



Via Electronic Filing

February 14, 2022

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

**Subject: Byllesby-Buck Hydroelectric Project (FERC No. 2514-186)  
Response to Comments on the Updated Study Report  
Request for Extension of Time to File Revised Study Reports**

Dear Secretary Bose:

Appalachian Power Company (Appalachian or Licensee), a unit of American Electric Power (AEP), is the Licensee, owner, and operator of the two-development Byllesby-Buck Hydroelectric Project (Project) (Project No. 2514), located on the upper New River in Carroll County, Virginia.

The Project is currently licensed by the Federal Energy Regulatory Commission (FERC or Commission). The Project underwent relicensing in the early 1990s, and the current operating license for the Project expires on February 29, 2024. Accordingly, Appalachian is pursuing a new license for the Project pursuant to the Commission's Integrated Licensing Process (ILP), as described at 18 Code of Federal Regulations (CFR) Part 5. Appalachian has conducted studies in accordance with 18 CFR §5.15, as provided in the Revised Study Report (RSP) and as subsequently modified by FERC's Study Plan Determination (SPD). Pursuant to the ILP, Appalachian filed the Updated Study Report (USR) for the Project on November 17, 2021. Additionally, Appalachian held a USR Meeting with stakeholders and FERC staff via WebEx on December 1, 2021. A USR Meeting summary was filed with FERC on December 16, 2021. The deadline to submit any disputes or requests to amend studies was January 15, 2022<sup>1</sup>. Comment letters were received from FERC, U.S. Fish and Wildlife Service (USFWS or Service) and Virginia Department of Wildlife Resources (VDWR) on January 18, 2022.

Appalachian received numerous comments from FERC staff and agencies, some requiring additional analyses to adequately address comments. Given the extensive comments and additional amount of time required to respond to these comments, Appalachian has developed a comment-response table included in Attachment 1. The comment-response table provides information on how a comment has been or will be addressed, and in what document(s) additional information will be provided.

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<sup>1</sup> Because this date fell on a Saturday (January 15, 2022) and Monday, January 17, 2022 was a federal holiday, the deadline for filing USR comments was extended to January 18, 2022.

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Appalachian is in the process of developing the Final License Application (FLA) which will be filed with FERC by February 28, 2022. The FLA will include additional information to address comments received on the USR to the extent possible. Additionally, Appalachian is currently completing additional analyses and revising study reports to address comments on the USR. As previously mentioned, there are numerous comments requiring a significant effort to adequately address concerns. Therefore, Appalachian is respectfully requesting an extension of time to submit the revised Aquatic Resources and Bypass Reach Flow and Aquatic Habitat study reports as supplemental information to the FLA, within 45 days of the February 28<sup>th</sup> FLA filing (April 14, 2022).

If there are any questions regarding this filing or request, please do not hesitate to contact me at (540) 985-2441 or via email at [ebparcell@aep.com](mailto:ebparcell@aep.com).

Sincerely,



Elizabeth Parcell  
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American Electric Power Services Corporation

cc: Distribution List  
Jonathan Magalski (AEP)

Attachment

# **Byllesby/Buck Hydroelectric Project (FERC No. 2514)**

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# Attachment 1

Response to USR Comments  
Received



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Entity	Topic	Agency Comment	Comment Response
FERC	Water Quality Study	Continuously recorded (15-minute) water temperature and dissolved oxygen (DO) data from each monitoring location during the 2020 and 2021 water quality monitoring seasons are presented graphically in Attachments 1 and 2 of the Water Quality Study Report filed with the USR. While these plots are useful in discerning general trends and differences in water quality parameters among the various monitoring locations, it is difficult to ascertain from these graphs the number of days that temperature and DO values were inconsistent with state water quality standards or to quantify the degree of stratification in the project's impoundments. Therefore, to assist staff's analysis of project effects on water quality, please provide a series of tables, or a spreadsheet file, that reports for each day of the 2020 and 2021 monitoring seasons, the daily minimum, maximum, and average water temperatures and DO values at each continuous water quality monitoring site, including each monitoring depth in the Byllesby and Buck impoundments. Please provide all water temperature data in degrees Fahrenheit and all DO data in units of milligrams per liter (mg/L).	Tables or a spreadsheet file that includes the daily minimum, maximum, and average water temperatures and DO values at each of the continuous water quality monitoring sites for the 2020 and 2021 monitoring seasons will be provided in the revised Water Quality Study report to be filed with FERC as part of the FLA. All temperature data will be provided in degrees Fahrenheit and all DO data will be provided in milligrams per liter.
FERC	Water Quality Study	Figure 8.1 of Attachment 8 of the Water Quality Study Report does not indicate the timing of drag rake operations at each development (Byllesby and Buck), as is shown by vertical reference lines on a similar figure in the report (figure 8.2). Therefore, please add reference lines to figure 8.1 to indicate the timing of drag rake operations at each development.	Figure 8.1 in the Water Quality Study report has been updated to indicate the timing of drag rake operations at each development. The revised Water Quality Study report will be filed with FERC with the FLA.
FERC	Bypass Flow and Aquatic Habitat Study	As indicated at both the USR and Initial Study Report (ISR) meetings, the potential stranding of walleye in the Buck bypassed reach during spill events in the spring spawning season is a concern. While a two-dimensional (2-D) hydraulic model was developed to simulate water depths and flow patterns in the Buck bypassed reach under the currently required ramping rate, the USR contains no information on the body depths of walleye. Therefore, to aid staff in their interpretation of the additional modeling scenario requested below in item 4, please provide body depth data for the size range of walleye that would be expected to occur in this portion of the New River during the spring spawning season. This information will help staff determine whether the existing ramping rate provides adequate escape routes (of sufficient water depth) for any walleye that may be attracted to intermittent spill flows and enter the Buck bypassed reach during the spring spawning season. Please consult with the Virginia Department of Wildlife Resources (DWR) to determine if body depth data are available for the New River strain of walleye; if such data are not available, data from nearby river systems may be used; in either case, please specify the sample sizes for all provided body depth data. Lastly, please file copies of any stranding reports or incidents (for walleye or other species) that Virginia DWR may have in its possession or be aware of, as this could provide information on the potential stranding locations in the Buck bypassed reach as well as the sizes of stranded fish.	Appalachian is consulting with the VDWR to determine if body depth data are available for the New River strain of Walleye, or data from nearby river systems if unavailable for New River strain. Appalachian will file with FERC, with the FLA if received in time or as supplemental information after the FLA as part of the revised Aquatic Resources Study Report, copies of any available stranding reports or incidents (for Walleye or other species) provided by VDWR.
FERC	Bypass Flow and Aquatic Habitat Study	The approved study plan states that model simulations will be performed to evaluate flow releases from various spillway gates and spill configurations [emphasis added] to determine flow patterns and hydraulic connectivity at downstream locations of interest. However, the 2-D hydraulic model developed for the Buck Development was only used to evaluate flow patterns under a single spill configuration, that of the existing ramping rate, whereby down-ramping flows are released into the bypassed reach through Tainter Gate 1. Therefore, to help inform an analysis of the optimal spillway gate through which down-ramping flows should be released to minimize the stranding risk of walleye in the Buck bypassed reach and to ensure the study is completed in accordance with the approved study plan, please perform a modeling scenario that simulates water depths and velocities in the Buck bypassed reach under the currently required ramping rate but releases down-ramping flows through Obermeyer Gate 10 instead of Tainter Gate 1. (Obermeyer Gate 10 is the gate closest to the area of concern for walleye stranding; whereas Tainter Gate 1 is the most distant gate from this area of concern (see figure 4-2 of the Bypassed Reach Flow and Aquatic Habitat Study Report). If the currently required ramping rate (i.e., down-ramping flows of the same magnitude and duration as are currently released through Tainter Gate 1) cannot be achieved with the Obermeyer gates, please explain why, and use the Tainter gate nearest the stranding area of concern (i.e., the southeastern portion of the bypassed reach immediately downstream of the spillway) as the release location for down-ramping flows.	Appalachian will include additional summary information comparing releases from Buck Tainter Gate 1 and Buck Obermeyer Gates in the FLA. Additional figures and analysis will be included, if and as appropriate, in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.

FERC	Bypass Flow and Aquatic Habitat Study	<p>Model output should include, at a minimum, depth and velocity heat maps for each of four modeled flows: (1) leakage; and flows equivalent to Tainter Gate openings of (2) 0.5 foot (~210 cfs), (3) 1.0 foot (~354 cfs), and (4) 2.0 feet (~714 cfs). The depth and velocity heat maps should be similar to figures 4-12 through 4-19 of the Buck Bypassed Reach Integrated Catchment Model (ICM) Development Report. In addition, for both release locations (Tainter Gate 1 and Obermeyer Gate 10 or the nearest feasible gate), please use the body depth information requested in item 3 above, to generate a new series of figures that are similar to the heat maps but instead show only those portions of the bypassed reach that have sufficient water depths (based on body size data) for walleye to swim through. Such maps should be generated for the both the smallest- and largest-sized walleye expected in the bypassed reach (based on consultation with Virginia DWR as described above) for each combination of release location (i.e., Tainter Gate 1 vs. Obermeyer Gate 10) and modeled flow (leakage, ~210 cfs, ~354 cfs, and ~714 cfs). This information will allow staff to assess if there are any differences in stranding risk and flow patterns (i.e., escape paths and connectivity in the bypassed reach) between these two different release locations for down-ramping flows.</p>	<p>Appalachian will conduct additional analyses per FERC's previous comment and provide new figures in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.</p>
FERC	Bypass Flow and Aquatic Habitat Study	<p>The current license does not specify where the required 360-cfs minimum flow must be released at each development. Appalachian currently provides this minimum flow via generation (i.e., as part of the flow through each powerhouse) and monitors compliance with the required minimum flow using flow data from a United States Geological Survey gage (No. 01365500) located about 2.5 river miles downstream of the Buck Development.</p> <p>The approved study plan states that the 2-D hydraulic models developed for Byllesby and Buck will be used to evaluate the relationship between minimum flow releases to the tailwater areas versus the bypassed reaches with respect to aquatic (fish) habitat. There was also discussion at the USR Meeting as to how the hydraulic connectivity of side channels, which can serve as important aquatic habitat for fish and freshwater mussels due to their relatively unique substrate composition (i.e., predominantly gravel and cobble vs. bedrock), may vary depending on the release location (powerhouse vs. bypassed reach) of the currently required 360-cfs minimum flow. However, the currently required minimum flow at each development (360 cfs) was not explicitly included (modeled) as a test flow; the only flows evaluated were those used to develop and calibrate the models. Therefore, to allow staff to assess the potential benefits of releasing the currently required 360-cfs minimum flow into the bypassed reaches, rather than through the powerhouses, please use the 2-D hydraulic models that were developed for Byllesby and Buck to simulate habitat conditions (i.e., water depths and velocities) in each bypassed reach (Byllesby and Buck) under both existing project operation (i.e., whereby the minimum flow is included as part of the generation flows through each powerhouse) and a potential future operational scenario whereby a continuous 360-cfs minimum flow is released into each bypassed reach via Tainter Gate 1 at Buck and Tainter Gate 6 at Byllesby. This information would aid in minimum flow evaluations (e.g., the release location of minimum flows at each development) and ensure the study is completed in accordance with the approved study plan.</p>	<p>Appalachian will use the 2-D hydraulic models that were developed for Byllesby and Buck to simulate habitat conditions in each bypass reach as requested. This information will be summarized in Exhibit E of the FLA and may be supported by information to be included in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.</p>
FERC	Bypass Flow and Aquatic Habitat Study	<p>Habitat conditions should be evaluated across a range of inflow conditions, including low-, mid-, and high-inflows; for example, the 90% exceedance, 50% exceedance (median), and 10% exceedance inflows, respectively. Also, the powerhouses should be 'operating' during the model simulations, with the amount of flow being passed through each powerhouse dependent on the particular combination of minimum flow release location (spillway vs. powerhouse) and inflow (low-, mid-, and high-) being modeled. In addition to depth and velocity heat maps for each combination of release location by inflow, model outputs should include habitat suitability maps (similar to the figures provided in Attachment 3 of the Bypassed Reach Flow and Aquatic Habitat Study Report) and also tabulate, for each release location by inflow combination, the weighted usable area (WUAs) for the species (all life stages of walleye) and guilds specified in Table 5-3 of the Bypassed Reach Flow and Aquatic Habitat Study Report.</p>	<p>Appalachian will provide model results for a range of inflow conditions as requested, in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.</p>
FERC	Bypass Flow and Aquatic Habitat Study	<p>The Buck Bypassed Reach ICM Model Development Report contains depth and velocity heat maps for each of the test flows used to calibrate the model (i.e., leakage, 210 cfs, 354 cfs, and 714 cfs). However, no such heat maps are provided for the Byllesby Development. Therefore, please provide, in your filing, the depth and velocity heat maps for each of the four test flows (leakage, 88 cfs, 158 cfs, and 194 cfs) that were used to develop the 2-D hydraulic model for the Byllesby Development. On each heat map, please indicate the magnitude of flows that were being released (spilled) into the bypassed reach and passed through the powerhouse, similar to figures 4-12 through 4-19 of the Buck Bypassed Reach ICM Model Development Report.</p>	<p>Appalachian will revise the Bypass Flow and Aquatic Habitat Study report to include the depth and velocity heat maps for each of the four test flows. Additionally, each heat map will be updated to indicate the magnitude of flows that were being released (spilled) into the bypass reach and passed through the powerhouse. The revised Bypass Flow and Aquatic Habitat Study report will be filed with FERC as supplemental information after the FLA.</p>

FERC	Bypass Flow and Aquatic Habitat Study	At the USR Meeting, Appalachian indicated that its current practice to ensure run-of-river operation during a powerhouse outage or complete station trip at either development is to immediately open spillway gates to ensure that total outflow from the project continues to approximate inflows. Please describe how it is possible for the spillway gates at each development to be operated during station outages (e.g., via backup generators, etc.). Also, please describe the maximum amount of inflow that can be passed through each powerhouse when all of its turbine units are non-operational (e.g., during complete station outages or unit trips); and describe whether it is possible to release the currently required 360-cfs minimum flow through the powerhouses during such non-operational periods.	Appalachian will provide additional description of Project operation of spillway gates during an outage in the FLA.
FERC	Bypass Flow and Aquatic Habitat Study	Page 7 of the Buck Bypassed Reach ICM Development Report states that additional bathymetry data for two pools on the southeast side of the Buck bypassed reach (see figure 2-3 of Attachment 1 of the report) may need to be collected and incorporated into the 2-D hydraulic model for the Buck Development. However, no additional bathymetry data appears to have been collected for this area, nor does there appear to be any plans for additional field work based on Appalachian's comments at the USR meeting. Therefore, please explain why additional bathymetry data was not collected for this area—which is the main stranding area of concern for walleye—and describe why the existing bathymetry data from this area is sufficient for modeling purposes.	Appalachian will address this comment in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA. No additional field data collection is planned or believed by Appalachian to be needed for the purposes of this study.
FERC	Bypass Flow and Aquatic Habitat Study	Based on figure 3-1 of the Buck Bypassed Reach ICM Development Report, there appears to be a small tributary that enters the bypassed reach along its southern shoreline, approximately mid-way down the reach. Please describe if, and how, inflow from this tributary was accounted for in your calculations of the amount of leakage flow through each of the spillway gates at the Buck Development (Table 2-2). Also, please confirm that the standing pools of water located upstream of this tributary (along the southeastern bank of the bypassed reach, immediately below the spillway) are maintained by leakage through the flashboard bays farthest away from the powerhouse (i.e., bays 15-22).	Appalachian will revise the Bypass Flow and Aquatic Habitat Study report to provide additional details regarding the small tributary entering the bypass reach and the standing pools located upstream of the tributary. The revised Bypass Flow and Aquatic Habitat Study report will be filed with FERC as supplemental information after the FLA.
FERC	Bypass Flow and Aquatic Habitat Study	The colors in the legend for figure 6-8 of the Bypassed Reach Flow and Aquatic Habitat Study Report do not match, or correspond to, the colors used in the graphic of this figure. Also, in figure 6-9 (of the same report), the colors on the plot are very difficult to distinguish from one another. Therefore, please provide updated figures for figures 6-8 and 6-9 that contain appropriately labeled legends and sufficient color distinctions to allow readers to distinguish the various water level logger locations more easily.	Appalachian will update the figures included in the Bypass Flow and Aquatic Habitat Study report and carry the changes over into Exhibit E of the FLA, to the extent updates can be made prior to the FLA filing. The revised Bypass Flow and Aquatic Habitat Study report will be filed with FERC as supplemental information after the FLA.
FERC	Bypass Flow and Aquatic Habitat Study	During the USR meeting, Commission staff asked if any observations of eastern hellbender, formal or incidental, had been made during the study period or any of the individual studies conducted therein. However, the Meeting Summary did not include this question or any response from the applicant. Therefore, please address this question in the license application.	No hellbenders were observed or reported during execution of the relicensing studies. Appalachian will address FERC's question regarding whether any observations of eastern hellbender had been made during the study period or any of the other relicensing studies in the FLA.
FERC	Wetland, Riparian, and Littoral Habitat Study	Page 7 of the Meeting Summary includes a question and comments about wetland acreages associated with the Wetlands, Riparian, and Littoral Habitat Study. In particular, the summary states that the "NWI estimated 9 acres of wetlands and the field verification estimated 12 acres of wetlands." Given that the NWI estimated 9 acres and the Wetlands, Riparian, and Littoral Habitat Study reported a total of 95.43 field-verified wetland acres, it is unclear what the "estimated 12 acres" refers to specifically. Therefore, please explain and clarify the difference between field verifications that estimated 12 acres of wetlands versus those that estimated 95.43 acres of wetlands.	Appalachian will revise the Wetland, Riparian, and Littoral Habitat Study report to clarify the estimated wetland acreages, and the revised study report will be filed with the FLA. Additionally, as applicable, wetland descriptions in the FLA will reflect this updated information.
FERC	Cultural Resources Study	The Consulting Party Distribution List in the Cultural Resources Study Report only contains three Tribes as having received the report. However, page 4 of the Distribution List of the draft license application (DLA) includes additional Tribes. Moving forward, please ensure that all Tribes who are included on the Distribution List of the DLA receive a copy of all study reports related to cultural resources, including the Cultural Resources Study Report filed with the Commission on September 13, 2021.	Tribes that did not respond to the initial and follow up consultation were excluded by Appalachian's cultural resources consultant from subsequent distribution as the lack of response implied they had no interest in the undertaking. Appalachian has retained the Tribes listed for the DLA distribution on the distribution of the FLA.
USFWS	Background and Existing Information	The Byllesby bypass reach appears to be significantly longer than 475 feet. The distance downstream from the base of the spillway to the downstream end of the island separating the tailrace channel from the bypass reach is approximately 590 feet (measured in both Google Earth Pro and ArcMap), and it appears that mixing of the powerhouse discharge and the bypass reach flow during periods of low inflow (e.g., Leakage Flow only) does not occur until approximately 800 feet downstream from the spillway. Further supporting this is the mesohabitat mapping which shows run habitat on the powerhouse discharge side meeting riffle habitat on the bypass reach side, at the downstream end of the island separating the two. The riverbed elevation would typically be expected to be higher in a riffle than in an adjacent run. For calibration purposes, the Service measured other features such as the Byllesby spillway, and we found our measurements of such features to be consistent with the Project Description. The Project Description should be updated to reflect an accurate description of the Byllesby bypass reach.	The Project description will be updated in the FLA (Exhibits A and E) and, as necessary, in all revised study reports to accurately reflect the Byllesby bypass reach.

USFWS	Habitat Assessment	The explanation of the assessment of cover types does not explain how the desktop habitat designation was verified in the field. Section 6.3.2. mentions that field investigation (as necessary) was done in September 2020. How much of the area was field verified? How do the LiDAR categories designated for cover (1-18 in Table 5-1) match to the narrative description in the original Habitat Suitability Criteria narratives?	Appalachian will include additional information to respond to the USFWS's comment in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.
USFWS	Bypass Flow and Aquatic Habitat Study	<p>The Service questions the prioritization of Bylesby Tainter Gate #6 as the first gate operated for releases into the bypass reach. Although this gate is near the center of the spillway structure, the downstream thalweg appears to be closer to the right descending bank (RDB). Releasing flows through Obermeyer gates closer to the RDB would better mimic natural conditions where low flows are mostly confined to the thalweg. This approach may also reduce fish stranding potential by avoiding short-duration wetting of adjacent, higher-elevation portions of the bypass reach. Obermeyer gate #11 or #12 should be considered as the primary gate for flow releases to this bypass reach.</p> <p>We also question the use of Buck Tainter Gate #1 as the first gate opened to release flows into the Buck bypass reach. The downstream thalweg appears to mostly follow the left descending bank (LDB), as would be expected (i.e., the thalweg typically follows the outside of a channel bend). However, the section of the spillway near the LDB is a flashboard section which does not allow for automated flow releases. Therefore, the Service recommends consideration of Obermeyer Gate #10 for flow releases to the Bylesby spillway. We recognize that under current operations, incremental Tainter gate settings are utilized for providing the ramping flows. The Service requests further analysis and discussion of this issue.</p>	See response to Comment 4 above.
USFWS	Habitat Assessment	This section lists the source documents for the numerical HSI curves used for each life stage, but does not indicate if those curves were developed from research immediately prior to the source documents publication of 2010, 2007, and 2008, or if they used prior published curves from earlier decades. How does research in the current decade after 2010 corroborate or contrast with the knowledge that went into earlier HIS curve development? Please provide the narrative of original HSI sources and their reference data sources. Attachment 2 only has numeric values of the HSI curves.	Appalachian will include additional information to respond to the USFWS's comment in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.
USFWS	Habitat Assessment	As the Service discussed in the USR joint agency meeting on December 1, 2021, we would like to understand how the Habitat Characteristic Classification designations equate to our understanding of riverine habitat. Instream Cover and Overhead Vegetation are not necessarily mutually exclusive categories, as the Tables 6-1 and 6-2 sum their percentages, with No Cover, to one hundred. Please provide the specific definitions for each category used from the model, and how they were assessed.	Appalachian will provide clarification or definitions for each category used from the model and provide an explanation of how they were assessed in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.
USFWS	Byllesby Habitat Assessment	The Service mostly agrees that there is little to no potential habitat under any flow scenario in the Bylesby bypass reach for the Deep-Fast Guild; however, there is a slight increase in habitat suitability for both the coarse substrate-associated representative (adult shorthead redhorse, <i>Moxostoma macrolepidotum</i> ) and the fine substrate-associated guild representative (adult silver redhorse, <i>Moxostoma anisurum</i> ) across all flows above leakage. However, no optimal habitat is gained, and the quantity of habitat gained is minimal.	Comment acknowledged. No changes are required to Exhibit E or the Bypass Flow and Aquatic Habitat Study report.
USFWS	Byllesby Habitat Assessment	<p>The Service also considered negative tradeoffs (e.g., loss of habitat or reduction in habitat suitability for a particular guild or life stage with increased flows to the bypass reach). The greatest gains in habitat with the fewest negative tradeoffs appear to be associated with the Low Flow release (88 cfs). In addition, the Bylesby bypass reach wetted area had a relative increase the most from Leakage Flow to Low Flow (by 1 acre), compared to the wetted area increases corresponding with the Mid Flow (0.3-acre increase) and High Flow (0.1-acre increase). Although, absolute total increase in wetted area could increase primary productivity instream and macroinvertebrate prey habitat. When considering these tradeoffs, one should also consider what percentage of the mean inflow each bypass reach flow represents. The Leakage Flow represents less than 0.5 percent of the annual mean inflow, whereas a minimum flow release of 88 cfs represents 3.9 percent of the annual mean flow.</p> <p>In order to prioritize spawning habitat for the endemic bigmouth chub and habitat for all life stages of the New River shiner, the Service will be recommending an increase in the minimum flow, to 88 cfs, to the Bylesby bypass reach. A minimum flow of 88 cfs represents only 3.9 percent of the annual mean in-flow to the Project.</p>	Appalachian will include summary information to support evaluation of the USFWS's preliminary recommendation in Exhibit E of the FLA. Additional analysis may be included, if and as appropriate, in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.

<p>USFWS</p>	<p>Buck Habitat Assessment</p>	<p>For the walleye adult life stage, the Service agrees that the results indicate little to no suitable habitat under any of the target flow scenarios. There is little difference between flows; increasing flow releases result in increases in marginal habitat quantity, but there is no obvious increase in habitat suitability with increasing flow.</p> <p>For walleye fry, there are tradeoffs, and we do not completely agree with the Applicant's interpretation of the results. Optimal habitat at the lower end of the Buck bypass reach becomes unsuitable above leakage flow, but a Mid Flow (354 cfs) release appears to provide the greatest increase in dispersed suitable and optimal habitat patches. We agree that the largest patch of optimal habitat is seen at Leakage Flow, at the lower end of the bypass reach, but the Mid Flow release clearly provides more optimal habitat than does the Low Flow release, based on the study results. For the walleye juvenile life stage, there were no significant improvements at any flow, except for some marginal habitat increase at the 354 cfs Mid Flow and the small amount of increased potential habitat described in the USR.</p> <p>For the walleye spawning stage, the Service does not completely agree with the Applicant's interpretation of the model results. Walleye spawning habitat suitability clearly improves with increasing flows to the Buck bypass reach, with the most suitable habitat provided under the High Flow release scenario (714 cfs). The reduction in habitat suitability downstream of the bypass reach and just downstream of the tailrace channel is related to the reduced powerhouse discharge on Day 4, compared to that of Day 3, and is not directly related to the increased flow to the bypass reach. Indirectly, a minimum flow of 714 cfs to the bypass reach would reduce the number of days that the powerhouse can generate at the Day 3 level. However, under the Day 3 scenario, the combined HSI score just downstream of the tailrace channel appears to be around 0.75 (i.e., sub-optimal), so this decline in suitability under the Day 4 scenario is an acceptable tradeoff for the increase in optimal and suitable habitat in the Buck bypass reach under the Day 4 scenario.</p>	<p>Appalachian will include summary information to support evaluation of the USFWS's comment in Exhibit E of the FLA. Additional analysis may be included, if and as appropriate, in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.</p>
<p>USFWS</p>	<p>Buck Habitat Assessment</p>	<p>The High Flow 714 cfs release resulted in the greatest overall improvement in habitat suitability when considering all species and guilds together, and the Mid Flow release was a close second, based on the model results. However, tradeoffs in reduced habitat downstream of the tailrace should also be considered. Leakage flow represents only 0.75 percent of the mean annual inflow to the Buck development, while the 210.7 cfs Low Flow release represents 9.3 percent of the mean annual inflow, the 354 cfs Mid Flow release represents 15.6 percent of the mean annual inflow, and the 714 cfs High Flow release represents 31.4 percent of the mean annual inflow. Considering all of the above, the Service will be recommending an increase in the minimum flow to the Buck bypass reach, to 354 cfs.</p>	<p>Appalachian will include summary information to support evaluation of the USFWS's preliminary recommendation in Exhibit E of the FLA. Additional analysis may be included, if and as appropriate, in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.</p>
<p>USFWS</p>	<p>Byllesby Habitat Assessment</p>	<p>While the Service does not disagree with the USR's conclusions regarding the habitat benefits of maintaining run-of-river operations through the Byllesby powerhouse, we believe that the Low Flow release (88 cfs) to the Byllesby bypass reach provides enough habitat benefits to justify the tradeoff in slightly reduced powerhouse generation flows to the tailrace, cross-over channel and side channel.</p> <p>We also question whether negative effects of reduced powerhouse generation were sufficiently tested, considering the limited range of modeled generation flows (from 1,144 cfs to 1,555 cfs) and the fact that the highest generation flow did not correspond with the lowest bypass reach flow release, nor did the lowest generation flow correspond with the highest bypass reach flow release, under the various test scenarios. We understand that this aspect of the study was dictated by Project inflow, and was not within the Applicant's control, but a true test of these tradeoffs would require a greater range of generation flows (Byllesby powerhouse hydraulic capacity is more than 3x the highest generation flow in the study), and incrementally increasing bypass reach flows tested against incrementally decreasing powerhouse generation flows.</p> <p>The Day 2 flow to the Byllesby bypass reach (88 cfs; recommended by the Service) corresponded with the highest powerhouse discharge flow to the tailrace, cross-over channel and side channel, such that the study did not evaluate a corresponding decrease in flow to these other Project features. The goal of systematically evaluating and balancing the needs and priorities of the various flow-related resources (as stated in Section 5, Methodology, Page 9 of the USR) was not completely met by this study, because there was no true evaluation of balancing of flow distribution. Negative tradeoffs proportional to the bypass reach flow releases were not sufficiently tested. Therefore, the Service focused its evaluation of study results primarily on the effects of the different test flows released to the bypass reaches. In addition, a finding of the study (Page 31) was that bypass flow releases did not influence water surface elevations in the tailrace, cross-over channel, or side channel areas.</p>	<p>Appalachian will include summary information to support evaluation of the USFWS's comment in Exhibit E of the FLA. Additional analysis may be included, if and as appropriate, in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.</p>

USFWS	Bypass Flow and Aquatic Habitat Study	The Service does not agree with the statement in the last paragraph of this section that, from an aquatic habitat perspective, it likely makes no substantial difference which gate is used to release the minimum downstream flow requirement. The thalweg is near the eastern bank (RDB), and the minimum flow should be released through the gate that is most directly aligned with the thalweg.	Appalachian will include summary information to support evaluation of the USFWS's comment in Exhibit E of the FLA. Additional analysis may be included, if and as appropriate, in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.
USFWS	Bypass Flow and Aquatic Habitat Study	The Service does not completely agree with the stated conclusions in this section. Model results indicated a significant increase in habitat suitability for the generic shallow-slow guild with coarse substrate (represented by the spawning life stage of the redbreast sunfish) in the lower Bylesby bypass reach, especially in the thalweg, under the Low Flow release scenario (88 cfs). In addition, although the Service had sufficient opportunity to influence the list of species to be evaluated, a thorough evaluation of all possible benefits to aquatic organisms would be well beyond the practicable scope of the study, and existing research (e.g. TNC Indicators of Hydrologic Alteration) supports a minimum flow to the Bylesby bypass reach that is greater than 0.5 percent of the annual mean inflow to the Project (current minimum flow provided through leakage). The Service does not agree with the conclusions in this section.	Appalachian will include summary information to support evaluation of the USFWS's comment in Exhibit E of the FLA. Additional analysis may be included, if and as appropriate, in the revised Bypass Flow and Aquatic Habitat Study report, to be filed with FERC as supplemental information after the FLA.
USFWS	Wetland, Riparian, and Littoral Habitat Study	<p>The Service notes the utility this study shows in field verification of data, especially for jurisdictional wetlands, as documented wetlands increased greatly over desktop analysis projections. Nearly 78 acres of palustrine emergent, scrub shrub and forested wetlands are important wildlife resources for waterfowl and fish and aquatic communities. The Service supports continued consultation with the Virginia Department of Wildlife Resources staff in developing the Wetland Management Plan.</p> <p>As we noted in the USR Meeting, impacts to wetland resources, even temporary drawdown impacts for months of maintenance or other factors, should be documented. Persistence of wetland vegetation is only one component of wetland habitat, and the seasonal presence or lack of hydrology must be factored into consideration.</p>	Comment noted and to be taken into consideration in Appalachian's preparation of the FLA.
USFWS	Aquatic Resources Study	Water quality data and velocity data were collected at sampling sites which included the bypass reaches. What were the flows (cfs) to the bypass during the surveys? The Service did not see this information in the USR. If this information was not documented at the time of the surveys, it should be possible to look back to the dates and times of the surveys and provide this information.	Appalachian will provide the flows (cfs) in the bypass reaches at the times when water quality and velocity data were collected in the FLA, as well as the revised Aquatic Resources Study report to be filed as supplemental information after the FLA.
USFWS	Aquatic Resources Study	A spillway and bypass passage survival rate of 97 percent was assumed based on the average of 136 survival tests conducted with juvenile salmonids on the Columbia River (Amaral et al. 2013). How does the spillway from the cited study compare to the Project spillways with regards to the drop in elevation from the downstream end of the spillway apron to the riverbed and plunge pool depth below the dam apron? There appears to be a drop in elevation from the Bylesby spillway apron to the riverbed below, with little to no plunge pool below most of the spillway gates. The Service requests additional information to support the assumption of 97 percent survival of fish passing via the spillways.	Appalachian will revise the Aquatic Resources Study report to address the USFWS's comment.
USFWS	Aquatic Resources Study	Were the submerged heights of the intake structures used to calculate velocities, or were the total heights (including non-submerged sections) of the intake structures used in the calculations? If non-submerged sections of the intake dimensions were used in the calculations, then the resulting calculated velocities will be underestimates. The Service has previously requested design plans of the intake structures, and water surface elevations. Without that detailed information, we cannot verify that the applicant's velocity calculations were performed according to the parameters the Service uses for calculations. Drawings presented in Appendix I, Additional Intake Drawings are insufficient.	The Aquatic Resources Study report will be revised to address the USFWS' comment.
USFWS	Aquatic Resources Study	This section states that burst swim speed data were compiled from the literature, however if data for a specific species or group was not directly available, it was calculated as 2x the critical swim speed based on Bell (1991). Bell (1991) does not define "critical" swim speed. The three swim speeds defined by Bell (1991) are cruising, sustained, and darting. To which of these does "critical swim speed" equate?	The Aquatic Resources Study report will be revised to address the USFWS' comment.

USFWS	Aquatic Resources Study	The Service previously provided our December 30, 2021 Draft License Application (DLA) comments regarding the tail length used for walleye in the Turbine Blade Strike Analysis (TBSA). In those comments, we noted that walleye up to 29 inches in tail length have been collected from the New River and stating, therefore, that this should be the maximum length used in the TBSA, as opposed to the upper limit of 13.5 which was used in this study, based on the 2020-2021 surveys. However, we did not take into account the clear bar spacing on the trash racks, and the body width to length scaling factor for walleye. Based on the scaling factor, this study determined that walleye with a tail length of 18.5 inches or greater will be excluded from the Project intakes. Therefore, we revise our previous request in our DLA comments, to conduct additional TBSA modeling for walleye, using 18 inches as the tail length upper limit for this species.	The Aquatic Resources Study report will be revised to address the USFWS' comment.
USFWS	Aquatic Resources Study	Table 5-11 indicates low monthly entrainment potential for walleye in all months except for June and July. However, we note that a 1992-1994 discharge netting study at the Townsend Project on the Beaver River (Ohio River tributary) in Pennsylvania collected walleye moving downstream through the powerhouse during all months of the year except for June (RMC 1994).	Appalachian will address USFWS' comment in the Final License Application and revised Aquatic Resources Study report.
USFWS	Aquatic Resources Study	5.2.3.3 Turbine Blade Strike Analysis, page 5-24, second paragraph, last sentence. This sentence refers to Table 5-6 which summarizes body length to width ratios and minimum length of at which fish species would be excluded by the trash racks. The minimum size of exclusion for larger bodied species of 14.5 to 18 inches does not completely agree with the table (upper end of range is 18.5 inches in the table).	The Aquatic Resources Study report will be revised to address the USFWS' comment.
USFWS	Aquatic Resources Study	The Service previously provided DLA comments pertaining to the maximum tail length used for walleye in the TBSA modeling, stating that walleye up to 29 inches have been collected from the New River. The maximum length used in the TBSA modeling was only 13.5 inches, based on specimens collected during the 2020-2021 surveys. The minimum length for this species that would be excluded from the powerhouses, based on the clear bar spacing of the trash racks, would be 18.5 inches. Therefore, the Service requests that additional TBSA modeling be conducted for walleye up to a maximum tail length of 18 inches, and that this table be revised to reflect the updated survival rates based on the additional modeling.	The Aquatic Resources Study report will be revised to address the USFWS' comment. The revised study report will be filed with FERC as supplemental information after the FLA.
USFWS	Aquatic Resources Study	Were the submerged heights of the intake structures used to calculate velocities, or were the total heights (including non-submerged sections) of the intake structures used in the calculations? If non-submerged sections of the intake dimensions were used in the calculations, then the resulting calculated velocities will be underestimates. The Service has previously requested design plans of the intake structures, and water surface elevations. Without that detailed information, we cannot verify that the applicant's velocity calculations were performed according to the parameters we use.	The Aquatic Resources Study report will be revised to address the USFWS' comment. The revised study report will be filed with FERC as supplemental information after the FLA. Appalachian notes that while additional historical design drawings for the Byllesby Development have been located and will be included, Appalachian has not been able to locate this design information in a different format.
VDWR	Wetland, Riparian, and Littoral Habitat Study	Results of the Wetland, Riparian, and Littoral Habitat Study could inform development of a Wildlife Management Plan to enhance Project wetlands for specific wildlife species, including ways to enhance some of the more significant wetlands for waterfowl use. Maintaining wetland resources at the Project to benefit waterfowl and waterfowl hunters would also provide additional recreation enhancement not outlined in the Recreation Study. Department of Wildlife Resources staff are available to discuss the development of a Wetlands Management Plan.	Comment noted and to be taken into consideration in Appalachian's preparation of the FLA.
VDWR	Bypass Flow and Aquatic Habitat Study	We support the comments of our partner agency, the U.S. Fish and Wildlife Service, regarding the Bypass Reach Flow and Aquatic Habitat Study, particularly with regard to reducing fish stranding, but also in terms of the actual length of the Byllesby bypass reach, instream flow modeling and instream flow needs, and native fish species benefited by the guilds examined. We emphasize the following points regarding how this study was conducted that are important to appropriate management of these formerly riverine habitats.	Comment acknowledged. No changes have been made to the Bypass Flow and Aquatic Habitat Study report.
VDWR	Bypass Flow and Aquatic Habitat Study	During this Study, as reported in the USR Meeting Summary, the DLA, and the USR, bypass flow to the Byllesby bypass reach was provided through Tainter Gate #6. A primary discharge from this gate, located near the center of the Byllesby Dam spillway, may have hindered the results of this study in the Byllesby bypass reach, since the location of this release point ignores the location of the thalweg on the right descending bank. As a result, the evaluation of bypass reach flows for this portion of the Project may not fully demonstrate how bypass reach flows can improve downstream connectivity and reduce potential stranding in the bypass reach.	See response to Comment 4 above.



VDWR	Bypass Flow and Aquatic Habitat Study	<p>During this Study, as reported in the USR Meeting Summary, the DLA, and the USR, bypass flow to the Buck bypass reach was provided through Tainter Gate #1. A primary discharge from this gate, located near the right descending bank of the Buck Dam spillway, may have hindered the results of this study in the Buck bypass reach, since the location of this release point ignores the location of the thalweg on the left descending bank. As a result, the evaluation of bypass reach flows for this portion of the Project may not fully demonstrate how bypass reach flows can improve downstream connectivity and reduce potential stranding in the bypass reach. As stated in our comments to date, we have a continuing concern about Walleye stranding in the Buck bypass reach, particularly during the spring Walleye spawning season when the Buck bypass is more frequently activated than at other times of the year.</p>	See response to Comment 4 above.
VDWR	Bypass Flow and Aquatic Habitat Study	<p>We agree with the U.S. Fish and Wildlife Service's evaluation of the interpretation of Buck bypass reach model results for the Walleye spawning stage when they state that the most suitable habitat is provided under the highest flow release scenario (714 cfs). Walleye spawning requires attractant flows and suitable spawning substrate. Creating suitable spawning conditions for the New River strain Walleye strain is a high priority for our agency, as outlined in our New River Walleye Management Plan, filed as a management plan under this Project. The Buck bypass reach was formerly fully functioning riverine habitat that provided Walleye spawning habitat, so its potential importance to the New River Walleye population should be an important consideration in managing bypass reach flows.</p>	Comment noted and to be taken into consideration in Appalachian's preparation of the FLA.
VDWR	Aquatic Resources Study	<p>We support the comments of our partner agency, the U.S. Fish and Wildlife Service, particularly with regard to turbine blade strike and spillway survival assessment and intake velocity measurements. In addition, we emphasize the following point regarding this study: With a total of only nine Walleye collected during the Aquatic Resources Study, using the mean total length of Walleye collected (13.5 inches, Standard Deviation of 1.5 inches) for the Impingement and Entrainment Study did not capture a realistic size distribution of Walleye using the Byllesby Buck Project Area. As a result, we support the U.S. Fish and Wildlife Service recommendation to perform additional Turbine Blade Strike Analysis for Walleye up to a maximum total length of 18 inches, based on the minimum size Walleye excluded from the intake of 18.5 inches total length, since the 2.25-inch clear bar spacing on the trash racks excludes Walleye of that length and larger.</p>	The Aquatic Resources Study report will be revised to address the VDWR's comment. The revised study report will be filed with FERC as supplemental information after the FLA.
VDWR	Recreation Study	<p>The Recreation Study was completed to our satisfaction, with the exception of documenting use of the Buck tailrace area, where use was discouraged by the presence of No Trespassing signs in close proximity to the dam, resulting in capturing virtually no human activity on cameras installed to assess use. As stated in our comments on the DLA, we support a collaborative approach to developing a Recreation Management Plan, including potential improvements to signage within the Project boundary, upgrades to the Byllesby Boat Launch, improvements to the Buck postage put-in, and the construction of new facilities at the Loafer's Rest Area, leased by Appalachian Power Company to the Virginia Department of Wildlife Resources. Our Department staff will participate in the development of this plan. Further collaboration on the Recreation Management Plan is advisable prior to filing the FLA.</p>	Comment acknowledged. No changes have been made to the Recreation Study report.