST VIRGINIA

assess the impact of the project on mussel populations downstream of the dam. Mussels located upstream can also be impacted by the project as juvenile mussels from upstream areas can be washed downstream into the reservoir or glochidia can be released from host fish into the reservoir. Because the reservoir provides lower quality habitat for many mussel species, recruitment of mussels into the population could be affected by the Project. Therefore, the Service recommends that suitable habitat upstream of the reservoir be surveyed for mussels.

**Section 2.1.5, Studies Adopted with Modification by the Licensees, Roanoke Logperch Assessment:** This section states the Dan River upstream of the Project is influenced by other developmental activities that are not Project related; therefore, there is no Project nexus to Roanoke logperch (*Percina rex*) (RLP) in the Dan River upstream of the Project reservoir. RLP surveys upstream of the reservoir would be used as a reference to assess the impact of the project on RLP populations downstream of the dam. While the Service recognizes that FERC defines the baseline as the existing conditions at the Project at the time of relicensing, under the Endangered Species Act (ESA) the Service considers both past and present impacts [50 CFR § 402.02]. If adult RLP are present upstream of the project, larval RLP can drift into and through the Project in the spring during spawning. Thus, the Project can impact resources upstream of the Project including RLP. Therefore, the Service recommends that suitable habitat upstream of the reservoir be surveyed for RLP.

This section states that Roberts (2012) reported that the only known extant RLP population in the Dan River watershed in Virginia resides in the Smith River, which is far upstream of the Project. Rosenberger (2007) reported that among Virginia tributaries to the Dan River, RLP are known only from the Smith River system, including Rockcastle Creek, Town Creek, and three disjunct sections of the mainstem Smith River. The licensees use this information as part of their rationale for not conducting RLP surveys upstream of the Project. However, Roberts (2012) also reported that RLP had been found in several tributaries to the Dan River in Rockingham County, NC, including the Mayo River, Big Beaver Island Creek, Cascade Creek, and Wolf Island Creek. In 2007, RLP were discovered in the mainstem Dan River, near Eden, NC (Roberts 2012). RLP were recently (2017) documented in the Dan River near the town of Berry Hill, NC, approximately 10 miles upstream of the head of the Project reservoir (NCWRC, personal communication). The species may also have expanded its range since the surveys were conducted by Roberts (2012). As stated previously, if the species does occur more immediately upstream of the Project reservoir, the Project may be directly impacting RLP larvae that may drift into the reservoir and die because habitat is not suitable, or that may pass through the Project powerhouse and be injured or die from entrainment, either of which requires Section 7 consultation with the Service under the ESA.

**Section 2.1.6, Studies Adopted with Modification by the Licensees, Bald Eagle Nest Survey:** The Service appreciates the licensees' proposal to conduct a bald eagle (*Haliaeetus leucocephalus*) nest survey, in response to the Service's previous comments. While the Service recommends ensuring that future project activities do not disturb or harm bald eagles, we would prefer that the resources for conducting this survey be reallocated in support of (1) improving the mussel survey design to significantly increase the probability of detecting all mussel species present in the project area, including any rare species that may be present (per the recommendations of the Virginia Department of Game and Inland Fisheries [VDGIF]), and including surveys upstream of the head of the reservoir, (2) expanding the RLP study to include sufficient sampling upstream of the Project reservoir to determine RLP presence/absence, which would help to determine whether RLP larvae may be subject to entrainment into the Project reservoir or through the powerhouse, (3) expansion of the general fisheries study to include sufficient survey effort downstream of the Project dam and powerhouse, (4) extending the water quality monitoring period through October which is also part of the low-flow season, and (5) extending the flow study to include at least 12 months of effort.

**Section 2.2.1, Studies Not Adopted by the Licensees, Aquatic Fauna Survey and Fish Survey:** This section states Duke (2019) provides recent information regarding the fish community of the Dan River in the Project area. This section concludes that this study adequately characterizes the Project's fish community; therefore, there is no need to collect additional information. The Service does not agree with this conclusion. The report summarizes three years of intensive fisheries sampling (2015 through 2017) using multiple gear types, including upstream of and within the Project reservoir. However, according to the report, fish surveys were only conducted upstream of the dam (transect G) in the reservoir. There were no fish surveys conducted immediately above the reservoir or in the tailwater below the dam. The closest downstream fish survey location is 55 miles downstream in the

headwaters of Kerr Reservoir, well below the dam. The area immediately below the dam between the Project dam and the Union Mill Dam lacks fish surveys necessary for an assessment of Projects impacts downstream. The closest upstream transect (F) is located approximately 8 miles upstream. Therefore, the area immediately above the reservoir should also be surveyed for fish as an upstream reference to assess impacts of the Project on fish populations.

**Section 2.2.2, Studies Not Adopted by the Licensees, Fish Passage and Protection Assessment:** While the Service agrees that there are currently no diadromous fish species in the Project area, there is the potential for the federally listed endangered RLP to be present in the Project area, considering recent documentation of the species approximately 10 river miles upstream of the Project reservoir, and the Project may function as an isolating mechanism, preventing dispersal and genetic exchange between RLP populations. Studies demonstrating RLP dispersal include Roberts et al. (2007) in which tagged RLP were documented moving up to 3.2 kilometers (km) between study sites, and Roberts et al. (2016) that estimated a RLP median lifetime dispersal distance of 6-26 km. In addition, many non-diadromous species documented in the Project reservoir are considered migratory (Wilcox et al. 2004), including quillback (*Carpiodes cyprinus*), golden redhorse (*Moxostoma erythrurum*), white sucker (*Catostomus commersonii*) and largemouth bass (*Micropterus salmoides*), among others, and some of these species serve as freshwater mussel host fish. For example, white sucker and largemouth bass have been identified as potential hosts for the yellow lampmussel (*Lampsilis cariosa*) (Kneeland and Rhymer 2008), which occurs in the Dan River (AES 2014). Therefore, the Project may also represent a barrier to mussel dispersal and genetic exchange, including for rare mussel species, some of which may be state listed or federally listed species (as yet to be determined through the planned mussel survey). Nevertheless, the Service understands it is premature to draw conclusions regarding these possible Project effects. At a minimum, the Service requests inclusion in the entrainment analysis, an assessment of time of year and frequency of spillage over the dam as a possible downstream alternative to passage through the powerhouse, and a characterization of the adequacy of safe passage (e.g., is there an adequate plunge pool below the dam) and viability of this route.

**Section 2.2.3, Studies Not Adopted by the Licensees, Recreation Use and Enhancement Assessment Study:** This section states there is no need to study recreation use and access at the Project. The Service does not agree with this conclusion. Given the increased interest in river recreation since the last relicensing, the Service believes a recreation study is warranted to study how recreation can be accommodated and/or enhanced at the Project. While portage around the dam may not be feasible, there may be other opportunities to enhance recreational use in the area. The Service supports recommendations provided by the VDGIF on this issue including evaluating the need for boat access in the upper part of the reservoir.

**Section 3.1.4, Draft Study Plans, Baseline Water Quality Monitoring Study, Methodology:** This section states one water quality logger will be deployed in the forebay at approximately 25% depth from the water surface. An additional water quality logger should be placed deeper in the water column to capture any potential differences in water quality resulting from potential stratification of the reservoir. To even out the distribution of the two loggers in the water column, upper and lower set points for the data loggers should be at approximately one-third and two-thirds depth below normal pool elevation, respectively. In addition to continuous monitoring of temperature and DO, once per calendar month (June through October), in situ water quality measurements of temperature, dissolved oxygen (DO), pH, and specific conductance should be collected at each of the water quality logger locations to better characterize water quality in the river. At the forebay monitoring location, a depth profile of temperature and DO should be collected each month. The depths of the forebay data loggers should be adjusted, if necessary to capture any stratification, during the study period based on a comparison of the continuous temperature and DO results with the monthly depth profile measurements. Individual water quality measurements (temperature, DO, pH, conductivity) should also be collected during fisheries (including RLP surveys) and mussel field sampling events.

This section states weather, river flow, and operations data will also be collected to add context to the water quality data, and that operations data used as part of the analysis will include turbine discharge and power generations. Analysis should also address how water quality is affected by different river flows and flow allocations (through the turbines versus over the dam crest). Of particular interest is whether water quality is affected during periods of no spillage over the dam crest.

**Section 3.3.1, Draft Study Plans, Desktop Entrainment and Turbine Mortality Study, Goals and**

**Objectives:** This section states the goal of the study is to evaluate the seasonal and annual fish entrainment and turbine mortality at the Project. Seasonal fish surveys are needed to determine species and seasonal abundance of fish that are in the vicinity of the Project and would be susceptible to impingement or entrainment. Duke (2019) collected some seasonal data in the reservoir; however this data is not provided in their report. Therefore, unless the Licensees can obtain this data from Duke, it is unclear how a seasonal assessment will be performed. The Service is interested in how impingement and entrainment varies across seasons.

**Section 3.3.4, Draft Study Plans, Desktop Entrainment and Turbine Mortality Study, Methodology, 3)**

**Entrainment susceptibility:** Entrainment susceptibility should also consider whether a particular species/life stage may be motivated to move downstream at a certain time of year (e.g., fall migration period; young-of-year dispersal); swim speed/ability (i.e., ability to escape the powerhouse intake flow) may not be the only factor determining whether a fish is susceptible to entrainment.

**Section 3.4.4, Draft Study Plans, Downstream Roanoke Logperch Assessment, Methodology, USFWS**

**Approved Surveyor:** This section states the Licensees have retained Alderman Environmental Services, Inc. (AESI) who employs biologists that have collected RLP in the past and qualify as an approved surveyor. No one from AESI is currently on the list of approved surveyors for RLP in Virginia. The list of approved surveyors for RLP and instructions for adding individuals to the approved surveyor list can be found at <https://www.fws.gov/northeast/virginiafield/endangered/surveyors.html>. The qualifications of the individual seeking approval as a surveyor should be provided to the Service at least 60 days prior to the start of the survey.

**Section 3.4.4, Draft Study Plans, Downstream Roanoke Logperch Assessment, Methodology, RLP**

**Reconnaissance Survey:** This section states that a reconnaissance level survey for the RLP will be performed in the downstream area. A more quantitative-level survey, than described in this Section, is needed downstream to better enable the Service to assess effects to RLP during the Section 7 consultation process. This increased level of effort will also assist FERC in making their Section 7 effects determination when they prepare their Environmental Assessment. It may not be possible to make an informed effects determination unless a more comprehensive RLP survey is performed downstream of the dam. If the species is present downstream, within the Potentially Affected Area, there is potential for Project operations to affect RLP spawning and nesting (e.g., adults could be pushed off of preferred riffle habitats, or shear stress related to Project discharge could disturb nests and push eggs downstream). The Service recommends that the Licensee work with the resource agencies to develop a RLP survey methodology that is adequate to detect the species and quantify the population so that an appropriate assessment of effects can be performed.

This study should not be limited to the downstream portion of the Project area. For the Service to analyze potential Project affects to RLP, and to quantify incidental take if there are adverse effects from the Project, information on presence/absence of the species immediately upstream of the Project reservoir is also needed. If the species is found upstream of the reservoir, then there is the potential for larvae to drift into the reservoir and/or through the powerhouse, either of which may impact the RLP. In the absence of data for the reach of the Dan River immediately upstream of the reservoir, based on recent documentation of the species approximately 10 miles upstream of the head of the reservoir (NCWRC, personal communication), the Service assumes the species is present upstream of the Project, in which case an additional larval drift study will be recommended. Methods have recently been developed for the collection and identification of RLP larvae (Buckwalter et al. 2019).

**Section 3.4.4, Draft Study Plans, Downstream Roanoke Logperch Assessment, Methodology, Downstream**

**RLP Habitat Assessment and Data Analysis:** These sections indicate that habitat suitability index (HSI) scores will be calculated from the habitat assessment. However, the proposed habitat assessment methodology is not systematic or rigorous enough to achieve this objective. For example, one velocity and depth measurement (i.e., under a single flow) is not sufficient for determining habitat suitability for RLP. If HSI scores are going to be used to determine whether the area below the dam is suitable for RLP, a more comprehensive analysis of the habitat conditions in the river will be needed.



**Section 3.4.6, Draft Study Plans, Downstream Roanoke Logperch Assessment, Study Schedule:** This section states the Licensees anticipate this study would be implemented during the 2020 study season and will commence by June 1. The Service recommends that RLP surveys be initiated after June 30 to protect RLP during breeding.

**Section 3.6.4, Draft Study Plans, Freshwater Mussel Survey, Methodology, Selection of Sampling Locations:** This section states two locations will be surveyed for freshwater mussels. One location will be in the upper reservoir and the other downstream of the Project dam. This level of effort is insufficient to determine whether rare or state listed or federally listed mussel species are present as the detection probability of these species is low. All mussel habitat below the dam should be surveyed with sufficient effort to confidently determine whether these species are present or not. In addition, the large area of the reservoir necessitates a much larger survey area. The higher quality habitat downstream of the dam also necessitates a more thorough survey to detect if these mussel species are present. Therefore, the Service recommends an approach that involves increasing the number of transects and associated survey effort, sufficient to allow development of a species richness curve, where search effort continues until no new species are found. As stated previously, a mussel survey upstream of the reservoir is needed as a reference to assess impacts from the Project. This increased level of effort is justified because federally listed mussel species may occur in this part of the Dan River and FERC will need to make a Section 7 effects determination for any federally listed species when they prepare their Environmental Assessment. It may not be possible to make an informed effects determination unless a more comprehensive mussel survey is performed downstream of the dam. The Service recommends that mussel survey methods be approved by the VDGIF prior to implementation, and the Service defers to VDGIF for determining the appropriate level of effort.

Thank you for the opportunity to comment on the DSP. If you have any questions, please contact John McCloskey of this office at (804) 824-2404 or via email at [john\\_mccloskey@fws.gov](mailto:john_mccloskey@fws.gov).

Sincerely,

Cindy Schulz  
Field Supervisor  
Virginia Ecological Services

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# ☒ North Carolina Wildlife Resources Commission ☒

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Gordon Myers, Executive Director

May 13, 2020

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

Subject: Draft Study Plan  
Schoolfield Hydroelectric Project, FERC Project No. 2411

Dear Secretary Bose:

The North Carolina Wildlife Resources Commission (NCWRC) has reviewed the Draft Study Plan (DSP) submitted to interested parties by STS Hydropower, LLC (STS) and the City of Danville, Virginia (Danville) on April 16, 2020. Although the project is located in Virginia, because the Dan River crosses the Virginia–North Carolina border multiple times, the NCWRC believes the presence and operation of the Schoolfield Project affects fish and wildlife resources of North Carolina. These comments and recommendations are provided in accordance with provisions of the Federal Power Act (16 U.S.C. 791a et seq.) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

The NCWRC has been engaged in this relicensing process from the start. We provided comments on the Notice of Intent on June 21, 2019, attended the joint meeting and site visit on September 18, 2019, provided study requests on November 15, 2019 (attached), and attended the virtual meeting reviewing the DSP on April 23, 2020.

The DSP addresses some of the interests we raised in our study request letter, but we believe additional study details and sampling effort are needed to provide adequate information for use in the draft license application and environmental analysis. We concur with the comments of the U.S. Fish and Wildlife Service submitted to the Commission on May 12, 2020 (accession number 20200512-5132) and provide the following additional comments.

## **Section 2.1 – Studies Adopted with Modification by the Licensees**

Section 2.1.2 – Flow Assessment Study: While we agree that Project impacts on downstream streamflow occur when streamflows are less than 2,000 cfs, such events are not limited to summer and fall months. As we illustrated in our study request, flow fluctuations have occurred

in February, March and November. As our examples point out, some of the flow fluctuations are rapid declines, others are flow dampenings, while others are peaking events. The months the data are collected is less important than providing sufficient monitoring to capture enough of those events to be able to discern whether the cause is due to fluctuations from upstream sources, the Project, or a combination of the two. Also, the summer of 2020 may not provide flows less than 2,000 cfs. For these reasons, that is why we requested that the data be collected for at least 12 months to capture a variety of flow conditions resulting from ambient conditions and flow manipulation by upstream entities.

Section 2.1.5 – Roanoke Logperch Assessment: This section concludes that Roanoke Logperch are not likely to occur in the project area because they were not collected during other survey efforts. We note that Roanoke Logperch are difficult to collect without using appropriate gear specifically targeted in their preferred habitats. We also indicated in our study request letter that Roanoke Logperch were collected since 2017 in the North Carolina portion of Dan River upstream of the Project. More specifically, the species was observed by NCWRC biologists using snorkeling gear in October 2017 approximately 2 miles upstream of the North Carolina-Virginia border near the town of Berry Hill, VA.

### **Section 3.2 – Operations and Inflow Assessment Study**

We recommend that the study title be adjusted to “Operations and Flow Assessment Study” because the intent is not to just assess inflow, but inflow to and outflow from the Project. We also point out that the location of the downstream river stage monitor be located upstream of any backwater effect from the Union Street Dam impoundment. Finally, we recommend that the study not be limited to the four-month period of June through September, but be expanded up to 12 months. If sufficient examples of flow fluctuations can be obtained in less time, we are agreeable to reducing the term of the study. We recommend that the data be downloaded and reviewed every few months and shared with the agencies to determine, with the Licensees, when the study can be ended.

We appreciate the opportunity to comment on the DSP. If you have any questions concerning these comments, please contact me at 828-803-6045 or [chris.goudreau@ncwildlife.org](mailto:chris.goudreau@ncwildlife.org).

Sincerely,



Christopher Goudreau  
Hydropower Licensing Coordinator



## ☒ North Carolina Wildlife Resources Commission ☒

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Gordon Myers, Executive Director

November 15, 2019

Mr. Michael Scarzello  
Eagle Creek Renewable Energy, LLC  
116 State Street  
Neshkoro, WI 54960  
michael.scarzello@eaglecreekre.com

### Via Email

Subject: First Stage Consultation Comments and Study Requests  
Schoolfield Hydroelectric Project (P-2411-028)

Dear Mr. Scarzello:

This letter contains First Stage Consultation comments and study requests of the North Carolina Wildlife Resources Commission (NCWRC) pursuant to the regulations governing the relicensing of a hydroelectric project by the Federal Energy Regulatory Commission (FERC) under the Traditional Licensing Process (18 CFR 16.8). The project is located on the Dan River in Danville, Virginia. However, due to the fact that the Dan River crosses the Virginia–North Carolina border multiple times, the NCWRC believes the presence and operation of the Schoolfield Project affects fish and wildlife resources of North Carolina. The NCWRC provides these comments in accordance with provisions of the Federal Power Act (16 U.S.C. 791a et seq.) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

On May 31, 2019 STS and Danville (co-Licensees or applicant) submitted a Pre-Application Document (PAD) and request to use the Traditional Licensing Process (TLP). STS and Danville propose to continue operating the existing dam, reservoir and powerhouse in a run-of-river mode to generate electricity. The PAD also states that no studies are planned by the applicant. On June 21, 2019 the NCWRC provided comments on the PAD. On July 24, 2019 the FERC granted the co-Licensees authority to use the TLP. A public meeting and site visit were held on September 18, 2019 which were attended by the NCWRC.

The NCWRC does not have a fish and wildlife management plan specific to the Roanoke River basin but we have prepared a Wildlife Action Plan (<https://www.ncwildlife.org/plan>) which focuses on rare, threatened and endangered species, and addresses fish and wildlife generally. The Wildlife Action Plan has been accepted by FERC as a comprehensive plan. Our

management goals are: 1) to protect and improve the overall aquatic ecology and important fisheries of the Roanoke basin, including listed species of fish, mussels, crayfish, snails, and amphibians; and, 2) to improve populations of diadromous fish species, including American eels.

Pursuant to 18 CFR 16.8(b)(5) we submit the following study requests in order to more fully understand the natural resources of the project vicinity and the potential impacts of project operation on them.

### Study Request #1 – Aquatic Fauna Surveys

#### *1. Study or information request*

Aquatic biota sampling of the Dan River in the immediate vicinity of the project and upstream and downstream of the project are necessary to adequately characterize the occurrence, distribution, and relative abundance of fish, mussel, and other aquatic taxa of the river. At a minimum, surveys should be conducted at three locations – downstream of the Schoolfield dam, in the project impoundment, and in riverine habitat upstream of the Schoolfield impoundment (above US 58). The downstream location should include areas immediately below the powerhouse, between the dam and Piedmont Drive bridge, and downstream of the bridge. Within the Schoolfield impoundment a variety of habitats should be targeted.

Additional sampling locations should be included to characterize the general faunal conditions of the Dan River in the vicinity of the project. These areas include the reaches downstream of the Union Street dam and the Dan Mills (Whites Mill) dam, respectively about 2.5 and 2.9 miles downstream of Schoolfield dam.

Different sampling methods should be used to target fish and mussels. Fish sampling should include boat, backpack or tote-barge electrofishing and seining. We are particularly interested in collecting small, benthic species that typically are not adequately sampled using just boat electrofishing methods. Fish collection should take place under normal to low flow conditions, between May and June to determine if any migratory fishes are present (i.e., spring spawning run of suckers) and in late summer or early fall.

Qualitative mussel sampling (presence/absence) should be conducted by visual (snorkel, SCUBA, or view scope) and tactile surveys. Areas immediately below the Union Street and Dan Mills dams and in the vicinity of Reedy Island also provide suitable habitats for benthic fishes and mussels.

All surveys should be conducted in a variety of habitat types at each site and be timed to provide catch-per-unit effort (CPUE). Temperature and dissolved oxygen should be measured at each site. Organisms collected should be identified to species, enumerated and measured.

2. *Basis for study request*

A thorough and comprehensive assessment of the aquatic fauna present in the vicinity of the project is lacking. The information on aquatic fauna provided in the PAD is generally not in close proximity to the Schoolfield project. The PAD indicates that the data source for most fish species in Table 4.4.1-1 is from fishmap.org which provides data at a HUC 8 scale, so it is not clear which of these species are actually found near the project. Also, previous fish sampling efforts do not appear to have targeted small or benthic species in the vicinity of the project, so it is possible that such species occur nearby.

Similarly, the mussel surveys conducted by Alderman Environmental Services in 2014 did not include the areas immediately downstream of the Schoolfield, Union Street or Dan Mills dams. The nearest mussel survey locations were 1.5 miles upstream of the upper end of the Schoolfield impoundment and 4.8 miles downstream of the Schoolfield dam. Areas downstream of dams typically provide suitable habitat for mussels because they often contain substrates that are less embedded with silt and sand. Therefore, the aquatic fauna in the reach downstream of Schoolfield dam is of particular interest.

3. *Resource issues and agency goals for these resources*

The NCWRC is charged with protecting and enhancing fish and wildlife, including rare, threatened and endangered species. Schoolfield dam and other dams in the area are likely fragmenting populations of rare fish and mussels. Our goal is to recover these species such that they are no longer listed as threatened or endangered. According to our records the following listed species have been collected since 2017 in the North Carolina portion of Dan River downstream of Duke Energy’s Dan River steam station dam and may occur in the vicinity of the project:

Common Name	Scientific Name	State Status	Federal Status
Atlantic Pigtoe	Fusconaia masoni	Endangered	Proposed Threatened
Green Floater	Lasmigona subviridis	Endangered	
James Spinymussel	Parvaspina collina	Endangered	Endangered
Notched Rainbow	Villosa constricta	Threatened	
Roanoke Logperch	Percina rex	Endangered	Endangered
Yellow Lampmussel	Lampsilis cariosa	Endangered	

Although diadromous fish species may not currently occupy the Dan River near the Project, they may obtain access to Project waters during the course of the next license period. Current efforts at the Roanoke Rapids and Gaston dams are moving American eels upstream. Should eels gain access above Kerr dam, they are very likely to pass the other low head dams downstream of Schoolfield.

4. *Why the study methodology is more appropriate than any other available methodology alternatives, including those identified by the applicant in the PAD*

According to the PAD, the applicant does not plan to conduct any studies.

5. *Documentation that the study methodology is a generally accepted practice*

These are standard fish and mussel surveys typically conducted for all hydropower relicensings.

6. *How the study/information request will be useful to the agency in furthering its resource goals and objectives practice*

Understanding how the project affects the rare aquatic fauna will assist the NCWRC and other resource agencies in developing operational and mitigation recommendations for the hydro project to minimize impacts to fish and wildlife resources.

Study Request #2 – Effects of Project Operation on Downstream Flows

1. *Study or information request*

Fine-scale data on reservoir and tailwater water surface elevations and hydropower generation should be provided to better understand project operations under a range of inflow conditions and the resulting effects on downstream flows. These data can be collected with water level loggers and should be provided at 15-minute intervals so comparisons can be made with USGS gage data. The data should be collected for at least 12 months to capture a variety of high and low flow conditions.

Also, the frequency and duration of previous instances of lowering and refilling the reservoir for maintenance or emergencies should be provided. Together, these data will be used to determine project impacts and assist in developing operating protocols to protect aquatic resources.

2. *Basis for study request*

Rapid and frequent fluctuations in flow can impact fish and mussel populations, particularly in riffles and other shallow habitats. Analysis of the USGS stream gages Dan River near Wentworth, NC (02071000), Smith River at Eden, NC (02074000), and Dan River at STP near Danville, VA (02075045) indicates that flows may be regulated by the Schoolfield project or other facilities in the intervening reaches. See attached figures for examples of apparent flow regulation of the Dan River. Because of the distances between the gages and the unknown operations of Schoolfield and the other facilities, it is unclear if, and to what extent, the flow regulation is due to Schoolfield or another facility. Providing detailed reservoir level and hydro generation data from Schoolfield will assist in determining its influence on downstream flows.

3. *Resource issues and agency goals for these resources*

The NCWRC is charged with protecting and enhancing fish and wildlife, including rare, threatened and endangered species. See the Wildlife Action Plan for more details. Furthermore, it is our goal to re-establish or expand migrations and populations of native, naturally reproducing target species, particularly American eel.



4. *Why the study methodology is more appropriate than any other available methodology alternatives, including those identified by the applicant in the PAD*

According to the PAD, the applicant does not plan to conduct any studies.

5. *Documentation that the study methodology is a generally accepted practice*

Documenting the effects of project operations on downstream flows and habitat is routinely conducted for hydropower relicensings.

6. *How the study/information request will be useful to the agency in furthering its resource goals and objectives practice*

The results will allow the NCWRC and other resource agencies to isolate the influence of Schoolfield on downstream flow fluctuations and determine necessary operational changes or mitigation options.

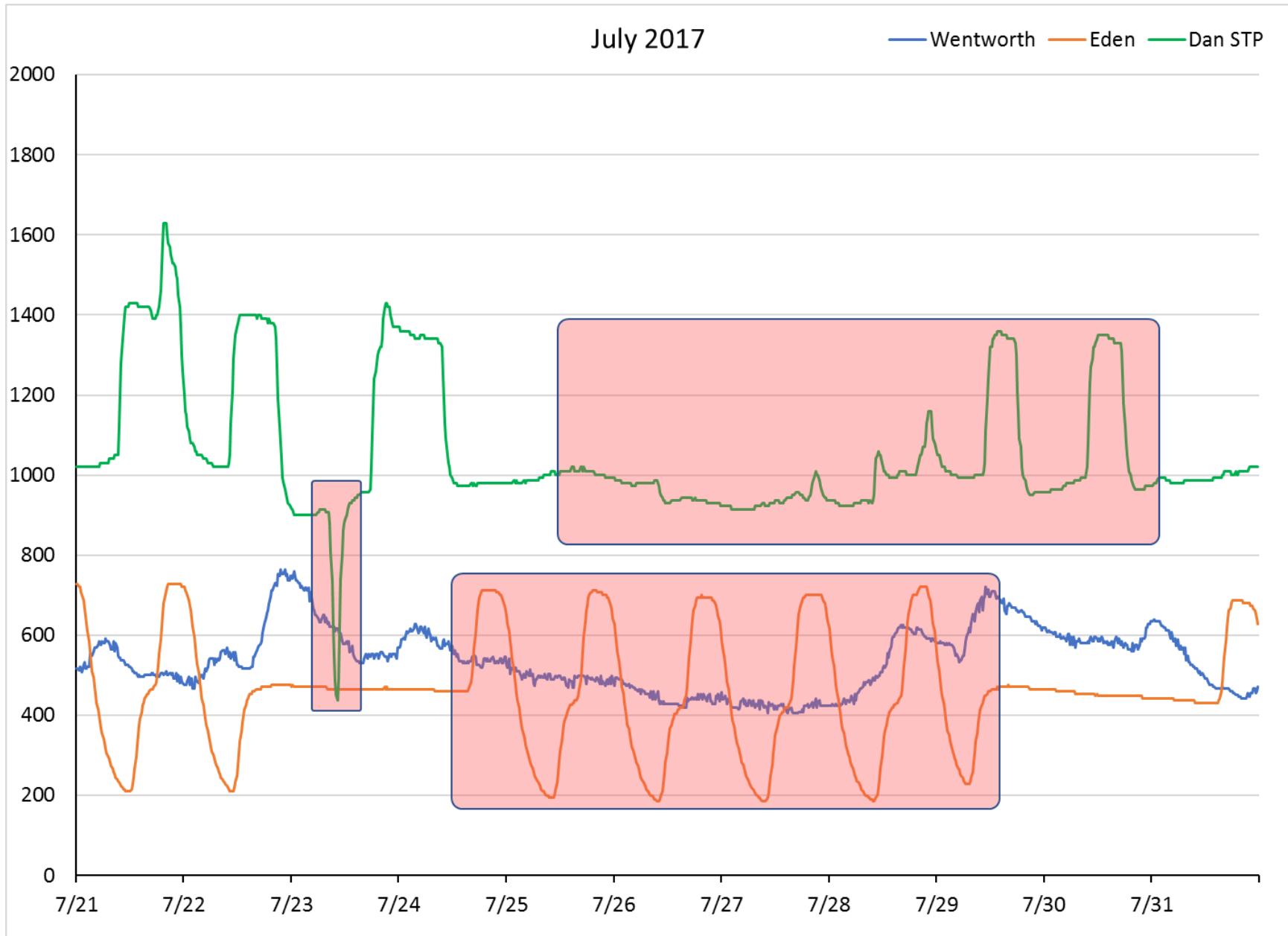
We appreciate the opportunity to provide these comments. If you have any questions concerning these comments, please contact me at 828-803-6045 or [chris.goudreau@ncwildlife.org](mailto:chris.goudreau@ncwildlife.org).

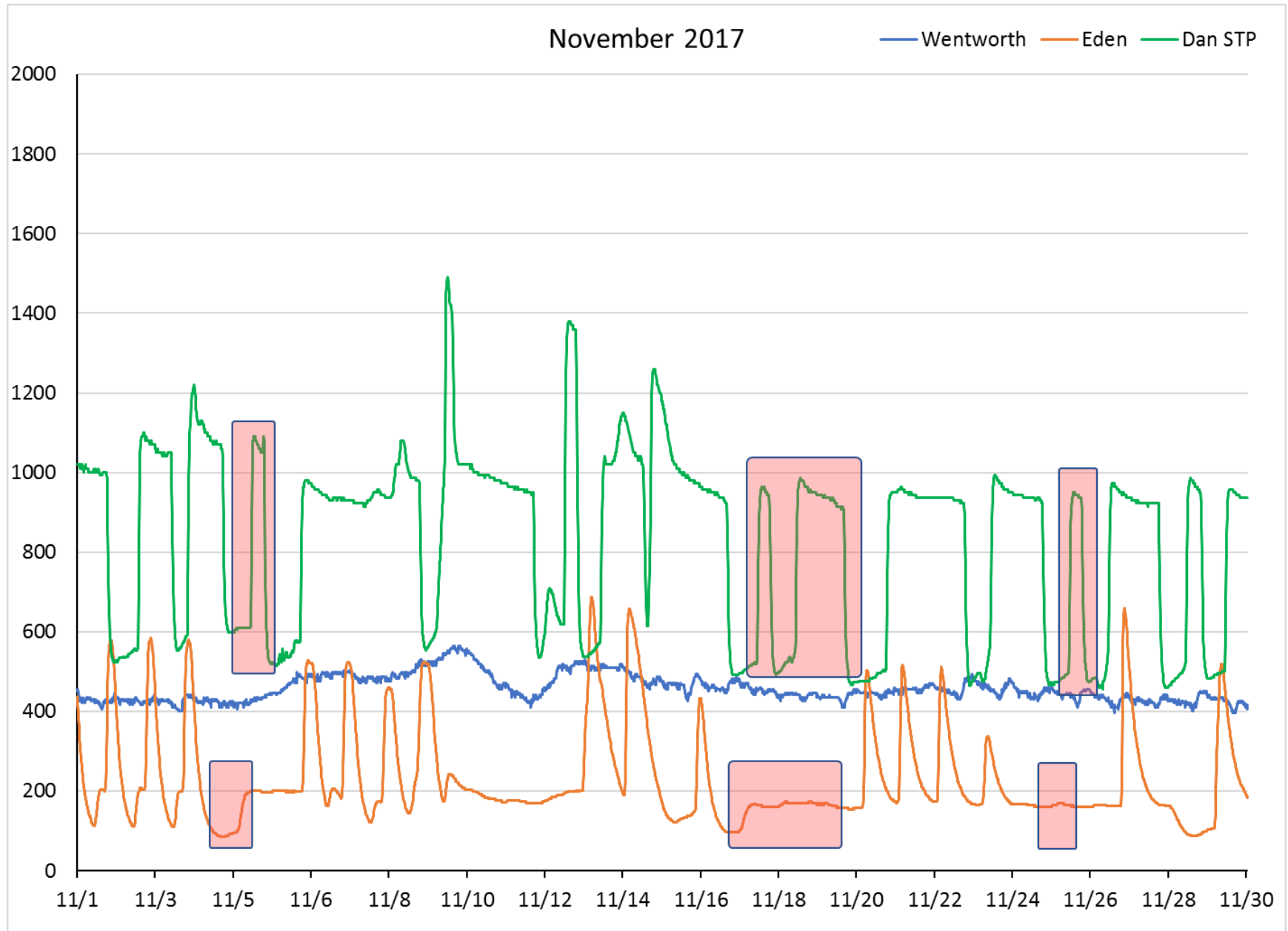
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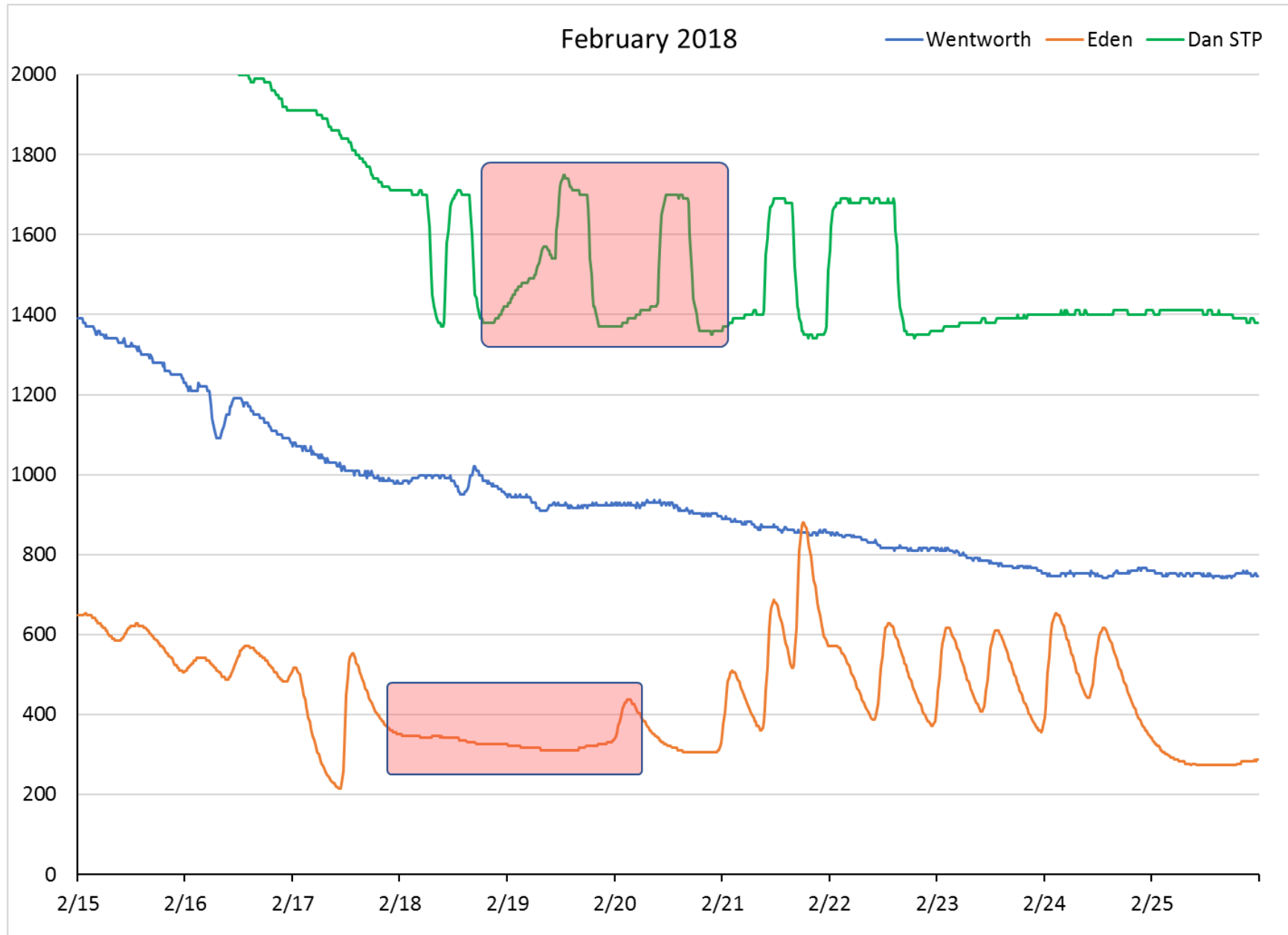


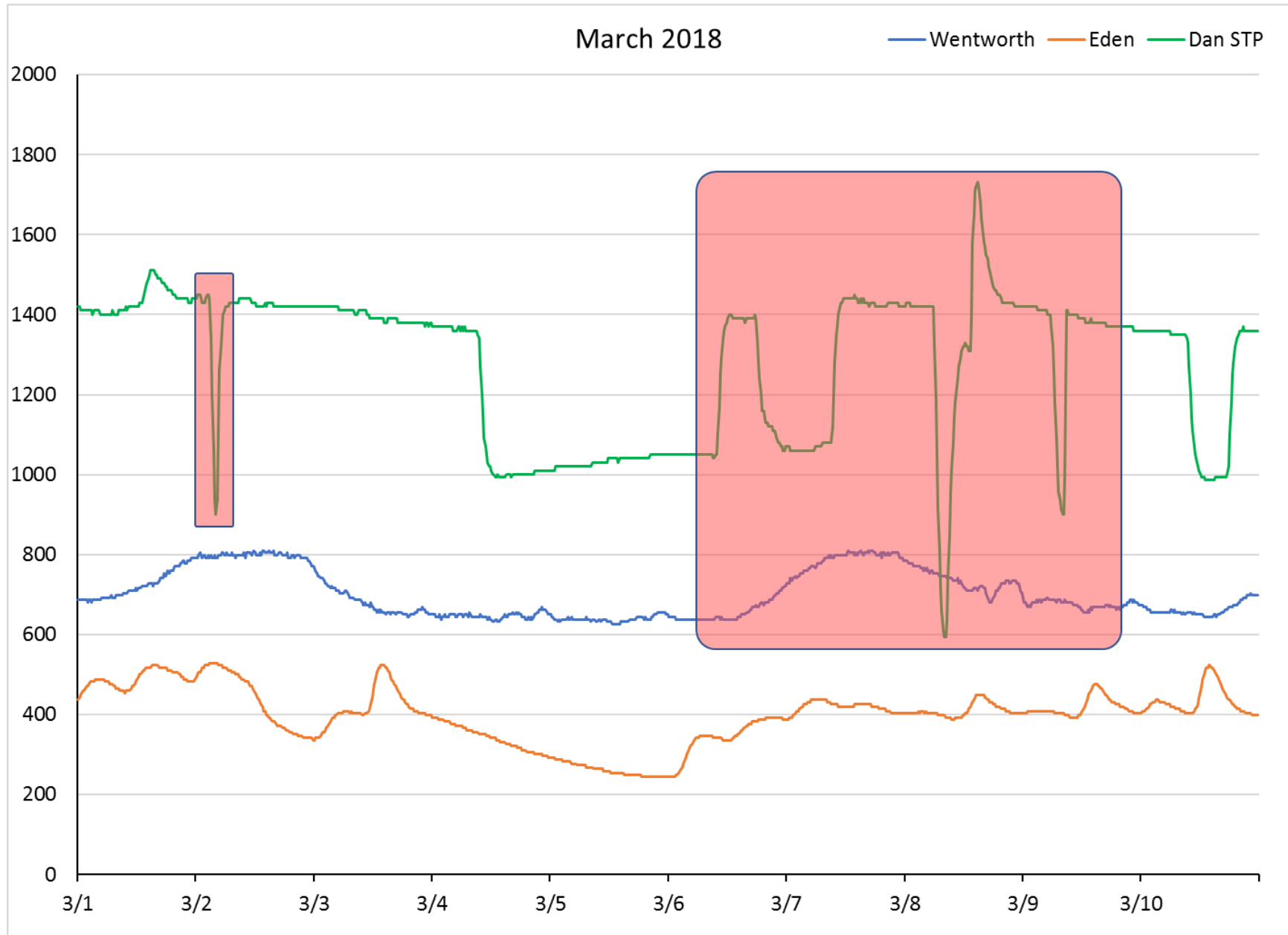
Christopher Goudreau  
Hydropower Licensing Coordinator

cc: Scott Smith, VDGIF  
John McCloskey, USFWS  
Fred Tarver, NCDWR











# COMMONWEALTH of VIRGINIA

Matthew J. Strickler  
Secretary of Natural Resources

Department of Game and Inland Fisheries

Ryan J. Brown  
Executive Director

May 14, 2020

Secretary Kimberly D. Bose  
Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, DC 201426

**Re: Schoolfield Hydroelectric Project (P-2411) – Application for New License  
Virginia Dept. of Game and Inland Fisheries Comments Draft Study Plans**

Dear Secretary Bose:

Thank you for the opportunity to provide input into the relicensing process for the Schoolfield Hydroelectric Project (P-2411). The mission of the Virginia Dept. of Game and Inland Fisheries (VDGIF) is to conserve and manage wildlife populations and habitat, connect people to Virginia's outdoors, and protect people and property by promoting safe outdoor experiences. Additionally, VDGIF is the state agency responsible for managing aquatic and terrestrial wildlife resources, including rare/listed species of fish and wildlife.

VDGIF has reviewed the Draft Study Plan (DSP) for the Schoolfield Hydroelectric Project (Project) as submitted for Eagle Creek Reusens Hydro, LLC (Applicant). In addition, we participated in a conference call held on 23 April 2020, with the applicant and interested stakeholders. During this call, VDGIF expressed several areas of concern regarding the DSP. The DSP does address multiple areas of concern to our agency, but some of the issues we raised in the initial scoping process are not addressed by the DSP. In addition, using our best professional judgement, several of the proposed studies lack the necessary scope and/or intensity to adequately address project impacts.

We have also reviewed the comments regarding the DSP as submitted by the U.S. Fish and Wildlife Service (USFWS) and the North Carolina Wildlife Resources Commission (NCWRC). We concur with and support all comments provided by those two agencies.

Studies Not Proposed by the Applicant:

*2.2.1 Aquatic Fauna Survey* – The Applicant states that by agreeing to conduct freshwater mussel and Roanoke Logperch surveys, that extant data on other fish species is sufficient for the relicensing process. We agree that the data cited by the applicant are a useful starting point, and may be sufficient for describing the fish community of the impoundment. However, they are completely inadequate for describing the fish community below the dam, in the reach impacted by project operations. The data being cited to assess downstream impacts came from an area many miles downstream, from a reach with very different habitat conditions. Finally, in order to

provide some frame of reference, an assessment of the fish community upstream from the project is also necessary. Without these basic data, the determination of project impacts and suitable mitigation measures will be exceedingly difficult.

*2.2.3 Recreation Use and Enhancement* – The Applicant states that no additional recreational access facilities are needed, thus obviating the need for additional study of this component. The Applicant points to facilities present in Abreu Grogan Park and the potential for additional access development by the City of Danville downstream. We concur that access needs in the impounded reach are being met by the Abreu Grogan Park facilities, and that a canoe portage around the dam may not be a practical option. However, we also recognize the need for access facilities downstream from Schoolfield Dam, as well as the need for access immediately above the impoundment. The Applicant notes that the City of Danville may provide some unspecified level of access below the impoundment in some unspecified timeframe. Since no access is currently available between Schoolfield and Union Street dams, a need is clearly defined. Additionally, the Applicant has not addressed the need to measure access demands in the project area. Thus, no determination can be made regarding the sufficiency of current access facilities without an examination of need and potential enhancement options. Thus, a recreation study is necessary in order to evaluate current access facilities and potential mitigation options.

### Proposed Studies

*3.4 Downstream Roanoke Logperch Assessment* – The DSP outlines a proposed survey for Roanoke Logperch downstream from Schoolfield Dam. We are in agreement that this work is necessary, but are uncertain of the level of effort proposed by the Applicant. Since the Roanoke Logperch is a small, cryptic, and rare species; a considerable amount of sampling may be necessary in order to accurately determine the status of the species in the project area. We recommend that capture (detection) probabilities be utilized to determine the appropriate level of effort. These probabilities can be generated in consultation with Roanoke Logperch experts. In addition, the Applicant does not propose to sample for this species above the impoundment. We agree that the presence of Roanoke Logperch is unlikely in the impoundment, but suitable habitat exists immediately upstream from the impoundment. Any logperch present could potentially utilize the upper impoundment on an intermittent basis. In addition, larval or juvenile logperch could migrate into the impoundment (or be washed in during high flow events). Given the habitat conditions in the impoundment, anything other than short-term residence time for this species in the impoundment could lead to high levels of mortality. Thus, the status of this species above the impoundment needs to be assessed in order to evaluate the impacts of project operations on this listed species, as well as to determine appropriate mitigation measures, if needed. In summary, we tentatively concur with the downstream sampling plans, pending additional detail regarding level of effort, but we have also determined that additional sampling is necessary upstream from the impounded area.

*3.6 Freshwater Mussel Survey* – We have determined that the mussel survey proposed in the DSP is inadequate to fully describe the mussel fauna present within the project impact area. The applicant is proposing to sample 2 x 100 m transects (one in the reservoir and one below the dam) to determine the presence/abundance of mussel species. Based upon detection probability estimates performed by VDGIF and others (based upon detection probability of individual mussels and the density of rare mussel species), the level of effort needed for this work would be 15-20 x 100 m transects for each area (above and below the dam). This would provide an approximately 95+% probability of detecting rare species.

The Applicant may wish to stratify these sampling transects by area in order to reduce sampling variability. We are willing to assist the applicant with selection of sampling transect locations in

order to get adequate coverage of the project area. In order to determine the presence of rare mussel species, a significantly more robust sampling effort is needed. The level of effort proposed by VDGIF should provide an acceptable level of detail needed to determine project impacts and potential mitigation needs.

In summary, we have identified a need and a nexus to the project for both a fish community assessment and a recreation enhancement study. Furthermore, we have identified shortcomings to the proposed Roanoke Logperch assessment and the freshwater mussel survey, and have provided additional detailed recommendations for each of these studies. The fish community and recreational enhancement studies are necessary to evaluate project impacts and to determine potential mitigation measures for said impacts. The modifications to the Roanoke Logperch and freshwater mussel studies are needed for similar assessments.

Thank you for the opportunity to provide comments to the Draft Study Plans for this project. If there are any questions or if further information is needed, please contact Scott M. Smith at [scott.smith@dgif.virginia.gov](mailto:scott.smith@dgif.virginia.gov).

Sincerely,

  
Scott M. Smith  
Regional Fisheries Manager

Cc: D. Michaelson (VDGIF)  
H. Hatcher (VDGIF)  
E. Aschenbach (VDGIF)  
B. Watson (VDGIF)  
M. Pinder (VDGIF)  
C. Goudreau (NCWRC)  
J. McCloskey (USFWS)  
R. McCorkle (USFWS)  
A. Cario (VDEQ)