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October 1, 2019

Via First Class U.S. Mail and Electronic Mail

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Ecological Services – Northeast Region
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Re: Section 7 Consultation on the Atlantic Coast Pipeline

Dear Mr. Phifer:

On July 26, 2019, the United States Court of Appeals for the Fourth Circuit vacated the September 11, 2018 Biological Opinion and Incidental Take Statement for the Atlantic Coast Pipeline (“ACP”). *Def. of Wildlife v. United States Dep’t of the Interior*, 931 F.3d 339 (4th Cir. 2019). That same day, a spokesperson for ACP declared that the vacated permit would have no impact on the timetable for completing the pipeline and that the Fish and Wildlife Service (“FWS”) would start the process for reissuing its approvals “immediately.”¹ As the agency well knows, this is the second time its approvals for this project have been vacated. Both vacatures followed rushed, incomplete analysis unsupported by best available science. We urge the agency to resist pressure from the pipeline companies to fast-track yet another approval for this unnecessary project and to instead heed its mandate under the Endangered Species Act (“ESA”) to protect and conserve endangered and threatened species and their habitats. That requires avoiding inflicting further harm on species where that injury may jeopardize the species, as it would here for rusty-patched bumble bee, clubshell, and Roanoke logperch.

In the year since the agency issued its last biological opinion and incidental take statement, facts regarding the impact of constructing this pipeline on protected species have changed. The agency must take these changes into account to issue a valid approval for this project. If the agency again seeks to expedite approvals, we are concerned these changes will be ignored. Therefore, on behalf of Defenders of Wildlife, Sierra Club, and the Virginia Wilderness Committee, we request that the agency consider the following in its re-evaluation of the pipeline.

¹ See Michael Martz, Federal court strikes down Fish and Wildlife permit for Atlantic Coast Pipeline, *The Richmond Times-Dispatch* (July 26, 2019) available at https://www.richmond.com/news/virginia/government-politics/federal-court-strikes-down-fish-and-wildlife-permit-for-atlantic/article_c5c40622-f38c-59a3-a248-f16d1c50ed44.html.

I. FWS Should Restructure its Biological Opinion

As an initial matter, if FWS is going to reissue approvals for this project it should revisit the structure of its biological opinion to avoid substantive errors. Its September 11, 2018 Biological Opinion for the Atlantic Coast Pipeline (“2018 BiOp”) was based on a 2017 biological opinion template distributed by FWS’s Northeast Regional Office with the stated intent of streamlining analysis. By focusing analysis on an individual population, the template encourages two errors in particular.

First, as a consequence of the template’s structure, the agency only considers impacts to a species as a whole if it first determines that a project will significantly harm a discrete population. If FWS determines a specific population can withstand project impacts, it stops its analysis without considering those impacts in the context of a species’ overall status. This approach does not comply with ESA requirements. Even if an individual population can withstand impacts, FWS must still consider those impacts at the species level.

FWS’s discussion of recovery units in its Section 7 Consultation Handbook, demonstrates why impacts to an individual population must be considered in light of the status of the species. Even if a discrete recovery unit may “be able to sustain some impact before the species in that recovery unit is jeopardized,” FWS must nonetheless assess impacts to the entire species, because the impacted recovery unit may be especially significant when considered in light of the overall status of the species. For example, a recovery unit may contain “the only known reproducing individuals of the species and may represent a major source of individuals for ensuring the survival of other recovery units.” FWS, ESA Section 7 Consultation Handbook 4-38. If so, “[a]ny loss of reproductive capability in the [recovery] unit can represent jeopardy because the survival of the entire species would be significantly impaired.” *Id.* Like impacts to recovery units, survivable impacts to discrete populations may nonetheless be significant when considered in light of the status of the species. If a discrete population contains “a major source of individuals for ensuring the survival of other [populations],” “any loss of reproductive capability in [that population] can represent jeopardy because the survival of the entire species would be significantly impaired.” But under FWS’s 2017 template, the agency never asks the species-level question; instead, analysis stops once FWS determines the discrete population will not experience a reduction in fitness, no matter how significant that reduction may be in the species-wide context. Even if a discrete population can withstand some degree of impact, FWS must still evaluate impacts to that population at the species level.

Moreover, “where baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm.” *Nat’l Wildlife Fed’n v. Nat’l Marine Fisheries Serv.*, 524 F.3d 917, 930 (9th Cir. 2008); *see also Turtle Island Restoration Network v. U.S. Dep’t of Commerce*, 878 F.3d 725, 737-738 (9th Cir. 2017) (finding no-jeopardy determination arbitrary where it focused only on harm from proposed action, without considering other factors leading to species decline). Yet FWS’s stepwise approach leads to that outcome; it

dismisses impacts to species in a state of jeopardy if those impacts affect the strongest remaining populations of the species. Project impacts are dismissed so long as they are inflicted on resilient populations. But those same populations represent the species' best chance for survival and recovery. This backward approach to analyzing impacts accelerates the path to extinction and cannot be squared with the ESA.

Second, the template fails to prioritize recovery of the species. *See* 50 C.F.R. § 402.02 (definition of jeopardize includes consideration of species recovery). Recovery means improving the status of the species to the point that ESA protection is no longer required. FWS may not be required to create an independent section addressing recovery in its biological opinions, but it must consider the potential for recovery in its discussion of each species, even if it believes a discrete population will withstand project impacts. In litigation over the 2018 BiOp, FWS took the position that disclosure of a species' "conservation needs" was sufficient consideration of the species' recovery needs. FWS Br. 28-29 (Case No. 18-2090; 4th Cir.) (ECF No. 95). But what FWS means by "conservation needs" is unclear. In some portions of the 2018 BiOp, FWS describes conservation needs as information needs. *See, e.g.*, 2018 BiOp, 13 (rusty-patched bumble bee's "conservation needs include assessing resiliency to environmental variation, perturbations affecting habitat size and quality"). The direct connection between those information needs and species recovery is never made clear. Elsewhere, the 2018 BiOp equates conservation needs with "reproduction, numbers, and distribution," which it then further characterizes as "resiliency, . . . redundancy, . . . and representation." 2018 BiOp, 12. The relationship between "recovery" and the concepts of "reproduction, numbers and distribution" or "resiliency, redundancy, and representation" is similarly unclear. The latter is largely focused on a population's ability "to withstand," i.e., survive, certain events – not improve sufficiently as a species so that ESA protection is no longer necessary. To the extent conservation needs are defined by this latter category, they seem to only analyze the likelihood of survival, rather than analyze how species recovery on the whole is affected by an action. FWS should change its biological opinion structure to prevent it from making these and other errors.

II. FWS Must Consider Impacts on Candy Darter

The candy darter was listed as endangered on November 21, 2018. 225 Fed. Reg. 58,747. Its risk of extinction is "high." *Id.* at 58,751. A leading factor contributing to its precarious state is excessive sedimentation of its habitat, which can be caused by "infrastructure projects (e.g., roads, *pipeline*, etc.) that increase sediment loading within the range of the candy darter as a result of stream crossings or forest clearing for permanent rights of way." *Id.* (emphasis added).

Both ACP and the Mountain Valley Pipeline ("MVP") will adversely impact the candy darter. MVP crosses at least four watersheds where candy darter is likely to occur, though MVP's developers have not actually looked for the fish. *See* Mountain Valley Pipeline, Final Environmental Impact Statement, 4-233 (June 23, 2017) (Accession No. 20170623-4000). ACP

crosses at least five watersheds where candy darter is likely to occur, though ACP's developers also have not surveyed for the fish. *See* ACP, Final Environmental Impact Statement, 4-216 (July 21, 2017) (Accession No. 20170721-4000). Pipeline construction “could alter habitat and render it unsuitable” for candy darters, “cause individuals to expend more energy to seek out different foraging and spawning areas,” and ultimately “kill or injure candy darters.” *See* Letter from John Schmidt, FWS, to David Swearingen, FERC (Jan. 5, 2018) (Accession No. 20180119-5004).

Despite these impacts, neither MVP nor ACP has completed Section 7 consultation for the candy darter, and neither enjoys the safe harbor of an incidental take statement. If FWS is going to reissue approvals for ACP, it must complete consultation for the candy darter, taking into account impacts on the species from both ACP and MVP. In other words, when considering the “status of the species” and “environmental baseline” in FWS’s jeopardy analysis for the ACP, it must take into account impacts to date from construction of MVP.

Moreover, FWS has proposed designating critical habitat for the candy darter that overlaps with both MVP and ACP. *See* 83 Fed. Reg. 59,232 (Nov. 21, 2018). Once that habitat designation is finalized, FWS is obligated to “insure that any action . . . is not likely to . . . result in the destruction or adverse modification of [critical] habitat” of candy darter. 16 U.S.C. § 1536(a)(2). Even before critical habitat is formally designated, FWS must “confer” with action agencies on any action likely to “result in the destruction or adverse modification of critical habitat proposed to be designated.” *Id.* § 1536(a)(4).

“Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.” 50 C.F.R. § 402.02. FWS concludes “a Federal action is likely to ‘destroy or adversely modify’ designated critical habitat if the action results in an alteration of the quantity or quality of the essential physical or biological features of designated critical habitat . . . and if the effect of the alteration is to appreciably diminish the value of critical habitat for the conservation of the species.” 81 Fed. Reg. 7, 214, 7, 216 (Feb. 11, 2016).

FWS has provided a list of activities specific to candy darter that may affect its critical habitat. They include “[a]ctions that would significantly increase water temperature or sedimentation and stream bottom embeddedness. Such activities could include, but are not limited to, land use changes that result in an increase in sedimentation [or] erosion.” 83 Fed. Reg. at 59,241. ACP will increase sedimentation in candy darter habitat through construction and maintenance of the right of way. In at least the Greenbrier River watershed, these effects will be cumulative with those caused by the MVP, which is also being constructed in this general area of proposed critical habitat.

To accurately assess sediment impacts, FWS must revisit its prior sedimentation analyses for ACP and MVP.² MVP originally (and arbitrarily) estimated that sediment control measures would achieve “on average 79% sediment containment.” FWS, MVP Biological Opinion (Nov. 21, 2017) (Accession No. 20171122-0006) (“MVP BiOp”), 24. That has proven untrue.³ Even FWS now recognizes that the sedimentation analysis behind its MVP BiOp is insufficient and does not reflect the realities of pipeline construction. *See* Letter from Kyla Hastie, FWS, to Kimberly Bose, FERC (April 12, 2019) (Accession No. 20190412-5164) (asking MVP to conduct new sediment analysis in light of past experience) attached as Ex. A. The assumptions underlying ACP’s 2018 BiOp are even more aggressive, assuming sediment control measures will achieve reality-defying 96% sediment containment. *See* ACP Biological Evaluation, App’x H, H-19 (March 10, 2017) (Accession No. 20170310-5157). This assumption has already been rejected as applied to the Forest Service and undoubtedly cannot be achieved in the field. *See Cowpasture River Pres. Ass’n v. Forest Serv.*, 911 F.3d 150, 174 (4th Cir. 2018). FWS has tools at its disposal, such as the RUSLE model, to more accurately predict the range of sediment impacts. It must use those tools relying on realistic assumptions about the efficacy of erosion control devices as informed by FWS’s experience to date with MVP. Proper consideration of sediment impacts is critical to accurately assessing ACP’s impacts on candy darter as well as other species including Roanoke logperch and clubshell.

III. Accurate Assessment of Impacts to Roanoke Logperch Shows ACP May Jeopardize the Species

Like candy darter, both MVP and ACP will affect the Roanoke logperch (“RLP”). As recognized in FWS’s April 12, 2019, letter to FERC, and FWS’s experience with MVP, there are numerous shortcomings in the RLP analysis for both projects. *See* Ex. A.

A. FWS’s definition of “action area” as applied to RLP is unsupported

“Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” 50 C.F.R. § 402.02. The 2018 BiOp defines the “action area” for RLP as the area where the construction right of way crosses RLP-occupied streams plus 200 meters above and 800 meters below each crossing. 2018 BiOp, 19. The entire “action area” for RLP is three separate, approximately 1-kilometer areas. *Id.*

There is no support for so drastically limiting the action area. “The most widespread current threat to Roanoke logperch is non-point source pollution in the form of fine sediment.” FWS, Roanoke Logperch Five-year Review (2007), 16. MVP has already contributed massive amounts of sediment to RLP streams, and that sediment has not been contained within an area 800 meters below and 200 meters above each individual crossing as FWS assumes in its effects

² This is also true with regard to FWS’s analysis for Roanoke logperch and clubshell, discussed below.

³ *See, e.g.*, Mountain Valley Watch, September 2019 Report (Accession No. 20190909-5016).

analysis for ACP.⁴ Nor is RLP activity limited to such a small area. According to the 2018 BiOp, RLP have a dispersal extent of up to 80 river kilometers. 2018 BiOp, 18. RLP exist outside these 1-kilometer “action areas” and sediment impacts will extend far beyond them. The “area to be affected directly or indirectly” by constructing the ACP, *i.e.*, the “action area,” is significantly more expansive than the unreasonably limited area that underpins FWS’s analysis.

Related, analysis for the ACP appears to have dismissed the potential presence of RLP in some streams based on habitat surveys conducted within this same approximately 1-kilometer area around individual crossings. If RLP habitat was not found in the 1-kilometer area, FWS assumed RLP were not present in the stream for purposes of its Section 7 effects analysis. But at best the surveys demonstrate that there is no suitable habitat within that 1-kilometer area; they do not show that RLP do not use other portions of the stream that will be affected by increased sedimentation from construction activities. FWS may not assume RLP are not present or that they are unaffected based only on these limited habitat surveys.

B. FWS’s estimate of RLP abundance is arbitrary

Within its unreasonably limited “action area,” FWS also arbitrarily underestimated RLP abundance. FWS did not conduct surveys to determine RLP presence or abundance. Instead, FWS based its analysis for the Nottoway River on the fact that *mussel surveyors* incidentally happened to see approximately 12 RLP while surveying the river *for mussels*. FWS “added a correction factor since mark-recapture data indicates that only about 10 percent of RLP are actually detected during surveys” for RLP. But the 10 percent correction factor is appropriate when surveying *for RLP*, not as a correction when surveying *for a completely different phylum*. As a result, FWS’s estimate that 120 RLP are present within the approximately 1-kilometer “action area” at the Nottoway River crossing is arbitrary and unsupported by the best available science. *See* 2018 BiOp, 19.

FWS’s estimates of RLP abundance at other crossings fare no better. Its estimate at Waqua Creek is based on the detection of a single RLP, 3.7 kilometers downstream of the proposed Waqua Creek crossing, *over seven years ago*. 2018 BiOp, 19.⁵ Its estimate at Sturgeon Creek is based on its unfounded estimate at Waqua Creek. *Id.*

In sum, instead of conducting *any surveys* for RLP, FWS based its population estimates on: 1) RLP incidentally noticed during mussel surveys and 2) detection of a single RLP in one waterbody seven years ago. This falls well short of the best available science bar. *See Defs. of Wildlife*, 931 F.3d at 345 (*citing* 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(g)(8)). FWS certainly has the capability to obtain more accurate, up-to-date data.

⁴ *See supra*, n. 3.

⁵ The fact that FWS estimates RLP abundance in the action area based on the finding of an RLP well outside that action area further shows FWS’s definition of action area to be arbitrary. RLP are occupying areas outside the 1-kilometer reaches and will be impacted by sediment discharged both within and outside of those areas.

Additionally, these estimates only account for RLP in FWS's unreasonably limited "action area." To accurately assess the impact of ACP (and MVP, for that matter) on RLP, FWS must expand the action area to account for "*all areas* to be affected directly or indirectly by" pipeline construction, 50 C.F.R. § 402.02 (emphasis added), and reasonably estimate the population of RLP within that area.

Finally, FWS's estimates appear to account only for the presence of, and impacts to, adult RLP. FWS must also take into account impacts to RLP larvae and young. That analysis may reveal that impacts to RLP are more substantial than FWS assumed in its analysis. Even if some adults can survive acute sedimentation of their habitat, sedimentation may more drastically affect larvae and young leading to decreased population sizes in subsequent years.

C. FWS ignores effects to RLP from upland and upstream sedimentation

Shockingly, FWS wrote FERC in April 2019 *asking FERC* to "provide an explanation as to whether effects to RLP from upland sedimentation were considered" *in FWS's own biological opinion for MVP*. See Ex A. As the agency charged with assessing impacts to species, FWS should know the answer to that question. That there is uncertainty is alone grounds to revisit the RLP analysis for MVP and ACP, which closely tracks the analysis from the MVP BiOp.

The 2018 BiOp for ACP acknowledges that RLP are likely to be affected by upland construction: "upland ground-disturbing activities, such as tree clearing, grading, constructing/improving access roads, and pipe stringing, are likely to introduce sediment into RLP habitat." 2018 BiOp, 39. Other 2019 biological opinions from the same FWS field office reach the same conclusion. See FWS, Biological Opinion for Route 718 Bridge Replacement (July 1, 2019), 4 (defining action area to include areas of "upland disturbance" including tree clearing areas).⁶ As do previous biological opinions involving Waqua Creek, one of the areas crossed by ACP. See FWS, Biological Opinion for Route 712 Waqua Creek (Dec. 10, 2013).⁷ But FWS does not include upland effects in its jeopardy and incidental take analysis for ACP, instead focusing only on individual stream crossings. Undoubtedly, upland construction outside of those crossings will cause sedimentation of streams affecting RLP and its habitat. FWS must forthrightly disclose and consider that impact.

Similarly, it is arbitrary for FWS to limit its sedimentation analysis for RLP to only those crossings where it believes RLP are present. Sediment introduced from crossings upstream of RLP locations will travel downstream into RLP habitat and must be accounted for. The ACP mainline and lateral line are proposed to cross waterbodies in the Nottoway River watershed over 100 times. See FEIS, App'x K. But FWS assumes only three of those crossings will introduce sediment into RLP habitat. There is no basis for that assumption. Impacts to RLP from

⁶ <https://ecos.fws.gov/tails/pub/document/13723875>.

⁷ https://www.fws.gov/northeast/endangered/TEBO/pdf/20131210_letter_Service_to_FHWA_and_Corps_Route_712_Waqua_Creek_Biological_Opinion_SIGNED.pdf.

upstream and upland sedimentation must be analyzed if FWS is going to allow pipeline construction through RLP habitat.

In line with the RLP Five-year Review, that analysis should be completed at the catchment level – not crossing by crossing – to properly account for point and nonpoint discharges into RLP habitat. *See* Roanoke Logperch Five-year Review, 20 (calling for a “watershed-level conservation approach that addresses sediment loading”). Catchment-wide analysis is all the more important for ACP, which is a fundamentally different type of project than most projects FWS considers regarding RLP. A bridge replacement, for example, likely involves a single crossing that may introduce sediment into RLP habitat. ACP involves dozens of crossings in addition to significant upland construction that will introduce sediment into the watershed and either directly or indirectly into RLP habitat. FWS must assess how overall construction of ACP will affect sediment loading in the watershed and what effect that will have on RLP.

D. RLP and its habitat will be affected for longer than FWS assumes

Related to its insufficient sedimentation analysis, FWS anticipates that FWS populations will “recover within 1-3 years” after ACP construction. 2018 BiOp, 54. This appears to assume that impacts from ACP will be felt for some shorter period of time. That assumption lacks support on at least two fronts. First, while construction of the pipeline will introduce significant amounts of sediment into RLP habitat, the permanent right of way will also lead to increased sedimentation in the long term. This is particularly true at stream crossings where the cleared right of way will create a permanent path allowing sediment to enter streams. This increased sedimentation will extend beyond the 1-3 year window FWS relies on. To accurately assess the effect of this pipeline on RLP, FWS must take into account increased sedimentation from the permanent right of way, not just construction.

Second, the 1-3 year window prediction also appears to assume that sediment introduced into streams from pipeline construction will quickly flush through the system. We are unaware of any data to support that assumption. FWS’s experience with construction of MVP demonstrates that erosion control has fallen short of performance estimations, and sediment has discharged to waterways in excess of predicted quantity, duration, and severity – and will, therefore, take longer to flush through. Coupled with the fact that RLP dispersal areas occupy significantly more river mileage than assumed by FWS’s “action areas,” FWS must assume sediment may affect RLP habitat for years after it has been introduced through pipeline construction. In other words, discharge of sediment into a stream is only the beginning of the problem for RLP; FWS must consider how long sediment still stay in RLP habitat, and whether and how long it will take sediment to flush through RLP habitat, if at all. That determination requires an accurate assessment of how much sediment will be introduced to the watershed as a result of construction at all stages. *See supra* Section II (discussing need for accurate sedimentation analysis to consider impacts to candy darter).

E. FWS does not fully account for impacts from reduced foraging habitat

Increased sedimentation will cause RLP to “move to clearer water” which, in turn, will cause them to “expend more energy to seek out different foraging and spawning areas.” 2018 BiOp, 53. While true, FWS’s analysis fails to account for the impact of such movements on RLP already occupying those areas. RLP will expend energy seeking out new foraging areas, *and* RLP already occupying those areas will face increased competition and fewer resources. FWS’s analysis recognizes the harm of forcing fish to relocate to avoid turbid waters but fails to account for the harm that relocation will inflict on fish already present in areas to which relocations will occur.

F. FWS must revise its jeopardy analysis in light of new information

Most significantly, FWS’s experience over the last year with construction of MVP demonstrates that constructing pipelines on steep slopes in RLP habitat will result in far greater impacts than originally assumed. If FWS is going to reissue approvals for ACP, it must take this information into account and recognize that constructing ACP and MVP in tandem, across the most important remaining RLP populations, may create conditions that jeopardize the species.

1. *Roanoke Logperch Status*

According to FWS, there are five populations of RLP “in widely separated segments of the upper Roanoke, Pigg, Smith, Nottoway, and Meherrin Rivers.”⁸ The populations in the Roanoke and Nottoway River watersheds are the strongest.⁹ But “[a]ll the populations are small” and “[s]mall logperch populations could go extinct with minor habitat degradation.”¹⁰ The species is “in danger of extinction throughout its range.” Roanoke Logperch Five-year Review, 20. The Nottoway River population, impacted by ACP, is generally thought to be stable but will only “remain stable if siltation is managed appropriately.” *Id.* at 6.

2. *Jeopardy Analysis*

In general terms, FWS looks to four categories of information when assessing jeopardy: the overall status of the species, the environmental baseline, the effects of the action, and cumulative effects. FWS, ESA Consultation Handbook, 4-33. FWS has obtained significant new information related to two of these categories since it issued ACP’s 2018 BiOp: status of the species and effects of the action.

⁸ See <https://www.fws.gov/northeast/pdf/RoanokeLogperch.pdf>.

⁹ See Amanda Rosenberg and Paul Angermeier, Roanoke Logperch (*Percina rex*) Population Structure and Habitat Use (2002), 2, available at https://www.fs.fed.us/rm/boise/publications/fisheries/rmrs_2002_rosenbergera002.pdf.

¹⁰ See <https://www.fws.gov/northeast/pdf/RoanokeLogperch.pdf>.

a. *Status of the Species*

The “status of the species” considers “all past human and natural activities or events that have led to the [species’] current status.” *Id.* at 4-19. The primary threats leading to the imperiled status of RLP involve either loss of habitat from dam construction or increased sedimentation of habitat. 2018 BiOp, 12. Activities that have contributed to these threats must be considered in jeopardy analyses when assessing the “status of the species.” This includes MVP.

MVP crosses the Roanoke River and Pigg River drainages. MVP BiOp, 14-16. The Roanoke River is home to one of the strongest remaining RLP populations but the river itself is already impaired for sediment and listed on Virginia’s 303(d) list. *Id.* The Total Maximum Daily Load for the Roanoke River calls for a 75% reduction in sediment loading to meet water quality standards.¹¹ In other words, the river is already providing degraded habitat for RLP; adding additional sediment to the waterway will only exacerbate those problems.

The last year of MVP construction has resulted in significant increases in sedimentation of streams, including those in the Roanoke River watershed. MVP has entered into a consent order with the state of West Virginia resolving violations of erosion and sedimentation control laws and unpermitted discharges of sediment into streams.¹² The state of Virginia has sued MVP alleging it violated state environmental laws over 300 times, including those designed to protect water quality.¹³ For its part, MVP appears to concede that it violated water quality laws but argues that the “alleged sediment discharges were . . . beyond MVP’s control.”¹⁴ Even if MVP did not properly account for the risks of constructing in steep terrain and erosive soils, in areas with high rainfall and strong storms, it is clear that MVP has caused significant water quality impacts, including in RLP habitat, far beyond what was expected when the project was initially approved in 2017.

Because impacts have been so much more severe than predicted by MVP and the relevant regulatory agencies, FWS has asked FERC to redo its sediment analysis, accounting for the fact that MVP’s erosion control measures have not worked as promised. *See Ex. A.* Once that is

¹¹ Virginia Department of Environmental Quality, Roanoke River Bacteria and Sediment TMDL Implementation Plan Part One (April 2015), E-2 *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/TMDL/ImplementationPlans/Drafts/Upper_Roanoke_Draft_IP.pdf; TMDL Implementation Plan Part Two (August 2016) *available at* https://www.deq.virginia.gov/Portals/0/DEQ/Water/TMDL/ImplementationPlans/Roanoke_River_TMDL_IP_Part%20II.pdf.

¹² West Virginia Department of Environmental Protection, Consent Order (April 19, 2019) *available at* <https://dep.wv.gov/pio/Documents/MVP%20LLC%20SIGNED%20ORDER.pdf>.

¹³ *See* Laurence Hammack, Virginia files lawsuit against Mountain Valley Pipeline, *The Roanoke Times* (Dec. 7, 2018) *available at* https://www.roanoke.com/news/local/virginia-files-lawsuit-against-mountain-valley-pipeline/article_bac7f07d-f210-5c68-9af9-779d3f9cd9bf.html.

¹⁴ *See* Laurence Hammack, Mountain Valley Pipeline files response to state’s lawsuit, *The Roanoke Times* (Jan. 11, 2019) *available at* https://www.roanoke.com/business/mountain-valley-pipeline-files-response-to-state-s-lawsuit/article_96db0fec-5350-5822-b027-83b535423217.html.

complete, FERC and FWS will use the analysis to reconsider how the project has affected RLP and what additional impacts may occur during MVP's construction and operation. *Id.* To be clear, this is a question of degree. Unmistakably, MVP's impacts have harmed RLP, further degrading the status of the species; any further work on MVP will cause additional impacts.

The severity of MVP's impacts on water quality and RLP populations was unknown, and not accurately predicted, when FWS issued its initial biological opinion and incidental take statement for ACP in 2017 ("2017 BiOp"), and still largely unknown when it issued the 2018 BiOp. At those points in time, MVP construction had not meaningfully impacted the status of the species.

That is no longer the case. Whereas once these projects were being developed roughly in parallel, construction of MVP has outpaced ACP. The work performed to construct MVP to date is now a "past activity" that must be considered as part of the "status of the species" when analyzing the ACP. FWS is not free to pretend those impacts have not occurred. It must assess and disclose the impacts of MVP and determine whether the species can withstand additional harm, from both further construction of MVP and construction of ACP. In short, given that: 1) a leading threat to RLP is excessive sedimentation of its habitat, 2) one of the strongest remaining populations is in the Roanoke River, 3) the Roanoke River is already impaired for sediment, and 4) MVP has contributed an unquantified and significant amount of additional sediment to the Roanoke River watershed – FWS must consider if RLP can withstand additional adverse impacts. MVP's impacts alone may have jeopardized the species. If so, FWS must require changes to ACP to avoid further harm. *See Nat'l Wildlife Fed'n*, 524 F.3d at 930 ("[W]here baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm."). Even if MVP has not jeopardized the species on its own, the effects of ACP must be evaluated in light of the degraded status of the species and its habitat resulting from MVP construction.

b. Effects of the Action

As evidenced by its letter asking FERC to redo its sediment analysis for MVP and reassess impacts to RLP using that new analysis, as well as its recent reinitiation of Section 7 consultation for MVP, FWS is well aware that it underestimated the effects of building a large pipeline through steep terrain in RLP habitat. The best available information before the agency regarding impacts from constructing pipelines through RLP habitat in this region is its experience with MVP. That information readily shows the effect of building ACP and MVP will be more harmful to RLP than originally assumed. FWS must account for that in new analyses for both projects.

FWS's analysis for MVP assumed avoidance and mitigation measures would achieve "on average 79% sediment containment." MVP BiOp, 24. The Forest Service's reliance on that estimate has already been invalidated. *See Sierra Club, Inc. v. United States Forest Serv.*, 897

F.3d 582, 595 (4th Cir.), *reh'g granted in part*, 739 F. App'x 185 (4th Cir. 2018). And experience to date confirms as much; MVP has been unsuccessful in achieving anything close to that level of mitigation.

ACP proposes using similar erosion control devices in similar terrain to those which have proven ineffective for MVP, and further assumes these devices will “function perfectly throughout their duration.” ACP Biological Evaluation, App'x H, H-40. ACP's predicted 96% sediment control relies on installation of *a single silt fence*. *Id.* at H-38. The Fourth Circuit has already questioned “the overly high efficiency rate of erosion control devices used in the sedimentation analysis (96 percent),” and pointed out the problem of “assuming that these devices would function nearly perfectly to reduce erosion and sediment, despite a wealth of evidence to the contrary.” *Cowpasture River Pres. Ass'n*, 911 F.3d at 176-177. No evidence suggests ACP can meet these standards. And the experience of MVP strongly indicates that ACP will be unable to achieve its even more inflated 96% sediment containment assumption; relying on such an unrealistic assumption to dismiss impacts in the analysis would be arbitrary. The original assumptions underlying FWS's assessment of effects on RLP were wrong – those effects have been, and will be, more severe than predicted. Construction and operation of these pipelines will cause more sedimentation than FWS assumed in its biological opinions for both MVP and ACP, and that amount of sedimentation will have greater consequences for RLP than the impacts considered in either biological opinion.

FWS is addressing the failure of this assumption in the case of MVP by reassessing impacts to RLP to more accurately capture the “effects of the action” on the species. FWS's experience with MVP demands that it also reassess the effects on RLP of constructing ACP.

As discussed above, FWS's MVP experience further shows its assumptions regarding the *lack* of effect on RLP from upland and upstream construction activities to be wrong; those activities have contributed significant amounts of sediment to RLP habitat, thereby harming the species. Moreover, those impacts have not been confined to 1-kilometer areas around individual crossings as FWS originally assumed. *See* MVP BiOp, 14 (using same narrow definition of action area).

Determining how much RLP habitat will be impacted by pipeline construction and operation is not merely an exercise on paper. In the 2018 BiOp, FWS used this arbitrarily limited action area – the area experiencing the “effects of the action” – to discount harm in its jeopardy analysis. Finding that RLP habitat “covers approximately 2,552 km . . . of which 497.753 are in the Nottoway River basin,” it determined ACP would not jeopardize RLP because the three 1-kilometer action areas “represent[] approximately 0.62 percent of the total RLP potential habitat in the Nottoway River basin and 0.12 percent of the total RLP potential habitat” overall. 2018 BiOp, 19. It used this same approach for MVP, defining “action area” in 1-kilometer stretches totaling “approximately 0.32% of the total RLP potential habitat in the Roanoke River basin and 0.20% of the total RLP potential habitat” overall. MVP BiOp, 16. But

MVP's project effects have already extended outside these limited action areas. MVP may actually impact a significant amount of the 1,581 kilometers of habitat in the Roanoke River basin, MVP BiOp, 16, and ACP may impact a substantial portion of the 497 kilometers of habitat in the Nottoway River basin, 2018 BiOp, 19. If FWS's jeopardy analysis turns on the percentage of total habitat affected, the two projects may impact half or more of potential RLP habitat for the entire species – plainly, a jeopardy concern.

Stated another way, FWS's approach of using an unreasonably limited action area and evaluating jeopardy based on the percentage of overall habitat that intersects with that action area is simply a recipe to never find jeopardy. A single project would have to cross RLP-occupied streams dozens or hundreds of times to affect a significant enough percentage of RLP potential habitat to potentially jeopardize the species. There are no projects that fit that mold. Even ACP which crosses streams in the Nottoway River watershed over one hundred times only impacts a fraction of a percentage of RLP potential habitat under FWS's analysis. FWS must develop a more accurate method to assess impacts to RLP.

To summarize, this is the information now before FWS: First, RLP is at risk of extinction. Roanoke Logperch Five-year Review, 20. "All the populations are small" and "[s]mall logperch populations could go extinct with minor habitat degradation."¹⁵ Populations in the Roanoke and Nottoway River watersheds have been the strongest and are essential to species survival and recovery.¹⁶ Together, the ACP and MVP will impact these two populations. Second, a leading factor in RLP's demise is excessive sedimentation of its habitat. Third, the Roanoke River is already impaired for sediment. Fourth, construction of MVP has contributed far more sediment to the Roanoke River watershed than predicted and assumed erosion control effectiveness has been inflated compared to performance under real-world conditions. Sedimentation has been so excessive that FERC recently reinitiated Section 7 consultation with FWS to reconsider the effects of MVP on RLP. *See* Letter from James Martin, FERC, to Cindy Schulz, FWS (Aug. 28, 2019) (Accession No. 20190828-3057).

FWS must recalibrate its ACP analysis to more accurately reflect the likely effects from the project. This requires revisiting its jeopardy analysis using more accurate assumptions about both the area of project effects and the predicted volume of sedimentation, based upon actual performance of erosion control devices. FWS must also develop a new analysis that takes into account further degradation in the status of RLP resulting from MVP construction. The harm caused by MVP construction may have been so drastic that it alone jeopardized the species, prohibiting FWS from authorizing additional harm to the species and potentially requiring an ACP reroute to avoid the Nottoway River RLP population. If MVP alone has not jeopardized RLP, FWS must consider, using more accurate analysis informed by real-world experience with MVP, whether ACP in addition to MVP will jeopardize the species. FWS's experience with

¹⁵ *See* <https://www.fws.gov/northeast/pdf/RoanokeLogperch.pdf>

¹⁶ *See supra* n. 9 at 2.

MVP suggests that the two projects together may jeopardize the species, requiring FWS to provide reasonable and prudent alternatives to the projects' current design, such as route changes that would avoid further harm to RLP.

IV. FWS Must Correct Errors in its Analysis of Impacts to Indiana Bat and Account for Additional Information

FWS's 2017 BiOp for ACP determined that the "majority of effects" to Indiana bats will occur through clearing suitable, unoccupied summer habitat. 2017 BiOp, App'x B, Table 7. Its 2018 BiOp took the opposite approach: clearing suitable, unoccupied summer habitat will not result in any effect to Indiana bat "regardless of the amount of acres being cleared." 2018 BiOp, 31. FWS's 2018 analysis falls short on several fronts.

First, it cannot be true that clearing suitable but currently unoccupied summer habitat has no impact on bats "regardless of the amount of acres being cleared." 2018 BiOp, 31. Certainly clearing *all* suitable, unoccupied habitat in Virginia, as an example, would have a significant impact on the bat's ability to survive and recover. As FWS recognized in preparing its 2017 BiOp, the amount of acreage cleared makes a difference. It originally determined that clearing suitable, unoccupied summer habitat would affect bats, in part because ACP was "the first project that proposes to remove such a large amount of trees." Email from Sumalee Hoskin, FWS, to Robyn Niver, FWS (Oct. 30, 2017).

Second, to justify its 2018 determination that clearing suitable, unoccupied summer habitat would have no effect on Indiana bats, FWS pointed to what it considered negative survey results. 2018 BiOp, 31. According to FWS guidance however, those survey results are used to determine Indiana bat *presence*, not absence.

FWS's current and past Indiana Bat Survey Guidelines allow Indiana bat presence to be determined by either mist-netting surveys (step four of the guidance) *or* acoustic surveys (step five of the guidance). *See* FWS, Range-wide Indiana Bat Survey Guidelines, 6 (April 2019). A project proponent, however, may "only choose one method for each survey area unit." *Id.* "Under no scenario can a project proponent use either mist-netting or acoustic [] surveys to challenge the other methods result." *Id.* Optional mist netting can follow positive acoustic detections "to document roost trees and population size" but "[n]egative results from follow-up mist-netting . . . does not refute a previously established positive acoustic result." *Id.*

Yet that is the approach FWS took here. Acoustic surveys documented Indiana bats at sites in West Virginia, Virginia, and North Carolina. *See* 2018 BiOp, 31; FEIS 4-262-263. Subsequent mist-net surveys at those sites apparently failed to capture bats. In February 2016, Atlantic Coast Pipeline, LLC, asked FWS to "[p]lease confirm [that] mist net sites resulting in no captures of an acoustically detected listed bat species, will have a final presence determination for that site of negative." *See* Atlantic Coast Pipeline Project Call Log (Feb. 29, 2016) attached as Ex. B. In line with the Survey Guidance, FWS responded that it cannot "use netting to

disprove an acoustic call.” *Id.* But by late November 2016, FWS had reversed course, going against its own guidance and allowing negative mist netting to negate positive acoustic detections. *See* Atlantic Coast Pipeline Project Meeting Minutes (Nov. 29, 2016) attached as Ex. C.

FWS cannot depart from its guidance documents at the convenience of pipeline developers. The positive acoustic detections demonstrate that Indiana bats use summer habitat that the 2018 BiOp designates as “unoccupied.” Any reissued approvals must account for impacts to bats in accordance with agency guidance.

Additionally, it is unclear whether the Indiana bat presence/absence surveys that form the basis of FWS’s opinions are still valid. The FEIS suggests some of those surveys occurred as early as 2015. FEIS, 4-262. Under FWS’s 2015, 2016, and 2017 Indiana Bat Range-wide Survey Guidance, negative presence/absence surveys are valid for a default period of *two years* that can be shortened if necessary. *See* FWS, Range-wide Indiana Bat Survey Guidelines, 2 (April 2015); Range-wide Indiana Bat Survey Guidelines, 3 (April 2016); Range-wide Indiana Bat Survey Guidelines, 3 (April 2017). Surveys performed under the 2015, 2016, and 2017 Guidance have long since expired.

Third, additional Section 7 consultation for Indiana bat on ACP may also require reinitiating consultation for Indiana bat on the George Washington National Forest. The biological opinion for the George Washington National Forest Land and Resource Management Plan (“Forest Plan”) assumes that there will be 23,513 acres of disturbance in potential Indiana bat habitat annually. *See* Letter from Cindy Schulz, FWS, to Liz Agpaoa, USFS (April 21, 2014). That acreage is apportioned by activity: 39 acres disturbed for gas leases, 3,400 acres disturbed through timber harvest and salvage activities, 50 acres disturbed through wildlife habitat management, 24 acres disturbed through special use activities, and 20,000 acres disturbed through prescribed fire. *See* George Washington Forest Plan, App’x J. The currently proposed route for ACP will impact over 300 acres of the George Washington National Forest, exceeding the allotted amount for “special uses” in the biological opinion for the Forest Plan. The Forest also may be exceeding the allotted amount for timber harvest in separate project approvals, as it continually authorizes timber sales without scientific analysis using categorical exclusions.¹⁷ If the degree of harm to Indiana bats assumed in the Forest Plan’s biological opinion is being exceeded, FWS must reinitiate consultation at the Forest Plan-level *before* reissuing approvals for the ACP, an embedded special use authorization under that programmatic consultation.

¹⁷ Examples include the following projects: Duncan Knob project; Pkin Vegetation Improvement project; Molly’s Hill Thinning project; North Zone Fire Wood Sales and Road Day-lighting project; and White Pine Thinning project.

V. FWS Must Fully Account for Impacts to Madison Cave Isopod

In both the 2017 and 2018 biological opinions, FWS was clear that construction of the ACP will directly affect 1,974 linear surface acres of Madison Cave isopod (“MCI”) habitat, and that MCI may be affected up to 0.5 mile away from that area of direct impact. *See* 2017 BiOp, 22, 33; 2018 BiOp 29, 43. In both biological opinions, FWS erred by assuming MCI would only be impacted in the limited area near Cochran’s Cave even though it lacked evidence to support that assumption. If FWS is going to reissue approvals for ACP, it must fully account for impacts to MCI. The best available science indicates MCI may be impacted across the 1,974 surface acres of habitat where their presence is assumed and within a 0.5-mile buffer of that linear surface-acre area.

Once properly accounting for the full extent of impacts to MCI from ACP, FWS must put those impacts into context in its jeopardy analysis. To properly account for the “status of the species” and “environmental baseline,” FWS must consider these impacts in light of ongoing effects on the species. These include impacts authorized in the NiSource Multi-Species Habitat Conservation Plan, which used similar analysis to determine that MCI could be affected across a 48,640-acre subsurface area. FWS must determine if these (and other) impacts cumulatively will jeopardize the species.

VI. To Avoid Jeopardy, ACP Should Avoid Clubshell Habitat

When developing a biological opinion, FWS is required to use “the best scientific and commercial data available.” 16 U.S.C. § 1536(a)(2). “The agency is not required to conduct new studies when evidence is available upon which a determination can properly be made.” *Defs. of Wildlife*, 931 F.3d at 345. But FWS can request “new studies when available data is inadequate to prepare a BiOp and render a jeopardy determination.” *Id.*

FWS should do so here. Its 2018 BiOp relied on outdated data, and by FWS’s own admission the clubshell “recovery plan ... is out of date.” *Id.* at 358 (*quoting* 2008 Five-year Review for Clubshell). Instead of again using outdated data in its jeopardy analysis, FWS should request that FERC provide the information it needs to accurately assess jeopardy for clubshell. At a minimum, FWS should wait until the clubshell’s currently ongoing five-year review process concludes and use that data in its analysis. FWS initiated a five-year review for clubshell in August 2018 and presumably that process is coming to a close. *See* 83 Fed. Reg. 39,113 (Aug. 8, 2018). In other words, updated data is nearly at FWS’s fingertips. It should not expedite its approvals yet again to satisfy the demands of ACP’s developers when it can easily wait to use this new data in its analysis.

If FWS refuses to wait for this current data, the best available data for assessing whether ACP may jeopardize the clubshell is the rangewide 2008 Five-year Review for the species and the 2018 clubshell salvage results from Hackers Creek. This data shows ACP may jeopardize the species. ACP should be rerouted outside clubshell habitat to avoid that outcome.

According to the 2008 Five-Year Review, of “100 streams once known to be occupied by [clubshell], the species is now limited to 13 extant populations occupying 21 streams.” Five-year Review, 11. As of 2008, “[o]nly seven clubshell populations show evidence of reproductive success.” *Id.* at 15.¹⁸ The “species continues to decline in half of the streams where it was present when listed as endangered in 1993.” *Id.* And while some populations are more extensive, they “do not compensate for the declining populations and lost habitat elsewhere in the clubshell’s range.” *Id.*

Specifically, as of 2008 FWS considered populations only in the following six stream reaches to be “stable”: Tippecanoe River, Green River, Allegheny River, French Creek, LeBoeuf Creek, and Elk River. *Id.* at 21-22.¹⁹ Populations in other streams were either declining, failed to show evidence of recruitment, or both, with the exception of the Middle Branch, North Fork Vermillion River where FWS only indicated that “1 live young individual [was] found in 1998.” *Id.* If the species has declined from 100 to six stable populations, it is on the brink of extinction.

FWS’s 1994 Recovery Criteria required establishment of viable populations in ten separate stream reaches to downlist the species from endangered to threatened and permanent protection of those populations (among other things) to delist the species. Eight of those stream reaches were specifically named and two were to be named later, though FWS never completed that step. Because FWS concedes that its recovery criteria are outdated, it should revisit which streams should be protected. To be clear, FWS should revisit *which* specific streams should be protected, not the *number* of streams. If establishment of viable populations in ten stream reaches was necessary to downlist the species in 1994, it is all the more necessary to establish *at least* ten viable populations now given the continued decline of the species. If anything, FWS should consider designating and protecting more than ten populations. But at a minimum, FWS should reassess and name which ten populations must be protected to ensure species survival and recovery.

By all accounts, the Hackers Creek clubshell population should be one of the protected populations. FWS assumed the species was in severe decline, but best available data collected in 2018 shows that to be untrue. FWS expected to find 19 or fewer individual clubshell in Hackers Creek but salvage efforts uncovered 68. 2018 BiOp, 21. FWS believed clubshell were limited to a 585-meter reach but, upon taking a closer look, determined the population extended 7.6

¹⁸The 2008 Five-year Review contradicts itself on this point. It states that a reproducing population has been documented in the East Fork West Branch St. Joseph River, Five-year review, 4, but also states that there is “no recruitment documented” in that stream, *id.* at 21. In 2010, the Columbus Zoo was awarded a FWS grant specifically to study “causative factors for absence of recruitment in the East Fork West Branch St. Joseph River population of clubshell.” See <https://www.fws.gov/midwest/news/230.html>. It therefore seems likely that this population is not reproducing.

¹⁹ Introduction of round gobies is threatening clubshell populations in French Creek and LeBoeuf Creek suggesting these populations may no longer be stable. See Jeff Mulhollem, Invasive round gobies may be poised to decimate endangered French Creek mussels, *Penn State News* (April 1, 2019) available at <https://news.psu.edu/story/566496/2019/04/01/research/invasive-round-gobies-may-be-poised-decimate-endangered-french>.

kilometers upstream. *Id.* at 22. Most importantly, the expert malacologist conducting 2018 clubshell salvage efforts in Hackers Creek determined that “[t]hough no sign of reproduction via observation of juvenile clubshell were observed, *the population appears to be stable.*” See Environmental Solutions & Innovations, Inc., “Clubshell (*Pleurobema clava*) salvage efforts in association with U.S. Fish and Wildlife Service Biological Opinion on Hackers Creek, Lewis County, West Virginia,” 2 (Aug 21, 2018) (emphasis added). The malacologist further concluded that “[t]his bodes well for the future outlook of the species in Hackers Creek.” *Id.*

As of 2008, best available science indicated stable populations of clubshell in six stream reaches, too few to meet the objective of protecting viable populations in ten stream reaches for species downlisting or delisting. A stable population has now been documented in Hackers Creek. FWS must prioritize protection of this population to avoid jeopardizing the species. That requires eliminating impacts to the population from ACP construction, accomplishable by suggesting a reasonable and prudent alternative of rerouting the pipeline out of the Hackers Creek watershed. Clearing trees in the watershed without trenching construction has already resulted in turbidity increases in Hackers Creek. There is no way to construct a pipeline through this watershed and terrain without causing significant sedimentation resulting in widespread harm to the population.

Finally, we note that FWS may not use a Section 10(a)(1)(A) permit, as has been issued to the White Sulphur Springs National Fish Hatchery for the purpose of recovering clubshell from Hackers Creek, to capture and physically relocate a species in an effort to escape a jeopardy determination. Section 10 permits must “not operate to the disadvantage of [] endangered species, and [must be] consistent with the purposes and policy” of the ESA. 16 U.S.C. § 1539(d). Using a Section 10 permit to avoid a jeopardy determination by taking a species out of its habitat and putting it in captivity clearly operates to the disadvantage of the species, specifically allowing habitat degradation. It also would be inconsistent with the ESA’s objective of conserving “ecosystems upon which endangered species...depend.” *Id.* § 1531(b). If FWS determines an action would jeopardize a species, it has three options: “either terminate the action, implement [a] proposed alternative, or seek an exemption from the Cabinet-level Endangered Species Committee pursuant to 16 U.S.C. § 1536(e).” *Nat’l Ass’n of Home Builders*, 551 U.S. 644, 652 (2007). Obtaining a Section 10 permit to conveniently move a species out of the way is not one of those options.

In sum, FWS’s obligation here is clear. It must propagate clubshell at the White Sulphur Springs National Fish Hatchery in accordance with its Section 10 permit, return those clubshell to Hackers Creek, and protect the population from ACP construction by suggesting a reasonable and prudent alternative to jeopardizing the species – rerouting the pipeline out of clubshell habitat.

VII. ACP Must Avoid Rusty-Patched Bumble Bee Habitat

There is no question that the rusty-patched bumble bee is on the brink of extinction and exists in a state of jeopardy. “The species is likely to be present in only 0.1% of its historical range.”²⁰ As confirmed by FWS in litigation over the 2018 BiOp, the bee “is so imperiled that *every remaining population* is important for the continued *existence* of the species.” FWS Br. 12 (Case No. 18-2090; 4th Cir) (ECF No. 95) (emphasis added).²¹ “[W]here baseline conditions already jeopardize a species, an agency may not take action that deepens the jeopardy by causing additional harm.” *Nat’l Wildlife Fed’n*, 524 F.3d at 930. Accordingly, the species’ September 2018 Recovery Outline, calls for avoiding all impacts “that may (1) result in mortality or injury to rusty patched bumble bee; (2) reduce reproduction or recruitment of young into populations; (3) increase stress to remaining individuals in the wild; or (4) alter habitat such that survival and reproduction is reduced.” FWS, Rusty-patched bumble bee Recovery Outline (September 2018), 7.²²

FWS’s 2018 BiOp unmistakably establishes that constructing ACP through rusty-patched bumble bee habitat will cause all of those impacts. Entire nests of rusty-patched bumble bees “are expected to be crushed by machinery during vegetation removal and construction.” 2018 BiOp, 41. “[R]oad widening and culvert replacement will crush any nests or queens overwintering along the access roads.” *Id.* at 42. “[T]he loss of reproductive individuals may reduce the success of future matings and the success of future colonies.” *Id.* at 56. ACP will “render habitat temporarily and permanently unsuitable.” *Id.* at 41. It will also cause a loss of floral resources which “will result in reduced survival and reproduction of some queens.” *Id.* at 42. There will be “injury or death of individual worker[.]” bees. *Id.* at 55. And other rusty-patched worker bees “may experience reduced health as a result of the decrease in food availability” caused by the project. *Id.* at 55-56.

FWS may not authorize those impacts because they will deepen rusty-patched bumble bee jeopardy by causing additional harm. The agency must instead propose a reasonable and prudent alternative to avoid jeopardy – rerouting the pipeline out of rusty-patched bumble bee habitat.

Even if FWS could authorize some impact to rusty-patched bumble bees generally, it cannot here because of the importance of the impacted population. FWS’s rusty-patched bumble bee Recovery Outline concludes that “[*e*]specially critical is the protection of rusty patched bumble bee sites where reproduction is known to still occur or which contain larger numbers of the species.” Recovery Outline, 7 (emphasis added). The population impacted by the ACP is the best example of that type of population currently known to exist anywhere.

²⁰ See <https://www.fws.gov/midwest/Endangered/insects/rpbb/>.

²¹ See also FWS, Survey Protocols for Rusty Patched Bumble Bee (Feb. 28, 2018) available at <https://www.fws.gov/midwest/endangered/insects/rpbb/pdf/SurveyProtocolsRPBB28Feb2018.pdf>.

²² https://ecos.fws.gov/docs/recovery_plan/RPBB%20recovery%20outline_signed_1.pdf.

Survey data collected this summer and attached as Exhibit D further confirms the importance of this population. The impacted population occupies a larger geographic area than FWS assumed in its 2017 and 2018 analyses and contains “larger numbers of the species” than previously determined. Notably, the new findings also confirm that pipeline construction will impact the bee in areas not previously assessed by FWS – pipeline construction is likely to cause more widespread impacts to the species than disclosed in previous analyses. The population has now been documented for three consecutive years, indicating it is successfully reproducing. As FWS knows, many presumed existing populations of rusty-patched bumble bee have not been re-confirmed since the early 2000s and may no longer exist. In the last decade, reproductive success over three consecutive years has only been documented in twelve rusty-patched bumble bee populations; the population impacted by ACP is one of those populations. *See Ex. D, 11.* The eleven other populations are all located in the Midwest. *Id.* The fact that the population in the path of the ACP is well outside the bulk of the species’ known range in the Midwest provides insurance against stochastic and catastrophic events, such as droughts or extreme temperatures, that could single-handedly decimate populations in that region. By any measure, the impacted population is one of the best remaining “sites” of rusty-patched bumble bees in the world, making its protection “especially critical” to preventing species extinction. It is “of global significance in our efforts to prevent extinction of this species.” *Id.* “[I]ncidental take of [rusty-patched bumble bees] in this population [should] be avoided at all costs.” *Id.*

FWS must suggest a reasonable and prudent alternative of rerouting ACP out of rusty-patched bumble bee habitat to avoid impacting the species. If ACP’s developers are unhappy with that outcome, they may seek further relief from the Endangered Species Committee pursuant to 16 U.S.C. § 1536(e). But FWS is not at liberty to ignore all of its prior findings to force a no-jeopardy determination for this project. The pipeline must be moved.

That does not mean that the pipeline cannot be constructed. As part of our summer 2019 survey effort, we also assessed the potential distribution of rusty-patched bumble bees in Virginia and West Virginia. The analysis does not indicate actual rusty-patched bumble bee presence or absence, but only shows areas where rusty-patched bumble bees are theoretically more or less likely to be found. That analysis shows that “alternate pipeline routes that would have a lower chance of impacting the species might be found along the VA/WV border both north and south” of the proposed route. *See Ex. D, 10.* These are logical areas to consider a reroute to avoid jeopardizing the species.

Finally, to the extent FWS continues to rely on high potential zone models to assess impacts to rusty-patched bumble bee, the summer 2019 observations, like the 2018 observations, again demonstrate the insufficiency of that model in this landscape to predict range. Although the model purports to show an area outside of which rusty-patched bumble bees are unlikely to be found, multiple rusty-patched bumble bees have been documented outside these high potential and primary dispersal zones – both the initial 2017 versions and the expanded 2018 versions created as a result of additional bee findings. If FWS is going to continue using this model in the

southern Appalachians, it must be revised with an explanation of why it can more accurately predict rusty-patched bumble bee populations. As applied to ACP, the model should be used to delineate those areas where rusty-patched bumble bee presence is unlikely and thus can accommodate a rerouted pipeline.

If I can answer questions about our concerns or provide any additional information, please let me know.

Sincerely,



Patrick Hunter

cc (email only):

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Exhibit A



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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In Reply Refer To:
FWS/Region 5/ES

APR 12 2019

Ms. Kimberly Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, D.C. 20426

Attn: James Martin, Branch Chief

Re: Mountain Valley Pipeline, LLC; Docket Number CP16-10-000; Project #05E2VA00-2016-F-0880 and #05E2WV00-2015-F-0046

Dear Ms. Bose:

On November 21, 2017, the U.S. Fish and Wildlife Service (Service) provided you with a non-jeopardy biological opinion (Opinion) based on our review of the referenced project and its effects on the federally listed endangered Indiana bat (*Myotis sodalis*) and Roanoke logperch (*Percina rex*) and the threatened northern long-eared bat (*Myotis septentrionalis*), small whorled pogonia (*Isotria medeoloides*), and Virginia spiraea (*Spiraea virginiana*) in accordance with Section 7 of the Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA).

The Federal Energy Regulatory Commission (FERC) has not requested reinitiation of consultation on the referenced project; however, FERC requested that the Service provide a list of questions and information/data needs to assist FERC and the Service in determining how best to proceed under the ESA regarding certain activities related to the Mountain Valley Project (MVP). The questions and information/data needs are provided below by topic. Please do not include the information regarding landslide conditions provided by Mountain Valley Pipeline, LLC to FERC on March 29, 2019.

Sediment Analysis

- Conduct and provide an analysis of the efficacy of MVP's current Erosion & Sediment (E&S) Control Plan to estimate past/current/future effectiveness of the plan. This plan serves as the foundation of any current/future sediment analysis.
- Conduct and provide additional sediment analysis as outlined in the October 23, 2018, email and associated attachment (enclosed) from Dr. Paul Angermeier, Assistant Unit Leader, U.S. Geological Survey Virginia Cooperative Fish and Wildlife Research Unit.
- Coordinate with U.S. Forest Service to determine what additional sediment analysis may be requested from MVP in response to the *Sierra Club, Inc. v. United States Forest Service*, 897 F.3d 582 (4th Cir. Jul. 27, 2018) Opinion. Provide any additional sediment analysis, including assumptions and methods used in the analysis.
- Conduct an analysis of, and provide copies of any other available/readily obtainable sedimentation model data from any source that addresses concerns about implementation and efficacy of sediment and erosion control measures. Especially useful would be any data regarding effects on aquatic species.

- Describe, in detail, any failed E&S controls or slips that resulted in any additional effects to any listed species or their habitat that were not analyzed in the November 21, 2017, Opinion. Include, at a minimum, the location, extent, and duration of the action (provide GIS shapefiles) and an analysis of effects to each listed species.

Candy Darter (*Etheostoma osburni*), federally listed endangered with proposed critical habitat)

- In Virginia, Stony Creek is occupied by candy darter and is proposed as critical habitat for candy darter. No instream work is proposed for the crossing of Stony Creek; the proposed crossing method is conventional bore. Provide additional review of the geotechnical analysis by a qualified individual to verify that the potential risks of the conventional bore technique are as minimal as described in the July 25, 2018, memorandum entitled “Stony Creek Bore Crossing, Summary of Electrical Resistivity (ER) Study,” from Billy Newcomb, Draper Aden Associates to Megan Stahl, MVP.
- MVP was provided candy darter location/survey data from the West Virginia Division of Natural Resources that was not included in FERC’s February 14, 2018, request to the Service for formal conference on the candy darter. Update the February 14, 2018, “Species Assessment to Address Potential Impacts to the Candy Darter” to include any available new information and analyses and provide to the Service.
- Using the information obtained under “Sediment Analysis” above, provide an analysis of effects to candy darter and its proposed critical habitat.

Roanoke Logperch (RLP)

- Provide confirmation that time-of-year restrictions for RLP as described in FERC’s MVP and Equitrans Expansion Project FEIS (2017) and BA (2017) for MVP and analyzed in the 11/21/2017 Opinion will continue to be implemented. If time-of-year restrictions will not be adhered to, provide an explanation of the reason, a detailed description regarding the time of year that project activities are proposed to occur, and an analysis of effects to RLP.
- Using the information obtained under “Sediment Analysis” above, provide an analysis of effects to RLP. Using the results of this analysis, provide an explanation as to whether effects to RLP from upland sedimentation were considered in the November 21, 2017, Opinion.

Indiana Bat/Northern Long-eared Bat

- Provide acres of tree removal and time of year the tree removal occurred within each bat habitat category (as defined in the November 21, 2017, Opinion) to date (e.g., X acres of unknown spring staging habitat was cleared in the month of X). Also provide this data as GIS shapefiles.
- Provide confirmation that time-of-year restrictions for tree clearing as described in FERC’s MVP and Equitrans Expansion Project FEIS (2017) and BA (2017) for MVP and analyzed in the November 21, 2017, Opinion will continue to be implemented. If time-of-year restrictions will not be adhered to, provide an explanation of the reason, a detailed description regarding the time of year that project activities are proposed to occur, and an analysis of effects to each bat species.
- Describe, in detail, any failed E&S controls or slips that resulted in any additional effects to bats or their habitat that were not analyzed in the November 21, 2017, Opinion. Include, at a minimum, the location, extent, and duration of the action (provide GIS shapefiles); the bat habitat category; and an analysis of effects to each bat species.
- Explain whether the slip/restoration estimates that MVP provided to the Service via email on December 2, 2018, include acreage amounts for future slip repair work. Provide a detailed explanation of how that amount was estimated and an analysis of effects to each bat species.
- Describe, in detail, additional bat habitat within each habitat category that will be impacted as a result of restoration work not analyzed in the November 21, 2017, Opinion. Include, at a minimum, the location, extent, and duration of the action (provide GIS shapefiles); the bat habitat category; and an analysis of effects to each bat species.

- Provide an analysis of how the results of MVP's Acoustic Bat Study Annual Report for PS-WV3-Y Mines, Greenville Saltpeter Cave, Canoe Cave, and Tawney's Cave, dated January 30, 2019, change any of the assumptions/determinations made in the November 21, 2017, Opinion.

Small Whorled Pogonia (SWP)/Virginia Spiraea (VASP)

- Provide an updated determination of effects to SWP since all surveys have been completed and no SWP was identified.
- Describe, in detail, any failed E&S controls or slips that resulted in any additional effects to SWP or VASP or their habitat that were not analyzed in the November 21, 2017, Opinion. Include, at a minimum, the location, extent, and duration of the action (provide GIS shapefiles), and an analysis of effects to each plant species.
- Describe, in detail, the amount of suitable SWP/VASP habitat that will be affected by restoration activities (provide GIS shapefiles) that was not analyzed in the
- November 21, 2017, Opinion and an analysis of effects to each plant species.

Stream Crossings/Route Alterations

- Provide confirmation that stream crossing locations and methods and route alignments and associated facilities, as described in FERC's MVP and Equitrans Expansion Project FEIS (2017) and BA (2017) for MVP and analyzed in the November 21, 2017, Opinion, have not changed and will continue to be implemented. If locations, methods, and/or alignments will not be adhered to, provide an explanation of the reason, a detailed description regarding the revised location, method, and/or alignment proposed, and an analysis of effects to each species analyzed in the November 21, 2017, Opinion.

Other Listed Species (species in the BA (2017) for MVP and the August 4, 2017 letter from the Service to FERC for which a "may affect, not likely to adversely affect" determination was made)

- Using the information obtained under "Sediment Analysis" above, provide an explanation of any change in effects analyzed for each of these species. If there is a change in effect to any species, indicate the revised Section 7 determination and the basis for that determination.
- Describe, in detail, any failed E&S controls or slips that resulted in any additional effects to these species or their habitats. If there is a change in effect to any species, indicate the revised Section 7 determination and the basis for that determination.
- Describe, in detail, if any of these species or their habitat will be affected by restoration activities (provide GIS shapefiles). If there is a change in effect to any species, indicate the revised Section 7 determination and the basis for that determination.

The Service requests that all responses and related information/data be provided to:

Spencer Simon
Deputy Assistant Regional Director, Ecological Services
U.S. Fish and Wildlife Service
300 Westgate Center Drive
Hadley, MA 01035-9589
Phone 413-253-8578
Spencer_simon@fws.gov

John Schmidt
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Cindy Schulz
Field Office Supervisor
Virginia Ecological Services
U.S. Fish and Wildlife Service
6669 Short Lane
Gloucester, VA 23061
Phone 804-824-2426
Cindy_schulz@fws.gov

If you have any questions regarding this request or our shared responsibilities under the ESA, please contact Kyla Hastie, Assistant Regional Director, Ecological Services at 413-253-8304 or via electronic mail at Kyla_Hastie@fws.gov.

Sincerely,



Kyla Hastie
Assistant Regional Director
Ecological Services

ACTING

Enclosure

cc: Corps, Norfolk, VA (Attn: William Walker)
FERC, Washington, DC (Attn: Paul Friedman)
USFS, Atlanta, GA (Attn: Timothy Abing)
USFS, Roanoke, VA (Attn: Jennifer Adams)
VDACS, Richmond, VA (Attn: Keith Tignor)
VDCR-DNH, Richmond, VA (Attn: Rene Hypes)
VDGIF, Richmond, VA (Attn: Ernie Aschenbach)
WVDNR, Elkins, WV (Attn: Cliff Brown)
MVP, Pittsburgh, PA (Attn: Joseph Dawley)
MVP, Pittsburgh, PA (Attn: Megan Stahl)

From: [Angermeier, Paul](#)
To: [Cindy Schulz](#); [Troy Andersen](#); [Hoskin, Sumalee](#)
Subject: [EXTERNAL] MVP impacts on RLP
Date: Tuesday, October 23, 2018 10:46:09 AM
Attachments: [Angermeier comments on BO re MVP impacts on RLP.docx](#)

Dear Cindy, Troy, and Sumalee,

With all the recent renewed scrutiny of MVP environmental impacts, including some permits being vacated and/or revised, I decided to take a close look at the Roanoke Logperch portion of the BO you submitted to FERC on 21 Nov 2017. I did not see (and was not asked to review) the BO before it was submitted. The BO clearly represents a TON of work, which I imagine had to be done in a painfully short timeline and under significant duress. However, I've identified several important shortcomings (see attached) that I believe led to significant underestimates of potential MVP impacts on RLP, as summarized in the BO. More importantly, the BO does not require implementation of a monitoring protocol that can provide scientifically credible estimates of RLP take, whatever that turns out to be.

I don't know if my comments can be put to any particular use, as I'm unfamiliar with your political and bureaucratic constraints in the context of managing potential environmental impacts on RLP. Perhaps my comments and the BO are moot at this stage of the MVP project. Alternatively, perhaps you will have upcoming opportunities to re-engage with MVP proponents regarding impact monitoring and assessment – this is my hope. Or perhaps my comments can be useful in your management of the Atlantic Coast Pipeline, which I expect to have similar environmental impacts.

In any case, I welcome the opportunity to discuss my comments and/or their implications if you think that would be helpful.

Sincerely,
Paul

Paul L. Angermeier
Virginia Cooperative Fish and Wildlife Research Unit
Dept. of Fish and Wildlife Conservation
Virginia Tech
Blacksburg, VA 24061-0321
Phone: 540-231-4501; Fax: 540-231-7580

Angermeier Comments on RLP Portion of MVP Biological Opinion

Partial list of acronyms used below

BO – Biological opinion
 FERC – Federal Energy Regulatory Commission
 MVP – Mountain valley pipeline
 RLP – Roanoke Logperch
 ROW – right-of-way
 RFRP – Roanoke River Flood Reduction Project
 RUSLE – revised universal soil loss equation
 SWAT – Soil and water assessment tool
 TOYR – time-of-year restriction
 USACE – U.S. Army Corps of Engineers
 USFWS – U.S. Fish and Wildlife Service
 VAFWIS – Virginia Fish and Wildlife Information Service
 VDGIF – Virginia Department of Game and Inland Fisheries

Fine-sediment impacts on RLP

Excess fine sediment in streams/rivers is presumably a primary cause of imperilment and a primary obstacle to recovery for RLP. Specific mechanisms of impact are largely unknown; impairment of foraging is anecdotally expected. However, excess fine sediment probably adversely affects *all* RLP life stages, including eggs, larvae, juveniles, adults, and spawners. Sediment effects on RLP reproduction, growth, and survival – the main components of fitness – are cryptic and uncertain because they remain unstudied. Even so, most of the risks to RLP listed on page 9-10 of the BO (eg, dams, urbanization, agriculture, silviculture, channelization, roads, riparian loss) are linked by their contributions to sediment mobilization from offstream sources and/or deposition on stream/river bottoms.

Overall, sediment-loading to streams/rivers must be considered – and managed as – a widely dispersed, chronic, incremental, and catchment-wide threat to RLP status and recovery. Although quantitative relationships between sediment-loading and habitat suitability or between habitat suitability and RLP abundance have not been developed, any additional sediment-loading is inherently problematic for persistence of RLP populations. Moreover, impacts of fine sediment can be managed *only* via preventative measures; very few management options exist after sediment enters waterways.

The MVP's *primary* potential impact on RLP is additional sediment-loading to streams/rivers relative to present conditions. The MVP ROW is by far the greatest potential source of additional sediment; another significant potential source is new and/or improved access roads, especially where grading and/or culvert installation are involved. The threat of additional sediment-loading is especially high during the construction phase but will remain significant throughout the restoration and maintenance phases until/unless highly effective sediment-control measures are implemented. To my knowledge, credible estimates of additional sediment-loading (temporary or permanent) from any of these sources have not been developed.

Additional sediment-loading – and its concomitant effects on RLP – will *undoubtedly* occur because of the MVP. Crucial unanswered questions germane to this impact include: a) how much additional sediment will be loaded? b) where specifically will sediment be loaded? c) over what timeframes (seasonal and annual) will sediment be loaded? d) how effective will proposed sediment-control measures be? e) how will additional sediment-loading affect RLP habitat suitability? and f) how will alterations in habitat suitability affect RLP distribution, abundance, and population structure? I have not thoroughly reviewed the thousands of pages of documents submitted by MVP proponents regarding asserted environmental impacts and/or mitigation, but none of the documents I have seen address these questions in sufficient detail to assess objectively the likely impacts of the MVP on RLP. Such an assessment would need to be based on well designed pre-construction surveys and spatial modeling, followed by well designed post-construction monitoring and spatial modeling. Further, to be credible, this assessment would need to be conducted by an independent agent who lacked conflicts of interest in appeasing proponents of the MVP. I offer additional comments on monitoring needs below.

In general, analysis of sediment-loading is complex, requiring attention to a suite of catchment-wide components such as uplands, riparian zones, ephemeral channels, and perennial streams. Key features affecting sediment-loading include land cover, topography, soil type, streambank stability, and precipitation. Because of the cumulative downstream direction of sediment-loading, instream conditions observed at any given point reflect the integration of offstream and instream conditions at many other points (some remote) upstream. Thus, observed local impacts to reaches occupied by RLP could originate from many areas upslope or upstream in the catchment. Fortunately, there are multiple, widely available, standardized tools designed to estimate soil loss (eg, RUSLE) or sediment-loading (eg, SWAT), which can be used to characterize spatial variation, identify likely hot-spots, and assess efficacy of sediment-control measures. Sediment estimates can be derived for specific source areas (eg, sections of ROW) or for entire catchments to reflect cumulative effects. However, to my knowledge such analyses have neither been performed by MVP proponents nor requested in the BO. Thus, current assessments of MVP impacts on RLP seem to be based on little more than vague assertions and expert guesses. Alternative approaches to impact assessment are needed to inform management choices.

Underestimating RLP take

In developing the BO, several analytical choices were made that seem to significantly underestimate potential impacts of the MVP on RLP. Below, I outline key weaknesses of four of these choices.

Narrow spatial focus on MVP crossings of five RLP streams

Although the MVP ROW encompasses dozens of perennial-stream crossings, many more (not estimated) ephemeral-channel crossings, and hundreds of acres of severely disturbed land within the geographic range of RLP, the analysis presented in the BO focuses narrowly on five stream/river crossings where RLP are likely to occur (Bradshaw Creek, Harpen Creek, North Fork Roanoke River, Roanoke River, and Pigg River). Sediment-loading impacts were assumed to extend for only 1 km at each crossing (200 m above and 800 m below). Based on stream/river lengths, these 5 km represent “0.32% of the total RLP potential habitat in the Roanoke River basin”. This narrow site-specific focus greatly underestimates the overall potential contribution by the MVP to additional sediment-loading in RLP catchments and reaches. In short, the BO over-emphasizes the risk to RLP posed by the take of individuals trapped behind cofferdams but under-emphasizes the risk to RLP posed by catchment-wide sediment-loading.

I suggest replacing the sediment-impact protocol described in the BO with one that more fully engages the scientific knowledge and tools available for assessing sediment impacts. A more instructive and reliable protocol for estimating sedimentation impacts would a) recognize that the *entire lengths* of the ROW and any new or improved access roads are potential sources of significant additional sediment; b) use models to estimate how much sediment will be mobilized from those sources; c) map the juxtaposition of sediment sources (in terms of water flow-paths) to all riparian zones, ephemeral channels, and perennial streams in RLP catchments; d) use a reasonable flow-attenuation factor to estimate how much of the initially mobilized sediment will eventually reach perennial streams over a 3-year timeframe; and e) assume that all additional sediment entering any perennial streams in RLP catchments will eventually enter (and adversely affect) RLP reaches. Such a protocol embraces the notion that sediment-loading to streams/rivers comprises widespread, diffuse, cumulative, and long-term processes. Moreover, I expect an analysis similar to that described above to show that far more than 0.32% of the RLP habitat in the Roanoke River basin will be adversely affected by the MVP.

The narrow focus on five stream crossings underpins the USFWS's decision to exclude certain MVP activities from consideration regarding their potential impacts on RLP. In particular, Table 3 shows that activities related to trenching, pipe stringing, regrading, and access roads were assigned NE or NLAA ratings. Although these activities intuitively seem likely to involve mobilization of additional sediment, they were excluded because they will be associated with cofferdams at stream crossings. However, these activities will extend far beyond stream crossings and are likely to contribute to additional sediment-loading (albeit dispersed), as discussed above. I suggest these activities be considered more fully as potential sources of additional catchment-wide sediment and included in the more comprehensive sediment-impact analysis described above.

The narrow focus on five stream crossings also underpins the BO's limited discussion of MVP impacts on RLP individuals and populations (page 33-34). The discussion implies the main impacts will be centered around stream crossings and cofferdams. However, given that significant additional catchment-wide sediment-loading is likely (as explained above), MVP impacts on RLP foraging and reproduction are likely to extend far beyond the focal stream crossings. Even incremental impairment of foraging could reduce growth, survival, and/or reproductive success of individual RLP, which could collectively threaten population persistence. RLP can disperse great distances (as described on page 13) but little is known about the spatial distribution of key source-habitats for recruitment. We do know, however, that catchment-wide processes influence local abundances. Thus, narrowly focusing on a few stream crossings produces a distorted assessment of the actual impacts of the MVP on RLP populations. That said, the severity and precise spatial distribution of such impacts is impossible to estimate without more specific knowledge of the spatiotemporal dynamics of sediment-loading from the MVP.

Under-estimates of RLP abundance

The BO applies a protocol that seems to under-estimate RLP abundance at and near focal stream crossings. For example, the abundance estimates for Bradshaw Creek, Halpern Creek, and Pigg River (page 15-16) are based on RLP occurrences documented in VAFWIS within a set fluvial distance from each crossing (6 km, 6km, and 24 km, respectively). Two important types of information – sampling

effort and RLP sizes – are missing from the BO’s analysis. Together, these omissions suggest the abundance estimates are unreliable.

The sampling extents of the specific collections that reported these occurrences are not described in the BO but it seems highly unlikely that the collections involved continuous, targeted surveys for RLP in all suitable habitat throughout the set fluvial distances. Rather, these collections probably are haphazardly located relative to all suitable habitat within the set fluvial distances and, so, represent only a small proportion of suitable habitat and the RLP living there. To provide meaningful estimates of RLP abundance near the stream crossings, counts from VAFWIS collections would need to be pro-rated to account for the area of suitable habitat actually sampled via a protocol targeting RLP. Other sampling protocols, such as those typically used in fish surveys, are likely to greatly under-estimate RLP abundance. Further, pro-rated counts of collected RLP would need to be extrapolated across all suitable habitat within the set fluvial distances from the crossings. I expect RLP abundance estimates calculated in this way to be much greater than those appearing in the BO.

The lengths of RLP reported in the VAFWIS collections are not described in the BO but it seems highly likely they were adults and/or subadults. Younger RLP (eg, larvae and young-of-year) live in different habitats and are rarely collected via standard fish-survey methods. Patterns of distribution and abundance of young RLP are scarcely documented but we do know their numbers swell each spring, probably reaching abundances at least 10 times those of adults. Further, suitable spawning habitat may occur in streams smaller than (but connected to) those where adults typically occur during post-spawning periods. Because young RLP are also sensitive to fine sediment, I suggest they not be ignored in assessments of MVP impacts. Thus, any estimates of the numbers of RLP likely to be affected by MVP activities should account for large seasonal pulses in abundances of young RLP.

On page 44, the BO describes reporting requirements for dead RLP “to enable the Service to determine if take is reached or exceeded”. Although dead specimens may be of interest in some contexts (eg, forensic investigations), they are poor indicators of take. The probability of finding a RLP killed via MVP activities is nearly nil except in fish-removal operations, which represent a tiny proportion of potential MVP impacts. Moreover, in my 29-year experience of working with RLP, I have never heard of anyone finding a dead young RLP, even though deaths of young RLP are certainly far more common than deaths of adults. Thus, reporting of dead RLP, even by competent searchers, is a sorely inadequate basis for assessing take. A more reasonable and reliable approach to assess take is to use a well designed scheme to regularly monitor habitat suitability and RLP abundance in areas downstream of MVP activities.

Under-estimates of MVP effects on RLP fitness

Several places in the BO suggest MVP impacts on RLP fitness (ie, reproduction, growth, and/or survival) have been under-estimated. For example, the BO recognizes in multiple contexts that increases in sediment/turbidity may impair RLP foraging and/or force them to “move to areas with cleaner substrate” (page 24), which “will cause decreased fitness to the majority of RLP that moved”. However, this view fails to mention two key aspects of such forced migration. First, foraging costs also apply to RLP living outside the newly degraded habitat, as they will need to share scarce food resources with the RLP migrants. That is, the migrants are not the only RLP that suffer MVP impacts on fitness. Second, impaired foraging does not mean that RLP simply get by with less food. Rather, impaired foraging for

individuals translates into reduced growth, survival, and reproductive capacity, which translates into reduced population density. Importantly, the degree of these impairments/reductions will remain unknown because no one is being required to measure them.

Further, the protective benefits of TOYRs are over-estimated. On page 34, the BO asserts “A TOYR ... to protect RLP during their spawning season will be implemented, which will minimize the potential for effects from sedimentation.” TOYRs are valuable but affect *only* the sediment mobilized during the (restricted) period of interest. Sediment mobilized during the rest of the year can still damage RLP habitat and reduce fitness during the year it is mobilized, as well as in subsequent years as it is transported through the ecosystem. Thus, TOYRs can minimize immediate direct effects of construction activities on RLP spawning and larval stages but TOYRs cannot address indirect and/or cumulative effects of MVP sediment-loading on a) young-of-year growth and survival, which is crucial to population persistence or b) general habitat suitability, including for spawning, in subsequent seasons and years.

Optimistic expectations for erosion/sediment control and ecosystem recovery

Multiple statements in the BO suggest an overly optimistic view of the efficacy of erosion/sediment control measures and the rates of ecosystem recovery following completion of MVP construction. For example, in discussing the potential impacts of instream structures (page 24), the BO states “After removal of structures and a return to baseline turbidity conditions, we anticipate that RLP will resume use of crossings.” Although no timeframe is specified, the wording implies that habitat recovery and resumed use by RLP will occur in <1 year – that is, within the lifespans of the migrants forced to leave because of reduced habitat suitability. However, instream sediment conditions need not return to baseline immediately after local additional sediment-loading stops. Sediment dynamics are complex and can take decades to return to baseline, especially if some additional sediment-loading continues indefinitely. For the MVP, such long-term sediment-loading seems certain, given the tree-clearing, trenching, and grading that has occurred along the ROW, including portions with steep slopes and highly erodible soils. Further, sediment mobilized in portions of RLP catchments upstream of RLP occurrences may easily take decades to find its way to RLP-occupied habitats. Finally, RLP population responses to MVP impacts are also highly complex and uncertain. In short, the timeframes for stream/river recovery from MVP impacts are impossible to estimate without clearer answers to the questions posed above (page 2 of this document): a) how much additional sediment will be loaded? b) where specifically will sediment be loaded? c) over what timeframes (seasonal and annual) will sediment be loaded? d) how effective will proposed sediment-control measures be? e) how will additional sediment-loading affect RLP habitat suitability? and f) how will alterations in habitat suitability affect RLP distribution, abundance, and population structure?

On page 24, the BO cites reports by MVP proponents to assert that erosion/sediment control measures “are anticipated to reduce surface water runoff and sedimentation, on average 79% sediment containment”. Given the steep slopes and erodible soils associated with much of the MVP ROW, this level of sediment containment seems intuitively unrealistic. I am very skeptical of this efficacy estimate, and my skepticism is supported by the MVP’s frequent violations of water-quality permits over the past few months (not to mention the many complaints by nearby landowners about offstream sediment deposition). Credible estimates of sediment containment would need to be based on models and/or field data representing site-specific sediment-loading and sediment-containment at stream crossings in

RLP catchments. This sort of science-based evidence of the efficacy of erosion/sediment control measures does not appear in the BO or any other MVP documents that I have seen.

Regardless of the eventual (and uncertain) timeframe for RLP recovery from MVP impacts, the BO should clarify that the RLP take associated with a months-long timeframe is likely to be much smaller than the take associated with a years-long timeframe, which would affect multiple reproductive seasons. Moreover, such differences in take have important implications for meeting the more general challenge of recovering RLP from its endangered status.

Conclusions section

Some conclusions asserted on page 38 of the BO seem unjustified relative to what is needed to advance general recovery of RLP. In particular, based on what is presented, “the potential for cumulative effects in the action area” was superficially assessed. Further, concluding that “These types of effects of the proposed action are not currently considered primary factors influencing the status of the species” seems to contradict the well-supported notions that a) the MVP’s primary potential impact on RLP is additional sediment-loading and b) excess fine sediment in streams/rivers is a primary threat to RLP.

Monitoring and reporting needs

Well designed monitoring and assessment protocols are the main scientific approaches to informing management decisions in the face of uncertainty. The potential impacts of the MVP on RLP involve many forms of uncertainty, with some potential impacts being severe enough to impede RLP recovery. Key uncertainties germane to RLP management include a) which MVP activities are most/least impactful; b) how MVP activities will affect instream habitat suitability; and c) how shifts in habitat suitability will affect RLP distribution and abundance. Relations among these factors are far too complex and uncertain to infer or assume outcomes based on what is now known about MVP activities. Even so, the BO frequently asserts “expected” or “anticipated” outcomes based on scant data or previous experience. These expectations apply to the extent and magnitude of impacts to RLP, as well as to rates and degrees of ecosystem recovery following MVP completion. Overall, this situation suggests a focused and effective monitoring plan is crucial protecting RLP. However, the monitoring and reporting requirements laid out for the MVP in the BO are sorely inadequate to assess potential impacts on RLP or to suggest informed modifications to MVP activities to better protect RLP. Below, I summarize key shortcomings of the proposed monitoring.

The BO’s main reference to monitoring is on page 7-8, including the following text: a) “environmental inspectors (EIs) will be employed to ensure that construction complies with construction and mitigation plans”; b) “a third-party compliance monitoring program will be funded to provide daily environmental monitoring services during construction”; and c) “monitoring of all disturbed upland areas will be conducted for at least the first and second growing seasons”. These monitoring efforts seem to be narrowly focused on upland disturbances within the ROW, with no attention paid to sediment transported out of the ROW (eg, into streams) or to its ecological consequences for habitat suitability or RLP populations. As described in the BO, the monitoring plan has no capacity to assess MVP impacts on a) instream habitat suitability for RLP or b) population responses of RLP, in terms of distribution and/or abundance. However, as explained above, these are the main ecological signals that need to be monitored to meaningfully assess MVP impacts on RLP.

A scientifically defensible assessment of potential MVP impacts on RLP – including acute, chronic, and cumulative effects – would include the following seven features: 1) spatiotemporal design amenable to before-after-control-impact analyses; 2) accurate characterization of pre-construction conditions to establish baselines; 2) spatiotemporal extent commensurate with the spatiotemporal extent of potential impacts and recovery (in this case, across multiple catchments and years); 3) monitoring frequency capable of detecting seasonal ecological responses; 4) dual focus on responses by instream habitat and RLP populations; 5) pre-determined criteria for what degrees of impact are acceptable; 6) pre-determined criteria for what degrees of recovery are acceptable; and 7) pre-determined procedures for altering MVP activities if unacceptable outcomes are observed. However, few of these features are clearly articulated in the BO. Page 44 alludes to “a RLP survey and habitat assessment at North Fork Roanoke River, Bradshaw Creek, Roanoke River, Pigg River, and Harpen Creek crossings 6 months the to assess the status of the RLP”, but too little information is provided to show that such data can be meaningfully interpreted to assess MVP impacts.

Another factor affecting the scientific defensibility of assessments is the choice of agents engaged to conduct monitoring and/or assessment. Page 44 of the BO implies that any “qualified surveyor(s) with a valid VDGI Permit” will suffice. However, I suggest that only independent agents (ie, those with no conflicts of interest to appease MVP proponents) are likely to produce objective, credible assessments. Further, I think it is unreasonable to expect USFWS to conduct (or pay for) the surveys and analyses needed to support reliable assessments of MVP impacts on RLP. However, it does seem reasonable for USFWS to request (require?) MVP proponents to pay for such work via independent agents.

The BO ignores the uncertainty associated with the effectiveness of potential restoration actions, thereby discounting the importance of monitoring their outcomes. Page 34 states “funds will be provided to continue and expand restoration efforts along the North Fork Roanoke River ... that tangibly benefits the RLP”. I certainly favor effective restoration efforts, but I know of no restoration study that shows ‘tangible benefits’ to RLP. The BO goes on to correctly state “restoration activities can provide a multitude of environmental and economic benefits including ... improved water quality; augmentation of habitat diversity; re-establishment of critical watershed functions; increased property and aesthetic values; and reduction of flood damages and riparian property loss.” Although all the mentioned benefits are plausible (and largely presumed), none can be measured or demonstrated without proper monitoring. To ensure restoration efforts are cost-effective, scientifically sound monitoring designs need to be set up *before* additional funds are invested in restoration actions. Such designs can ensure that restoration success is assessed objectively and that managers learn valuable lessons to apply to future restoration efforts. Finally, the BO offers a caveat: “the nature and extent of that benefit is not determinable at this time.” I agree, and suggest that benefits of restoration actions will never be ‘determinable’ unless proper monitoring of outcomes is implemented regularly.

Procedural issues

The main source of my experience with how potential impacts of large construction projects on RLP are assessed and managed is my 27-year engagement with the RFRP. Notably, I worked closely with the USFWS throughout the RFRP. Thus, I am puzzled by the striking differences in assessment approach adopted by the USFWS for of these two projects. In particular, the BO for the RFRP required the USACE

to monitor RLP abundance and habitat conditions for a multi-year period that included pre-construction, construction, and post-construction phases. However, my reading of the BO for the MVP suggests a much more lax approach regarding potential impacts on RLP, with minimal monitoring requirements and practically no statistical capacity to assess potential impacts. I think this disparity is unjustified, as the MVP is likely to a) affect more river km of suitable RLP habitat and b) cumulatively generate more additional sediment-loading. Although much of the MVP disturbance will occur farther from surface waters than the RRFRP disturbance, the steeper terrain of the former suggests the potential for greater erosion and transport of fine sediment, with much of it (basically not estimated) eventually entering riparian zones, ephemeral channels, and/or perennial streams. Thus, I am keen to hear the USFWS's rationale for the differences in their approach regarding these two projects.

I am also puzzled by why I was not consulted in any substantive way during the development of the BO for the MVP regarding potential impacts on RLP. Key advantages to engaging with me to help develop the BO include 1) my long history (35 yrs) of work on fish-habitat associations; 2) my long history (29 yrs) of RLP work, including 10 peer-reviewed papers; 3) my extensive experience monitoring potential impacts of construction on RLP; 4) my ongoing partnerships with the USFWS related to RLP conservation; 5) my recent work on relations between sediment-loading and instream habitat quality; and 6) my position as a federal scientist. In retrospect, I believe my involvement in developing the BO could have significantly improved its scientific foundation for assessing impacts of the MVP on RLP.

Document Content(s)

20190412_letter_Service to FERC_MVP.PDF.....1-13

Exhibit B



ATLANTIC COAST PIPELINE

PROJECT CALL LOG

MEETING WITH (COMPANY/AGENCY): U.S. Fish and Wildlife Service	PHONE NO.: Conference Call
COMPANY: USFWS; NC, WV, VA	
PROJECT CONTACT: Sara Thronson	PHONE NO.: 612-347-7113
DATE: 02-29-16	TIME OF CONVERSATION: 2:30 EST
ATTENDEES AND THEIR AFFILIATION:	
<p>John Ellis: USFWS North Carolina Field Office Sumalee Hoskin: USFWS Virginia Field Office Liz Stout: USFWS West Virginia Field Office Bill Scarpinato: Dominion Sara Thronson: Natural Resource Group, LLC (NRG) Tracy Brunner: NRG Maggie Voth: NRG Michael Fishman: NRG Prescott Weldon: NRG Kathleen O'Connor: NRG Zoe Bryant: NRG</p>	
RE: ACP Bat Survey Discussion	

LOG OF CONVERSATION:

Sara Thronson began the call by asking Bill Scarpinato to provide an update on the project. Bill described the approximately 95 mile reroute that will move the line out of the sensitive areas at Cheat, Back Allegheny, and Shenandoah Mountains. Sumalee asked for the shapefile of this new reroute and Sara explained that it went out February 2nd to Troy Anderson. Bill explained that Dominion has chosen to conduct two open houses the week of March 7th and e-mails and letters have gone out to the public concerning the reroute. There is a new county crossed, Bath County, Virginia.

Sara updated everyone on the status of the BA and explained that it does include results from 2015 surveys but does not include the reroute. The BA will be sent out March 1st for comments on conservation measures.

Sara provided a background on what was discussed in the face-to-face meetings in December and how project study plans have been developed. A series of questions specific to 2016 bat surveys, provided to each of the FWS points of contact prior to the meeting, were discussed. That list and responses are outlined below.

Available data:

Are all relevant MYSE records in respective Natural Heritage databases?

- VA: Yes, the VDGIF has up to date information on MYSE and a map of known maternity roosts and buffered hibernacula locations.
- NC: No, they will have a map up on the website soon once they get information from the DOT report.
- WV: Yes, Craig Stihler with WVDNR has all of the information.

Are potential or known maternity roost tree and hibernacula data available for each state outside of the Natural Heritage data?

- No, see response to first question.

Will clarification be provided for existing Natural Heritage data to specify whether existing records refer to species captures, maternity roosting trees, or hibernacula?

- VA: Yes, they do differentiate between potential and known roost trees.
- NC: Said they were uncertain; they have roost trees, but don't have maternity roosts marked
- WV: Said that only roost tree data no hibernacula data was available

No field surveys are **required** under the Final 4(d) Rule, but rather are recommended as conservation measures. If no take is anticipated (let's say we can limit clearing outside of the pup season, and we are not clearing any known maternity roosts or within 150 feet of same), is there still a recommendation for this conservation measure?

- Where only have MYSE: under 4(d) rule and Programmatic Biological Opinion, take is covered if avoid clearing during the pup season.
 - VA: Can't necessarily have NLAA determination
- VA: Yes, mist netting can be used as a conservation measure. VA encourages people to do mist net surveys, but if only have MYSE, survey is not needed. Surveys can be a voluntary conservation measure.
- NC: No field surveys are required under current regulations, but everything could change again if the current 4(d) rule is challenged in court. There has been some talk of the possibility of future lawsuits, and so the USFWS would caution project proponents that if the current rule is overturned in court, survey requirements will change.
- WV: Concurred with NC and VA responses.

2016 Survey Season:

Is additional mist netting in locations where the Project had positive acoustic hits in 2015 still recommended for MYSE based on the final (4d) rule?

- Yes

If we're still doing follow up net surveys for MYSO or state listed bats, and we have an incidental capture of MYSE, will radio-tracking be required?

- Yes, recommend to still do radiotracking.

The Project is proposing Phase 2 effort level mist netting survey in 2016 for sites with positive acoustic hits in 2015. Please confirm mist net sites resulting in no captures of an acoustically-detected listed bat species, will have a final presence determination for that site of negative (probable absence).

- New information from Robyn Niver confirmed that this is no longer possible. Once we have a positive acoustic hit we cannot negate it by conducting phase 2 mist netting. We will not be able to use netting to disprove an acoustic call but it can be used to reduce a buffer.
- The FWS said they will have to get back to us with recommendations for what kind of conservation measures that these mist nets surveys will account for. John Ellis said that mist net surveys are in our best interest because of the high profile of the project and the possibility of regulations changing in the future.

A follow-up question was posed: If no bats are captured during mist netting at a site where a positive acoustic hit was found, how does that affect buffers and conservation measures?

- For MYSO, the 5-mile buffer at the acoustic site remains. For MYSE there would be no buffer, but more discussion and follow-up by FWS was required.

WV Roost Tree Surveys:

How does the final 4 (d) rule affect roost tree surveys with respect to the WV mitigation requirements?

- Liz Stout said that we are technically only looking for MYSO now but we should look for both MYSO and MYSE because due to pending litigation, it may change in the future. They are only concerned with MYSE maternity (primary) roost. This will have an impact on what we mitigate for in our Myotis Bat Conservation Plan.

Are potential roost tree surveys still required within MYSE occurrence areas?

- Liz said no, but we should still do them.

If so, will the buffer distance on occurrences where roost tree surveys are required change (currently 3 miles for MYSE captures and 5 for MYSO captures)?

- Further discussion and follow-up by FWS was required.

Will primary and secondary roost tree definitions be retained for both MYSO and MYSE, and if so, will the definitions for MYSE change?

- The definitions will not change. However, they are only concerned with MYSE primary (maternity) roosts now, not secondary roosts.

WV: How does the final 4(d) rule change the requirements of the Myotis Bat Conservation Plan?

- As of now, they are only concerned with MYSO, but due to the risk of litigation, it was recommended to include MYSE now.

Take is assumed if clearing trees occurs within 0.25 mile of 'known hibernacula'; does this change the need or survey standards for potential portal surveys?

- Same standards in WV, no changes.

If we found a cave/mine that did have potential as a bat site (no records of bats there), would it be necessary to survey for MYSE presence? If yes, what would options be for determining presence/probably absence? What levels of survey would be adequate? Is following the current guidelines acceptable?

- Yes, follow the current survey guidance.

Can we use acoustics at entrance during fall/spring? Acoustics won't determine species, but could determine occupancy.

- Liz said that harp trapping would be needed, but would need to get back to us on the use of acoustics to narrow down the sites that required harp trapping.

How does the final 4(d) rule affect (or eliminate) the 3-mile "occupied habitat" buffers resulting from MYSE mist net captures and acoustic detections (Appendix C of the USFWS 2014 *Northern Long-Eared Bat Interim Conference and Planning Guidance*)? Will these still be used to determine habitat impacts?

- WV: The 3-mile buffers for MYSE go away. The updated maps have removed some of the buffers. WVDNR has the updated shapefile.

- VA: Maps buffer maternity roost trees by 150 feet; hibernacula are buffered by 5-mile buffer because of potential impacts to associated habitat.

Do the conservation measures in the *Northern Long-Eared Bat Interim Conference and Planning Guidance* relating to spring staging, fall swarming, and hibernacula still apply under the 4(d) rule (e.g., TOY restrictions for burning, clearing, and blasting)?

- No, the conference guidance should not be used anymore.

If a known roost tree is removed outside of the maternity season, should we notify Heritage so the record can be removed from the list?

- Yes, and notify both the FWS and Natural Heritage data keepers in the respective states.

An alternative review method was proposed for hibernacula in WV, based on a previous request to conduct pedestrian surveys within 1 km either side of the project route by WV FWS.

- In karst areas – survey 1 km on either side of the centerline
- In bat areas (as identified during acoustic surveys or previous data) – survey 0.25 mile on either side of the centerline
- In state-listed areas and the Monongahela National Forest – survey 1000 feet either side of the centerline

We asked Liz Stout if we could make our hibernacula surveys more efficient by concentrating pedestrian surveys as described above. She said that they have never allowed this in the past and that she would have to review our study plan and discuss with Barb Douglas before she made a decision.

Dominion will be starting acoustic surveys in NC the week of February 29, 2016.

FWS asked to clarify if telemetry studies would be done from roads and accessible tracts.

- Yes, surveys will be conducted where we have survey permission, including public roads.

Other topics briefly covered were:

- VA FWS said they would provide comments back on the eagle study plan on March 1.
- WV FWS said they also had comments they would provide on the eagle study plan, but those comments were only on the proposed monitoring.
- With respect to Fishing and Swift Creek, the NCFWS prefers drilling at sensitive streams. They inquired if geotech would be completed on streams where federally listed species may occur to prove that drilling could not be completed at the crossing. Sara explained that geotech is only completed on streams where HDD is proposed, therefore no geotech is planned at these streams.

USFWS Call, 2016 Bat Surveys

February 29, 2016

Page 6 of 6

ACTION ITEMS

ACTION REQUIRED:

Update study plans and follow up with FWS to determine how mist netting will be used as a conservation measure.

BY WHOM:

Prescott Weldon

cc:

Exhibit C



ATLANTIC COAST PIPELINE PROJECT MEETING MINUTES

MEETING WITH (COMPANY/AGENCY):

U.S. Fish and Wildlife Service (FWS), U.S. Army Corps of Engineers (USACE), Dominion, Environmental Resources Management (ERM), Dawson Associates (Dawson)

DATE:

November 29, 2016

LOCATION:

Staunton, VA

ATTENDEES AND THEIR AFFILIATION:

Live meeting:

Liz Stout, FWS West Virginia
Kim Smith, FWS Virginia
John Ellis, FWS North Carolina
Bill Hartwig, Dawson
Richard Gangle, Dominion
Spencer Trichell, Dominion
Colin Olness, Dominion
Tracy Brunner, ERM
Sara Thronson, ERM
Maggie Voth, ERM

Via Phone:

Sarah Nystrom, FWS Virginia
Troy Andersen, FWS Virginia
Sumalee Hoskin, FWS Virginia
Emily Wells, FWS North Carolina
Sarah McRae, FWS North Carolina
Samantha Dailey, Wilmington USACE
Steve Gibson, Norfolk USACE
Jennifer Broush, Dominion

PREPARED BY:

Maggie Voth

MEETING MINUTES:

Representatives from FWS, USACE, Dominion, ERM, and Dawson met to discuss the updated version of the Biological Assessment (BA) and Migratory Bird Plan (MBP) filed with FERC on October 20, 2016. The purpose of the meeting was to identify any informational gaps that the FWS needs to initiate consultation, as well as discuss any FWS concerns related to additional survey information provided in the updated BA.

FWS agreed to provide written comments on the October 20th BA draft by December 9th.

FWS stated that they have not been receiving updates from FERC and have not seen the administrative version of the DEIS. FWS asked that FERC add Troy Andersen and Liz Stout to the recipient list for FWS WV and FWS VA since John Ellis is the only FWS contact currently listed.

Project Schedule and Time-of-Year Considerations

The following Project schedule changes were discussed:

- Dominion explained that first-year construction tree clearing periods shifted to winter with the majority of clearing now planned for winter to avoid Migratory Bird Treaty Act (MBTA)

bird and bat time-of-year restrictions (TOYR). The updated schedule includes tree clearing starting in November 2017, though some areas were selected for potential early clearing starting mid-October.

- FWS stated that within Indiana bat hibernacula buffer areas, tree clearing would need to adhere to the TOYR, particularly in Randolph and Pocahontas Counties, West Virginia. FWS clarified that the clearing restriction applies to known use areas from Indiana bat captures and hibernacula, but does not apply to positive acoustic results with negative follow-up mist netting from Dominion surveys. All three FWS offices agreed that positive acoustics in 2015 and negative mist-netting in 2016 following the current range-wide Indiana bat summer survey guideline, would indicate unoccupied habitat. FWS requested that no out-of-season clearing be conducted near swarming areas (within 10 miles of Priority 1/2 hibernacula or 5 miles of Priority 3/4 hibernacula).

FWS requested additional clearing restrictions including the following:

- No grubbing or tree clearing between November 15 and April 1 within 50 feet of waterbodies located within 12-digit HUCs (subwatersheds) containing listed aquatic species. This request is not related specifically to a spawning period or species biology, but is intended to reduce runoff to sensitive waters outside the growing season and prevent erosion events in winter that could be detrimental to the 4 or 5 streams crossed with known mussel populations in North Carolina.
- Dominion explained that tree felling would occur in the winter months to adhere to TOYRs associated with migratory birds and bats, but the clearing and grubbing of these would occur later in the year (spring/summer) so this should not cause a concern.
- FWS agreed to provide a list of streams/waterbodies where this restriction would be applicable.

Additional Temporary Workspace and Erosion & Sedimentation Controls

The FWS requested a 300-foot buffer for workspace on sensitive streams and the following was discussed explaining that larger buffers can increase in-water work timeframes.

- Equipment and construction staging sites at stream crossings increases efficiency and allow construction to work quickly in the stream bed (and disturb the stream itself for less time).
- The FERC standard for waterbody buffer is 10 feet from spoil to edge of waterbody; a 300 foot buffer would mean stream materials need to be moved during construction and would lengthen the in-stream disturbance period. Pipe and other construction materials are stored 50 feet away, but the soil is closer.
- Dominion will adhere to all erosion and sedimentation (E&S) control requirements including FERC industry standards, E&S permitting, construction general permits for each state, and a best-in-class program.

- FWS would like more information on the E&S controls that will be used. Dominion requested that the FWS provide a list of the 12-digit HUCs and streams in North Carolina and Virginia where sensitive species may warrant additional E&S controls.
- FWS requested that a 3rd party monitor be on the ground during stream crossing work and potentially karst work, as well.

Ground disturbance near listed species is a concern for FWS and the following was recommended to address potential effects of soil disturbance along new access roads:

- Conduct a cumulative effect analysis on soil disturbance within sensitive subwatersheds
- Adding gravel to existing access roads is not considered a disturbance, however activities such as adding a culvert or widening a road should be included.
- Include a breakdown of the type of workspace and planned activities within each of the 12-digit HUCs.
- FWS requested that Dominion continue to look for opportunities to avoid and minimize disturbance, particularly in sensitive catchments.

Bald Eagle Permitting

The updated MBP describes two bald eagle nests falling within 660 feet of the project and one within a half-mile of proposed blasting areas in Augusta and Nottoway Counties and the City of Chesapeake in Virginia.

- Eagle nest at AP-3 MP 76.5 in the City of Chesapeake, Virginia currently falls in the project workspace. A route adjustment is being considered to increase the distance to the eagle nest to approximately 100 feet, or equal to the nest distance from the existing railroad, but adjustments to reach the recommended 330 foot and 660 foot buffers are limited due to the constraints in the area. Tree clearing and pipeline construction near this nest are proposed outside the eagle nesting season. FWS stated that an eagle disturbance permit may still be required despite the eagles already acclimatized to the railroad disturbance because the route adjustment here would leave the nest with the railroad on one side and pipeline on the other.
- Eagle nest near AP-1 MP 244.1 in Nottoway County, Virginia lies within 330 feet of the proposed Project. This nest is also within a half-mile of potential in-trench blasting and adjacent to Lees Creek. Noise studies related to in-trench blasting were refiled on November 17, 2016. FWS recommended an eagle disturbance permit for this nest site even if construction occurs outside of the nesting season.
- Eagle nest near MP 147.8 in Augusta County, Virginia is located approximately 1,800 feet from the project area, but within ½ mile of in-trench blasting. No permit would be required if blasting occurred outside of the nesting chronology for this nest. FWS recommended mitigation measures such as sound dampening to prevent blast noise from being at a disturbance level. FWS did recommend obtaining a permit to prevent a potential project delay by seeking a permit during construction.

The FWS stated that the migratory bird permit office will handle bald eagle permitting and it is anticipated that it will take 3-6 months or longer to obtain the permits. Bald eagle permits require NEPA and NHPA tribal coordination that could be expedited if the FWS could utilize the FERC documents or be a part of FERC's NEPA process if timing overlaps. Bald eagle permits need a copy of record of decision, with finalized NEPA process prior to eagle permit issuance. The VA FWS will review draft eagle permits prior to submittal to migratory bird office.

Migratory Bird Plan

- Per the VA FWS, Bald eagle no longer state-listed in Virginia, but it is protected.
- ERM completed aerial survey for stick-nests in March 2016. Resurvey along portions of line where eagles more likely to occur (coastal NC and eastern VA) may need to be considered prior to construction.

Specific comments provided by the FWS included:

- For other raptors and owls nests that are less visible from the air, FWS recommends ground survey to identify nests and species, since the wider range of species will also mean a wider range of nesting seasons. Raptors and owls nest early in winter; Dominion will need to avoid and minimize impacts to those species when clearing during that period. Nests in use cannot be cleared or disturbed; activity restrictions for nests located adjacent to the project would depend on species and its individual noise tolerance. In the worst case, the project would need to avoid an area during nesting season, if an occupied nest was found. Unoccupied nests can be blocked or removed, so long as no adults or young are present. It is also possible to “discourage” nesting by making the nest unsuitable.
- Provide the distance to disturbance for nests for owls and raptors, including nests within 100 feet or so of clearing areas.
- For wintering eagles, the MBP currently states Atlantic will provide an “eagle observer” on USFS land. FWS recommends extending this to areas all where golden eagles are likely to occur. FWS will provide list of counties where this addition would be recommended.
- Concrete examples of avoidance and impact reduction should be added to the MBP. A link to the website referenced by the FWS during the last call (containing a list of conservation measures) will be provided by FWS.
- Section 5.2 page 20 is vague. FWS would like examples of what makes adherence possible or not possible, and for which species before they can address the effectiveness of the measures.

Habitat Equivalency Analysis

The FWS presented the assumptions of their Habitat Equivalency Analysis (HEA) for the project. The HEA was calculated for the project footprint plus acres of fragmented forest. Forest fragmentation was defined by forest cores currently containing greater than 225 acres of forest core dropping below that acreage threshold due to project clearing activities. Growth

curves for indicator species in each bird conservation region were used to estimate forest recovery time to maturity. The output ratios are dependent on mitigation type, which makes calculating the HEA an iterative analysis. Impact acreages were multiplied by mitigation ratios to reach mitigation offset acres; land values, site preparation, and management and monitoring fees per acre were also incorporated. The FWS will coordinate with the states as they continue to revise the HEA.

Karst Survey Report and Karst Plan

The survey report included a desktop review of potential karst features within 0.25 miles of the project and field surveys within the 300-foot survey corridor. Dominion explained the report does not specifically address feature avoidance because those adjustments were previously implemented during routing. The FWS requested that the BA include the following:

- the routing process showing that karst avoidance has occurred
- The alternatives addressed in RR10 should be pulled into the BA to make the BA a stand-alone document.
- Cochran's cave is a good example of routing and avoidance, since secondary cave mapping data and electrical resistivity imaging (ERI) surveys were used to make additional route adjustments due to species concerns (Madison Cave isopod). Include this detail in the BA.

FWS in West Virginia and Virginia would like shapefiles of the karst survey data and the ERI survey results at Cochran's Cave.

FWS requested that Dominion clarify where impacts will and will not be minimized, including any conservation measures that will or will not be implemented in the vicinity of karst features. Conservation measures and impact minimization discussion should be broken into categories specific to the feature karst type (cave, open-throat, depression/sinkhole, etc.) and the feature location (within or not within project workspace). E&S controls and karst feature treatment should be explicit, and Dominion should clarify the distances and locations of disturbance buffers versus fueling buffers. FWS will be providing written comments in the next month or so on the revised karst plan submitted in September. FWS requested the following be incorporated into the Karst Survey Report:

- "Risk" should be clarified.
- The chain of notifications should also be clearly laid out in the karst plan, including both national and local contacts, for emergency response and impacts. This section should also include a notification time frame.
- A 3rd party observer should be present during construction at particularly sensitive features.
- Dominion prefers to assume presence of listed species in karst features rather than conduct dye trace. Dye trace studies will not be completed because of limited land access and likelihood of them being insufficient or incomplete.
- No fueling or lubrication will occur within 300 feet of identified karst features. These buffers should be included into post-construction maintenance (herbicides, mowing).

- Herbicide use restrictions near karst features should also be added to the invasive management plan; herbicides use in that plan already includes limitations within a set distance of federally listed species.

Karst-related species impacts - Madison Cave Isopod

FWS requested more specific information on potential drainage to open-throated and sinkhole features in the Madison Cave isopod habitat area, including karst survey data. Even without identified karst features, the project crosses 23 to 24 miles of potential habitat. The FWS expects a Likely to Adversely Affect determination for the Madison Cave isopod because this species cannot be surveyed for and therefore presence is assumed in potential habitat.

Karst-related species impacts - Bats

Although not desirable, ongoing hibernacula surveys can be dialed back from 1 km to 0.25 miles for survey in areas without land access. Assuming presence of direct impact to hibernacula in the data gap areas is an option, however no projects have attempted for a direct impact to Virginia big-eared bat or Indiana bat, so there is no precedent. If direct impacts are assumed, the project must prove that impacts are negligible and would not result in a jeopardy decision.

Where surveys cannot be conducted, West Virginia Speleological Society data can be used to interpolate potential caves. Passage direction and internal cave mapping of existing caves near the project is also important to know whether passages cross the project and could potentially open up caverns during construction. FWS stated that the karst plan should include plans for what will be done if a void (cavern) is opened.

Aquatic Species and In-Stream Concerns

Water withdrawals at any time of the year would be considered an adverse impact to aquatic species. FWS requested an alternatives analysis for alternative water sources and to provide detail on proposed intake velocity, water volume and purpose, seasonal timing, and screen size. Dominion stated that alternatives analysis tables including this information were filed with FERC in November in response to a data request. The following water withdrawal options were discussed:

- Municipal water sources may not be a good alternative due to discharge limitations.
- Water storage ponds should be filled slowly and stored for construction work to avoid stream TOYR.
- The TOYR dates and methods for mussel species differ by state and species:
 - In North Carolina, moratorium dates for stream work because of dwarf wedgemussel presence are March 15 to May 31 and August 15 to September 30.
 - In Virginia, moratorium dates for stream work because of dwarf wedgemussel presence are March 15 to May 31 and August 15 to October 15.

- Virginia water withdrawal requirements include a 1 millimeter mesh screen and 0.25 feet-per-second intake velocity, were intended for larger fish and would not be able to result in a Not Likely to Adversely Affect finding for mussel glochidia.
- Proposed water storage ponds will be located by the drilling site so that water can be accessed for drilling mud, typically 300 feet away from the waterbody.

Dominion stated that the geotech reports provided risk of hydrofracture and not the risk of inadvertent returns which could occur from a hydrofracture. Most were low risk, but one was medium risk. The FWS recommended that information and contingency planning should be included in the BA (Attachment G HDD Plan), as well as more information on the steps to be taken and notification chain of command.

FWS stated that six mussel species under review for listing in North Carolina will have a listing decision by March 31, 2017.

The FWS would like text in the BA to describing the crossing options, how they work, and the potential pros and cons of each.

Small Whorled Pogonia

The group discussed the USFS field meeting held at the small whorled pogonia habitat in Virginia, which FWS staff did not attend. A report for small whorled pogonia describing the findings of requested wind and light-level change analyses has been drafted and is under internal review.

A Likely to Adversely Affect determination is expected as long as the project remained upslope of the GWNF small whorled pogonia population. The BA should include the following:

- The FWS requested that the BA include analysis on the previous route, including the wetlands that were avoided in arriving at the current route position.
- E&S controls and the effect on overland water flow in relation to plant populations and changes to the hydrology.
- Potential mitigation could include voluntary contribution to protect known small whorled pogonia sites elsewhere in the state may be an option for mitigation. Kim Smith is working on methodology for calculating the mitigation ratio.
- Other mitigation options discussed included monitoring the existing population over time for changes due to the project. Re-creating the current surface topography near the population to negate surface flow changes was mentioned proposed as an avoidance and minimization measure.

Roanoke Logperch

The FWS expects a Likely to Adversely Affect determination for the Roanoke Logperch. Any instream activity or water withdrawal from an occupied or assumed occupied waterbody would be considered an adverse impact and result in take. Relocation of fish prior to in-stream work is also considered take.

Chowanoke Crayfish & Green Floater

Brian Watson in Virginia and Janet Clayton in West Virginia should be contacted for locations where the chowanoke crayfish and green floater may occur, if there are any concerns for these species, and to confirm timing restrictions for these species.

Rusty Patch Bumblebee

According to the Natural Heritage Inventory data, the ACP project crosses a historic occurrence of this newly-listed species. FWS Virginia is currently working on a procedure for how to address this species, and may request surveys in select areas.

ACTION ITEMS

ACTION REQUIRED:	BY WHOM:
Comments on October 20 th BA draft by December 9 th	FWS
Provide list of the 12-digit HUCs in North Carolina where sensitive species warrant additional E&S controls by December 5 th	FWS NC
Provide list of sensitive waterbodies in Virginia for additional E&S controls	FWS VA
Eagle permits to Sarah Nystrom for review prior to submission to migratory bird office	ERM
Provide list of counties where eagle observers are recommended	FWS
Link to the website containing a list of conservation measures for migratory birds	FWS
Provide karst survey data, including the ERI survey results at Cochran's Cave	ERM
Provide written comments to the karst plan in December	FWS

Attachments:

cc: Project Files

Exhibit D

Rusty-Patched Bumble Bee Inventory, Virginia and West Virginia



PROJECT NO.

19-080

REVIEWED BY:

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Mitchell, Stone
Environmental**

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Acknowledgements

We gratefully acknowledge access provided by many private landowners that allowed us to complete field work for this project.

Title and Approval Page

Document Title

Rusty-Patched Bumble Bee Inventory, Virginia and West Virginia September 19, 2019.

Document Prepared by:

Stone Environmental, Inc., 535 Stone Cutters Way, Montpelier, VT 05602 (802) 793-6449

Document Preparer Approvals:

Leif Richardson, Stone Environmental, Inc.



09/19/2019

Signature

Date

Patrick Hunter, Southern Environmental Law Center

Signature

Date

Executive Summary

The rusty-patched bumble bee (*Bombus affinis* Cresson) is a rare species listed as Endangered by the United States Fish and Wildlife Service. The species' range across the eastern USA has declined by more than 90% and most remaining populations are now restricted to the northern Midwest. One of the only populations documented in the eastern USA in a decade is located in the Appalachian Mountains of Virginia and West Virginia, where it is threatened by construction of the Atlantic Coast Pipeline. The US Fish and Wildlife Service has issued two Biological Opinions detailing potential impacts to this and other endangered species and both have been vacated following lawsuits that raised concerns about their conclusions. To help address knowledge gaps regarding risks to this endangered species, in summer 2019 we conducted eight days of inventory in the area where the proposed pipeline route could impact it. We documented five new sites where the rusty-patched bumble bee occurs.

1. Table of Contents

*Cover Photo: A
worker-caste female
rusty-patched
bumble bee forages
near the Atlantic
Coast Pipeline route
in Bath County,
Virginia, July 10,
2019 (L.
Richardson)*

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2. Introduction

The rusty-patched bumble bee (*Bombus affinis*; ‘RPBB’) is a social species where family groups live in annual colonies consisting of a reproductive female (‘queen’) and her offspring, who include non-reproductive worker-caste females, males (‘drones’), and new reproductive females (‘gynes’). Because only one bee in each colony reproduces, colonies are the individual units that comprise a biological population. RPBB was once among the most common bumble bee species across the eastern and Midwestern USA, including in the southern Appalachian Mountains. Its populations abruptly declined by more than 90% in the late 1990s in most areas of their former range; declines have also been noted for a number of other North American bumble bee species¹. These declines have been linked to four primary factors. First, the RPBB may be highly susceptible to virulent strains of one or more bumble bee pathogens, especially *Nosema bombi*, which can spill-over to wild bee populations from commercial bumble bee colonies that were widely deployed for pollination of blueberry, cranberry, and other field crops in the mid-1990s², and managed honey bee hives³. Second, this and other bumble bee species are harmed by commonly used pesticides, including neonicotinoids, the use of which as seed treatments grew rapidly in 1994-1999, resulting in them being commonly detected in bee diets⁴⁻⁷. Third, high quality bumble bee habitats, such as flower-rich meadows, wetlands, and forest understories have declined in area across much of the species’ range. Finally, climate warming has caused loss of bumble bee populations in the hottest areas of their historic range (i.e., lowest latitude and elevation for Northern Hemisphere species), resulting in a net loss in geographical range⁸. There is evidence that each of these threats played a role in the decline of the RPBB, but the extent to which these factors may exert synergistic negative effects on the bee is not well understood.

The RPBB was listed by the US Fish and Wildlife Service (USFWS) as endangered in 2017, with virtually all extant populations being confined to the upper Midwestern USA⁹. The same year, the species was rediscovered in western Virginia as part of a biological inventory of the proposed route of the Atlantic Coast Pipeline (ACP). A small number of other observations were subsequently made in mountainous areas of Virginia and West Virginia, demonstrating that the species persists in remote, high elevations sites in the Appalachian Mountains. It is not known whether these observations are of multiple, isolated biological populations, a metapopulation with limited gene flow among subpopulations, or one expansive population. This uncertainty has important bearing on how development projects might affect RPBB recovery efforts and should be resolved; for clarity we refer here to individual observation localities separated from others by some distance as ‘populations’. The USFWS designated High Potential Zones (HPZ) around the observations in Bath and Highland Counties, VA, in which the species is likely to occur, and these form a core part of the Service’s reasoning in its 2017 Biological Opinion reviewing potential impacts of the ACP to endangered species¹⁰ and its 2018 revised Opinion¹¹ re-authorizing pipeline construction. The 2018 Opinion was vacated by the 4th circuit court of Appeals in July, 2019, in part due to uncertainties in the analysis regarding the RPBB populations in the path of the pipeline¹².

The goal of this project was to help address some of these uncertainties by conducting additional inventory work in the HPZs as well as along the proposed pipeline route through mountainous terrain on the VA/WV

border. We made two four-day surveys of bees in 2019, finding the RPBB in five of ~25 sites surveyed. As part of a larger, ongoing research project, we also gathered and aggregated all known specimen and observation records for the RPBB, using historic occurrences in the southern Appalachian Mountains region to design our survey methods. We summarize our findings on the RPBB and other bumble bee species below.

3. Methods

We obtained necessary permits (i.e., a USFWS Scientific Recovery Permit and a West Virginia endangered species Scientific Collecting Permit; **Appendix B**) and conducted two four-day surveys for RPBB around the pipeline route in Augusta, Bath, and Highland counties in Virginia and Pocahontas and Randolph counties in West Virginia. Surveys were conducted 7-10 July and 17-20 August, 2019. Land parcels to survey were identified by considering the permitted route for the ACP, where we had landowner permission to work, and where historic and recent RPBB observations had been made. We used non-lethal survey methods based on those created by the USFWS to guide researchers working with this species¹³. In each survey, we conducted two types of bee observations: 1) timed observation periods; and 2) casual surveys made while walking roadsides and other habitats. For timed observations, we first identified a discrete area of habitat, then identified and recorded all bumble bees by species and caste as they foraged on flowers. Observation periods lasted 15-60 minutes and varied according to site characteristics and bee abundance. Casual surveys varied in duration and we did not always quantify numbers of each species/caste as we conducted them. In both cases, we caught and handled bumble bees only when we were not able to identify them on the wing. When RPBBs were observed, we vouchered their presence through photographs, which were usually possible without first restraining the bees (**Fig. 2B**). In all cases, bees were released unharmed after handling.

We used ArcGIS and R statistical computing software¹⁴ (including packages ‘dplyr’, and ‘ggplot’) to summarize the data collected in this study.

We used Maxent software¹⁵ to explore the geographic and bioclimatic factors that might influence RPBB distribution in the study area. The RPBB once occurred in a wide array of habitat types across the eastern USA, including prairie grasslands, developed areas, agricultural fields, and forests. Following its population decline in the 1990s, most remaining populations are found in the Midwest in anthropogenic habitats, especially suburban areas, parks, and restored grasslands. By contrast, the populations in VA and WV occupy a matrix of forested, mountainous terrain and low-intensity agricultural land. To predict where additional RPBB populations might occur, we constructed a species distribution model (SDM) for the southern Appalachian Mountain region. We first used the Bumble Bees of North America database¹⁶ to compile all known records of RPBB occurrence, then supplied the model with 47 locations where RPBB observations have been made in the region (North Carolina, Tennessee, Virginia, and West Virginia) in the last 20 years. The full model incorporated as predictor variables a range of gridded climate and landscape variables, including bioclimatic variables developed by Worldclim¹⁷, and remote sensing products characterizing leaf area index, soil water index, normalized difference vegetation index (NDVI), elevation, land use/land cover, and soils. All predictor variables were clipped from their original global extent to an area of eastern North America encompassing all of the RPBB's historic range. In each model iteration we computed an average of five model runs, and we used a model selection procedure to remove at each iteration those variables with little contribution to the model or to thin sets of variables with high correlation.

4. Results

4.1. Bee Inventory

We sampled bees at ~25 individual survey sites 7-10 July and 18-21 August (**Fig. 1; Appendix 1**). At these sites we made observations of 569 bumble bees during timed observations, and combined with casual surveys, made identifications of >1,000 individual bees. Overall, the RPBB accounted for less than one percent of our observations. We found worker-caste female RPBB in five sites during the July surveys, but did not record the bee in August (**Fig. 2; Table 1**). Four of these bees foraged at non-native field thistle (*Cirsium discolor*) while the fifth was observed nectaring at wild bergamot (*Monarda fistulosa*). Four of the observations were made in flower-rich fields maintained as grasslands by occasional haying or low-intensity grazing; the fifth site was a roadside parking area. All five observation localities were close to extensive areas of forest.

Of 16 species known to occur in Virginia and West Virginia, we documented nine during these surveys: *Bombus affinis* (i.e., the RPBB), *B. auricomus*, *B. bimaculatus*, *B. fervidus*, *B. griseocollis*, *B. impatiens*, *B. perplexus*, *B. sandersoni*, and *B. vagans*. Abundance of each species was uneven in our study, with the common species *B. bimaculatus* accounting for 61% of all bees we observed in July, but fewer than 2% of those encountered in August. *B. impatiens*, another common species, was 17% of bees in July and more than 85% in August. Most of the other species we documented are also common and widespread, but *B. fervidus*, observed a total of five times in this study, is listed as ‘Vulnerable’ by the International Union for the Conservation of Nature¹⁸ and was confirmed in a recent NatureServe analysis to be declining across its historic range (Richardson, *unpublished*). Bumble bee diversity was markedly higher in July vs. August surveys, suggesting that the latter occurred too late in the growing season for us to observe the RPBB. However, available collections data demonstrate that the species should still be active in this region in mid-late August (**Fig. 3**).

The matrix of fields, forest, and low density developed areas in the project area provides an excellent mix of flowering plants for bumble bees. In July, plants where we most often encountered bees included wild bergamot (*M. fistulosa*), thistles (*C. discolor* and *C. vulgare*), teasel (*Dipsacus* species), Catawba rhododendron (*Rhododendron catawbiense*), Horsefly weed (*Baptisia tinctoria*), and clovers (*Trifolium* species). In August, the most important flowering plants for bumble bees were wingstem (*Verbesina alternifolia*), jewelweeds (*Impatiens capensis*, *I. pallida*), Joe-pye weeds (*Eutrochium* species), sunflowers (*Helianthus* species), Carolina horsenettle (*Solanum carolinense*), and ironweed (*Vernonia* species).

4.2. Predicting Rusty-Patched Bumble Bee Distribution

Based on RPBB observations/specimens from the southern Appalachian region, our SDM predicts a broad swath of suitable habitat for RPBB in higher elevation areas along the VA/WV border, the NC/TN border, and areas of eastern KY (**Fig. 4**). The final model performed well, having a mean area under the curve (AUC) of 0.995 ± 0.002 SD. The most important predictors of RPBB occurrence (i.e., those variables included in the final, best-fit model) include elevation (the bee is rarely found below 1,000 m), land cover (occurrences are strongly positively correlated with grasslands and mixed deciduous/evergreen forest cover), and leaf area index (sites occupied by the bee have extensive vegetative cover and have among the highest photosynthetic potential of any in the region; **Table 2**). Soil type, precipitation seasonality, and winter temperature were also

important predictors, the latter suggesting both warm and cold thermal limits during hibernation on the species' occurrence in this region. Based on this assessment, the ACP currently passes through areas where RPBB populations are most likely to persist; alternate pipeline routes that would have a lower chance of impacting the species might be found along the VA/WV border both north and south of the study area (**Fig. 4**).

Future efforts to locate RPBB populations in this area will be most fruitful if they occur during periods when the bees are most active. Our assessment indicates that RPBB abundance peaks around 1 August, when large numbers of both workers and males are typically produced by colonies (**Fig. 3**). July and August surveys such as ours have a relatively higher likelihood than others of documenting the bee. In addition, lesser numbers of bees (likely queens) can be expected in May and early June.

5. Discussion and Conclusions

5.1. Patterns of Occurrence

In this study, we document five new populations of the rusty-patched bumble bee along the proposed route of the Atlantic Coast Pipeline. We found the bee in open, flower-rich habitats that may be impacted during pipeline construction activities. While new observations of this rare species are encouraging, the study demonstrates that the RPBB is not likely to be abundant relative to other bumble bees, even where it does occur in the study area. While some observations of the bee were made after only a short amount of survey effort (i.e., the roadside observation, **Fig. 2d**), in most cases we only found the RPBB after concerted effort. An additional line of evidence demonstrating the species' relative uncommonness is that we failed to find it in most of the sites we visited; given the duration of our surveys and habitat requirements and known distribution of the species in this area it is likely that some of these survey events represent false negatives, and that the species does in fact occur in them, albeit at densities too low to have been detected using our methods. While the recent records of RPBB occurrence in this area are encouraging from a species recovery standpoint, the observations we summarize here suggest that the bee's populations are relatively small and thus more sensitive to disturbance than those of other co-occurring bee species.

The RPBB populations that are the focus of this study are of global significance in our efforts to prevent extinction of this species. RPBBs in the Bath/Highland County area are one of just five populations (or metapopulations) reported outside of the Midwest in the last decade, the other four consisting of single-bee observations that researchers have not been able to confirm across multiple years of inventory. The Bath County, VA HPZ (labeled #119 in USFWS GIS products) is one of just 5% globally for which the bee's presence has been confirmed in three or more consecutive years in the last decade. The bee once occurred in a wide variety of habitats across eastern North America, but its range has contracted >90% and virtually all remaining populations are now found in the heavily agricultural and developed habitats of the US Midwest. A mountain matrix of fields and forests, RPBB habitats in the southern Appalachians are distinctly different from those of all other known extant populations. As such, bees from VA and WV could serve as a critical reservoir of genetic diversity necessary to recovery of the species at large. As a unique population group isolated from many of the factors that threaten other rusty-patched bumble bee populations, we recommend that incidental take of RPBB in this population be avoided at all costs.

One notable outcome of the project is the observation of *B. fervidus*, a species widely reported to be in decline in eastern North America^{1,18-21}. *B. fervidus* is a species closely associated with grasslands, including hayfields, where it commonly nests on the surface of the ground. The species likely persists in the study area due to the abundance of minimally managed grasslands; future stewardship efforts aimed at this bee in this area should therefore consider the distribution and habitat quality of hayfields and other grassland cover types.

5.2. Rusty-Patched Bumble Bee and the Atlantic Coast Pipeline

The present study expands the area where a federally listed endangered species is known to occur in the path of the proposed Atlantic Coast Pipeline. Assuming the High Potential Zone framework for species recovery efforts is retained by the USFWS, we expect that our observations will be incorporated into a newly expanded

HPZ for RPBB in Augusta, Bath, and Highland Counties in Virginia, reflecting an increase in the area in which pipeline construction activities could result in RPBB takings.

We failed to find the RPBB in most sites we surveyed, and in those occupied by the bee, its abundance was low relative to other bumble bee species. These results standing alone do not allow a precise estimation of the number or density of individual bees or bee colonies that could be impacted by pipeline development at any given site, but they do permit some general conclusions about impacts of the construction project. The presence of RPBB at additional localities in the path of the pipeline project show that construction could result in taking of more colonies or individual bees than previously assumed by the USFWS' Biological Opinions. We show that RPBB is a relatively uncommon member of the bumble bee assemblage at any given site, which might suggest that colony density in the area is low, or that colonies are small. Given that bumble bees may fly 1km or more to gather floral resources, it is also possible the bees we observed were from nests outside areas of pipeline construction activity.

We did not collect data on reproductive output of RPBB colonies, so we are unable to assess how many new gyne (queen)-caste bees will hibernate in the vicinity of construction activities.

5.3. Conclusions

This study expands the known distribution area of the rusty-patched bumble bee in Bath and Highland Counties, Virginia. Our research increases the area where RPBB populations are known to co-occur with the proposed Atlantic Coast Pipeline, and suggests that in this area, the bee is both uncommon and patchily distributed. Like other uncommon insects, the RPBB can be difficult to detect even where it occurs, and a thorough assessment of pipeline construction risks to this species will be necessary to avoid or at least minimize takings.

6. Figures and Tables

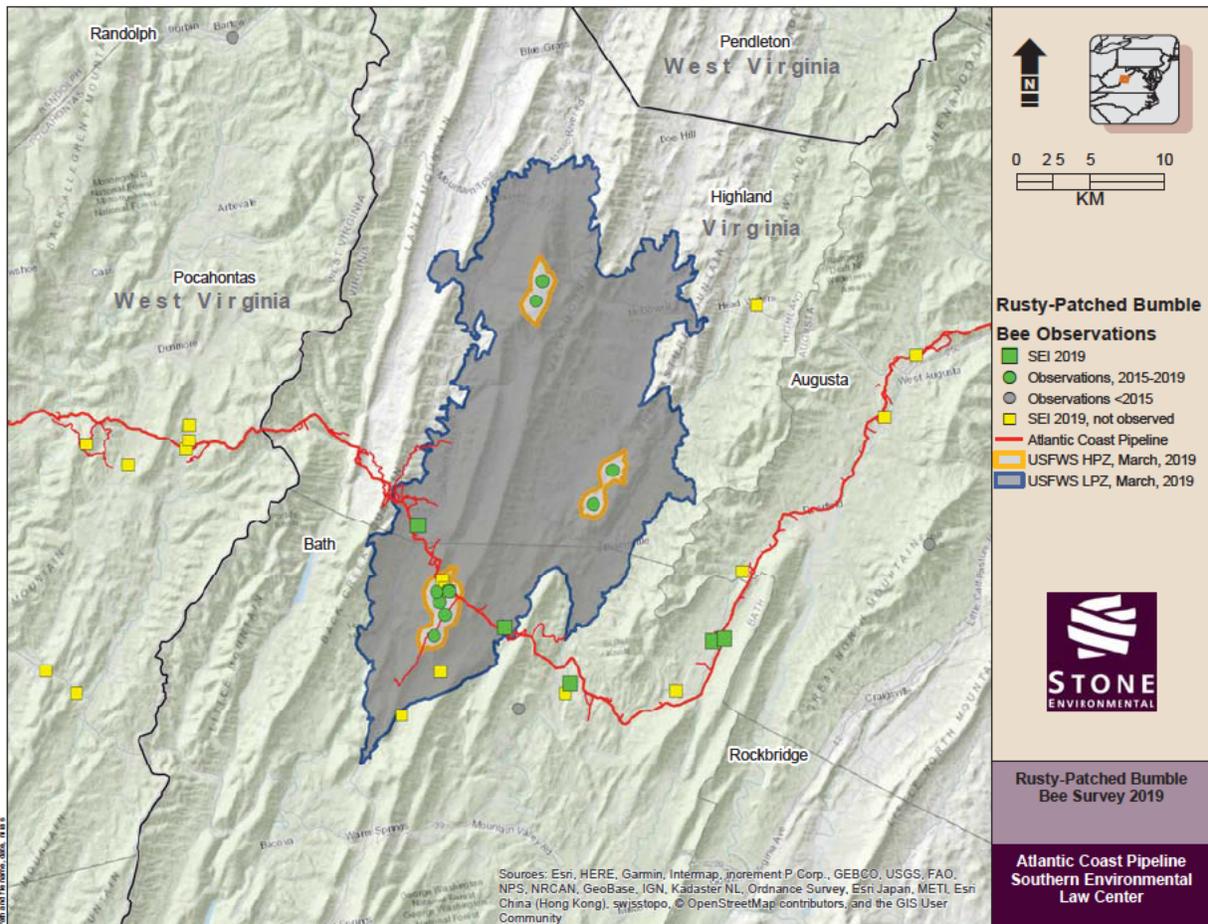


FIGURE 1: Rusty-patched bumble bee observations around the Atlantic Coast Pipeline

More than 30 observations of the RPBB have been made since 2017 (green symbols) near the proposed route of the Atlantic Coast Pipeline through the Allegheny Mountains of Virginia and West Virginia. Surveys by Stone Environmental (‘SEI’) in 2019 contribute five additional occurrence areas along the pipeline route, and the USFWS high and low priority zones for the species (‘HPZ’ and ‘LPZ’, respectively) are likely to be extended to include these areas. Yellow squares represent areas where we surveyed bumble bees but did not observe the RPBB; these could represent areas where the bee does not occur, or simply locations where survey effort was not sufficient to voucher this rare species.

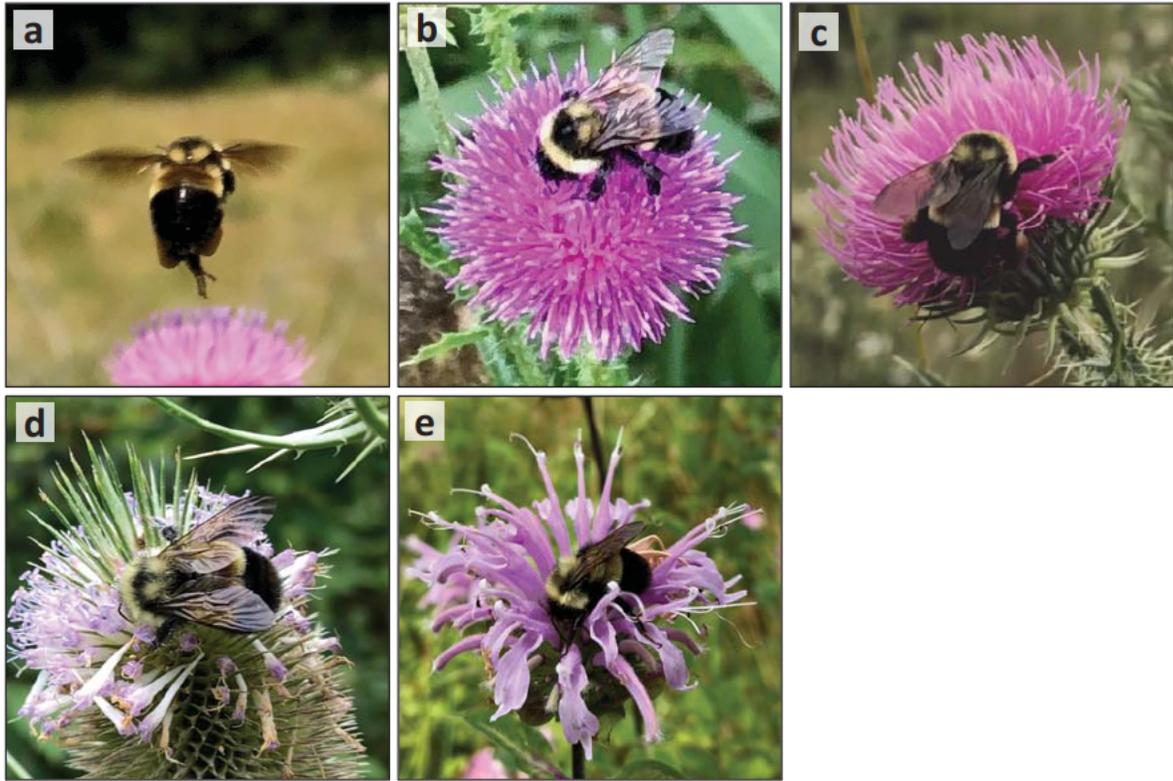


FIGURE 2: Rusty-patched bumble bee observations

We made five observations of worker-caste female rusty-patched bumble bees during the survey. Bees were observed near Mustoe, Highland Co., VA on 8 July (a); in Deerfield (b and c) and Millboro (d), Bath Co., VA on 9 July; and in Burnsville, Bath Co., VA on 10 July. Bees were positively identified to species, photographed in situ, and released unharmed. Additional photos of each bee available upon request. See **Table 1** for collection details. Photos: Leif Richardson.

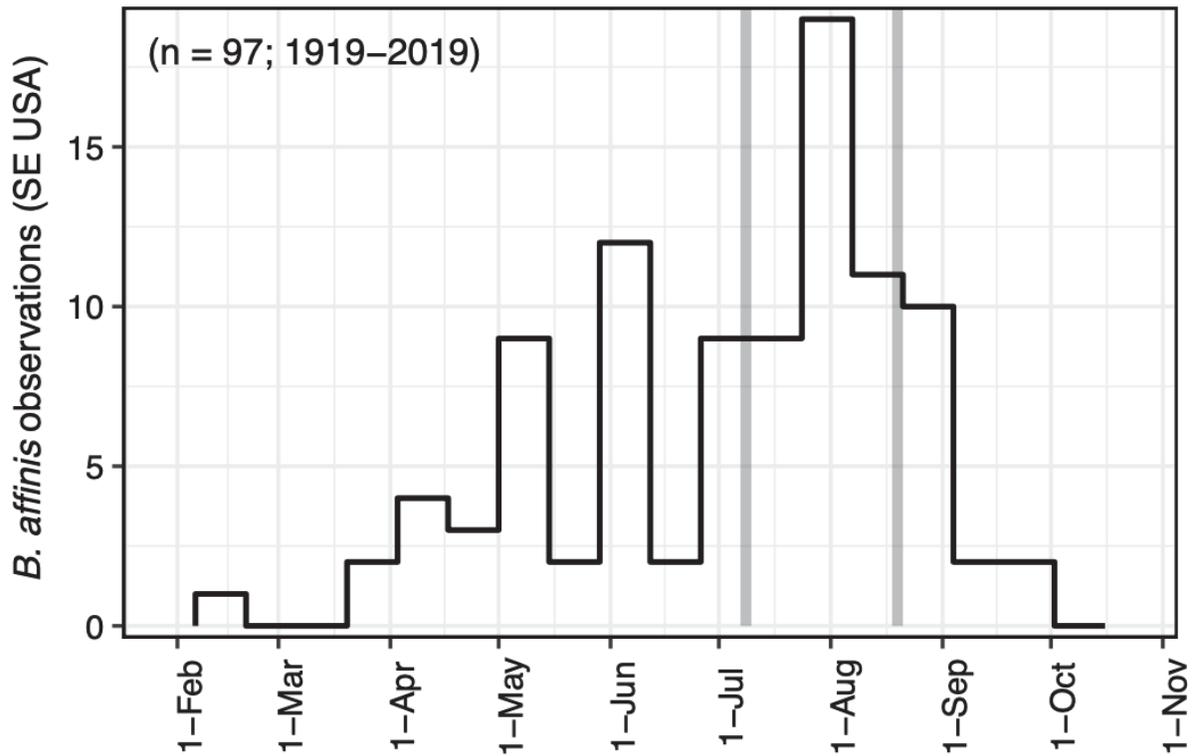


FIGURE 3: Rusty-patched bumble bee seasonal activity

Histogram of collection/observation dates for 97 *B. affinis* records made in the southern Appalachians ecoregion, 1919-2019. Our 2019 surveys, indicated by gray shading, bracket the period when RPBB is most abundant in collections. Data are from Bumble Bees of North America database¹⁶ and include the five records from our July survey.

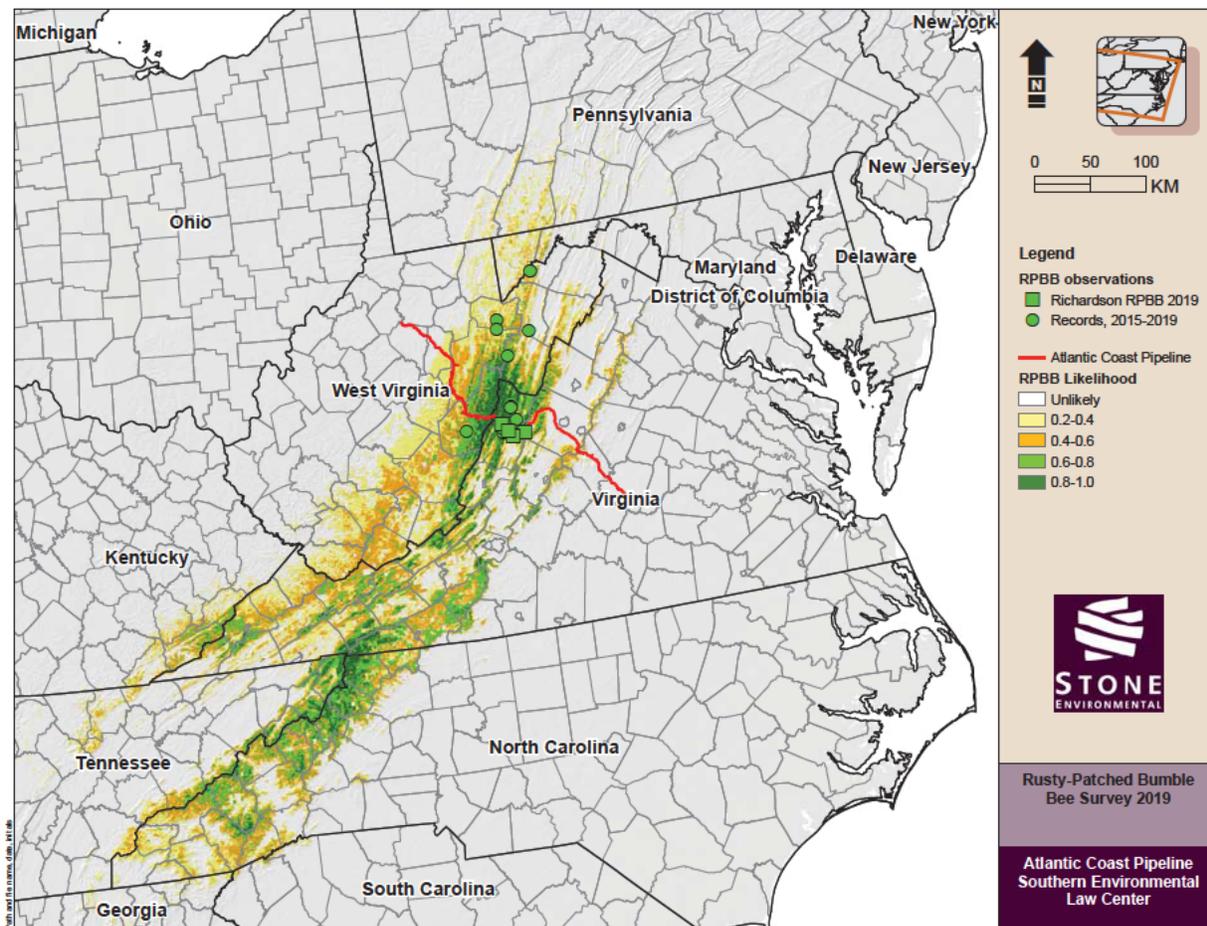


Figure 4. Predicted distribution of rusty-patched bumble bee in southeastern USA

Species distribution model depicting the probability of rusty-patched bumble bee occurrence based on ecological, landscape, and environmental factors. Model was created using Maxent software and is based on the 47 known observations of the bee made in North Carolina, Tennessee, Virginia, and West Virginia since 1999, around when the species crashed throughout its range in eastern North America. Additional populations persist in the US Midwest. See text for details.

Date	County	Location	Site	Latitude	Longitude	Habitat	Host plant
7/8/2019	Highland	Mustoe	Route 220 county line	38.23144	-79.7025	Old field	Thistle
7/9/2019	Bath	Deerfield	The Wilderness (A)	38.13227	-79.4921	Old field	Thistle
7/9/2019	Bath	Deerfield	The Wilderness (B)	38.13246	-79.4831	Old field	Thistle, mullein
7/9/2019	Bath	Millboro	Cow pasture road	38.1217	-79.6073	Roadside	Teasel
7/10/2019	Bath	Burnsville	Glen Brook Farm	38.16199	-79.6498	Old field	<i>Monarda fistulosa</i>

Table 1: Rusty-patched bumble bee observations

We made five observations of the RPBB in field and roadside habitats in July, 2019 in western Virginia.

Variable	Percent contribution	Permutation importance	Source	Link
Mean temperature, coldest month (BIO06)	0.6	0.2		
Mean temperature, coldest quarter (BIO11)	2.1	79	WorldClim	http://www.worldclim.org/bioclimate
Precipitation seasonality (BIO15)	22.2	8.5		
Leaf Area Index	14.6	0.8	Copernicus Global Land Service	https://land.copernicus.eu/global/
Digital Elevation Model	32.7	11.2	USGS	
Soils	26.5	0.2	International Soil Reference and Information Center	https://www.isric.org/
Land Cover/Land Use	1.3	0.1	USGS	https://www.usgs.gov/media/images/north-america-land-cover-characteristics-database-version-20

Table 2: Species Distribution Modeling

Distribution of RPBB in the southeast was best predicted in a Maxent SDM by seven landscape, vegetation, and bioclimatic variables.

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8. Appendix A: Bee data

8.1. Rusty-patched bumble bee observational data

Bumble bee observational data for this study are available in tabular format by request of Southern Environmental Law Center.

9. Appendix B: Permits

9.1. USFWS Scientific Recovery Permit

NATIVE ENDANGERED SPECIES RECOVERY
ENDANGERED WILDLIFE**Permit Number: TE41689C-0**

Effective: 03/12/2018 Expires: 12/31/2023

Issuing Office:

Department of the Interior
U.S. FISH & WILDLIFE SERVICE
Endangered Species Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, MN 55437-1458
permitsR3ES@fws.gov



Chief - Endangered Species

Permittee:

LEIF L RICHARDSON
dba **STONE ENVIRONMENTAL, INC**
STONE ENVIRONMENTAL, INC
535 STONE CUTTERS WAY
MONTPELIER, VT 05602
U.S.A.

Authority: Statutes and Regulations: 16 USC 1539(a); 50 CFR 17.22, 50 CFR 13.

Location where authorized activity may be conducted:

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:

ANNUAL REPORT DUE: 12/31

See permit conditions for reporting requirements

Authorizations and Conditions:

Permit number TE41689C-0 replaces sub-permit number 17-21 issued on 06/29/17. Sub-permit 17-21 is invalid as of 3/12/18.

A. General Conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other federal law. Necessary state and/or local permits where applicable, must also be acquired and observed; this permit is invalid without such permits.

C. Valid for use by Leif Richardson. Field assistants not named on this permit may conduct activities pursuant to



this permit only under the direct on-sight supervision of a named permittee. "On-sight" supervision is defined as having the authorized individual at a distance that would allow this individual to immediately assist a supervised individual, as needed, while they are conducting an authorized activity.

D. ACCEPTANCE OF THIS PERMIT SERVES AS EVIDENCE THAT THE PERMITTEE AND ITS AUTHORIZED AGENTS UNDERSTAND AND AGREE TO ABIDE BY THE TERMS OF THIS PERMIT AND ALL SECTIONS OF TITLE 50 CODE OF FEDERAL REGULATIONS, PARTS 13 AND 17, PERTINENT TO ISSUED PERMITS. SECTION 11 OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED, PROVIDES FOR CIVIL AND CRIMINAL PENALTIES FOR FAILURE TO COMPLY WITH PERMIT CONDITIONS.

E. Permittee is authorized to take (capture, handle, and release) rusty patched bumble bee (*Bombus affinis*), for scientific research (presence/absence surveys, studies to document habitat use, and population monitoring) aimed at recovery of the species.

F. Activities are authorized at the following locations:

F.1. Locations within Region 3 of the USFWS: Illinois, Indiana, Iowa, Minnesota, Ohio, and Wisconsin, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.2. Locations within Region 4 of the USFWS: North Carolina and Tennessee, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Locations within Region 5 of the USFWS: Maine, Maryland, Massachusetts, Pennsylvania, Tennessee, Virginia, and West Virginia, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. Permittee shall notify and request approval from the USFWS Field Supervisor for the state in which activities are proposed to occur at least fifteen (15) days prior to conducting any activities. Contact information is available at: <https://www.fws.gov/midwest/endangered/permits/index.html> (located under 1. Recovery and Interstate Commerce Permits, For Fish and Wildlife Permit Holders). Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A full description of activities (i.e., proposed project, purpose and need, surveys, methods, etc.)

G.4. Dates when the project is proposed to take place.



- G.5. Evidence that Permittee has received any required contracts to complete the activities.
- G.6. Whether all prior annual reporting requirements have been fulfilled.
- G.7. You may proceed with activities only upon receipt of written concurrence from the applicable USFWS Field Supervisor. *Your concurrence letter must be carried with this permit to authorize site-specific activities.*
- H. Permittees must adhere to the following conditions:
- H.1. Rusty patched bumble bees may be captured with aerial hand nets following the methodology, guidelines, and best practices included in the "Survey Protocols for the Rusty Patched Bumble Bee (*Bombus affinis*)" (Survey Protocols). Survey Protocols are available online at: <https://www.fws.gov/midwest/endangered/insects/rpbb/guidance/>. Note that you must use the most up-to-date version of the Survey Protocol, available on the USFWS website page on February 28th of each year.
- H.2. For areas believed to be unoccupied by rusty patched bumble bee (See map online at: <https://www.fws.gov/midwest/endangered/insects/rpbb/guidance/>), you are authorized to take (capture, release, and accidental mortality) only in the event that the species is captured accidental to lawful survey activities directed at other species (if using lethal survey methods such as bee bowl, pan, or cup traps, malaise traps, or blue vane traps). This permit does not authorize any activities for the specific purpose of lethal capture of rusty patched bumble bee. If rusty patched bumble bees are identified at any point in time at a survey site, all lethal survey methods shall cease within a two (2) mile area and permittee shall contact the U.S. Fish and Wildlife Service in accordance with Condition H.3. Should accidental mortality occur you must document the capture and collect information outlined in Condition I.6. on the captured individual.
- H.3. Accidental mortality, under Condition H.1., may not exceed one (1) specimen. In the event that this number is met, all rusty patched bumble bee activities for this permit must cease. You must contact the Minnesota/Wisconsin Ecological Services Field Office (Condition J.2.) within two (2) business days and explain the incident and its circumstances. Your initial contact may be made by telephone; however, a written explanation must be provided within five (5) days of the incident to the following USFWS offices: Regional Recovery Permits Coordinator, Bloomington, Minnesota (Condition J.1.), the Minnesota/Wisconsin Ecological Services Field Office (Condition J.2.), and the Field Office for the state in which the activity occurred (Condition K.). Following mortality or injury of a rusty patched bumble bee you may not resume activities authorized by this permit without written permission of the U.S. Fish and Wildlife Service, Minnesota/Wisconsin Ecological Services Field Office (Condition J.2.).
- H.4. Rusty patched bumble bees that are found dead or killed accidentally (during authorized surveys) may be salvaged. Prior to collecting specimen(s), you must photograph to document the condition. You shall preserve the specimen(s) using standard museum practices including proper identification and indices [include date, complete scientific and common names, and geographic location (township, range, section, and UTM) where salvaged]. All specimens obtained under this permit remain the property of the United States Government and must clearly be identified as such. All dead specimens shall be sent to a public scientific or educational facility or museum in the state where the individuals were collected along with a



copy of the permit(s) under which they were collected. When agreed upon in writing by the Minnesota/Wisconsin Ecological Services Field Office (Condition J.2.), specimens may be sent out of state to an alternate specialized educational facility or museum within the United States. A list of specimens collected (if any), pertinent location data, and the facility where specimen is curated shall be provided in your annual and final reports.

H.5. Upon any new discovery location, permittee shall notify the U.S. Fish and Wildlife Service Field Supervisor(s) (Condition K.) and the Minnesota/Wisconsin Ecological Services Field Office (Condition J.2.) in writing of where the new discovery location occurred (previously undocumented sites only) within fourteen (14) days of discovery unless otherwise specified by the Field Supervisor(s). No voucher specimens may be collected. Any newly identified locations shall be vouchered with photographs and/or video recordings.

H.6. For a permittee using approved, lethal protocols in areas where the lethal protocols are allowed (Condition H.2.), all rusty patched bumble bees need to be identified from samples annually, in time to be included in the annual report due January 31. In some cases, accidental mortality may not be discovered until specimens are identified by a bee taxonomist. In these cases the permit holder and/or taxonomists must take an initial look through samples to identify rusty patch bumble bees in order to include this information in the annual report. In the event that one or more rusty patched bumblebees are identified in a sample, all lethal survey activities must cease within two (2) miles of the capture location. The Minnesota/Wisconsin Ecological Services Field Office (Condition J.2.) must be contacted within two (2) business days of discovery of the specimen and the circumstances of collection. Initial contact may be made by telephone, however, a written explanation must be provided within five (5) days of the identification to the following USFWS offices: Regional Recovery Permits Coordinator, Bloomington, Minnesota (Condition J.1.), the Minnesota/Wisconsin Ecological Services Field Office (Condition J.2.), the Field Office for the state in which the activity occurred (Condition K.).

I. An annual report of all activities conducted under the authority of this permit is due by January 31 following each year this permit is in effect. In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. Although not required at this time, we request the use of the survey data and habitat collection sheet(s) as found online at <https://www.fws.gov/midwest/endangered/insects/rpbb/guidance/>, for reporting required data. Using the online reporting spreadsheet will help standardize data collection and increase efficiency in reporting. The online reporting data sheets can be used to report the information required below. At a minimum, your report shall include:

- I.1. A description of locations (date, time, geographic locations (state, county, and geographic coordinates using latitude and longitude in decimal degrees)) of areas surveyed, even if no rusty patched bumble bees were encountered. While not required, we would also appreciate receiving a description of locations surveyed where no *Bombus* of any species were found.
- I.2. The date, time, geographic locations (state, county, and geographic coordinates using latitude and longitude in decimal degrees) of any rusty patched bumble bees encountered. While not required, we appreciate receiving information for other *Bombus* species captured, as this information could help indicate suitable habitat for rusty patched bumble bee.



- I.3. A description of the habitat conditions where the surveys took place (e.g., floral diversity and abundance, management practices and potential stressors).
- I.4. A description of field procedures, data collection methods, and survey effort.
- I.5. Photographs of the identifying characteristics for each individual federally-listed species. Photographs of other *Bombus* species observed are encouraged.
- I.6. A complete description of injuries or mortalities to listed species while in your possession, the dates of occurrence, location of occurrence, any circumstances surrounding the incidents, and a description of any steps taken to reduce the likelihood that such injuries and/or mortalities will occur in the future.
- I.7. Any other data you may have collected for individual rusty patched bumble bees, such as evidence of damage or injury, mortalities, and/or locations where salvaged specimens are being kept.
- I.8. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.
- I.9. Copies of all site specific authorization letters required under Condition G.

If no activities occurred over the course of the year, indication of such shall be submitted as an annual report.

J. Copies of your reports shall be sent to the offices listed below. When possible, electronic copies shall be submitted in lieu of hard copies in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office.

J.1. Regional Recovery Permits Coordinator

U.S. Fish and Wildlife Service - Midwest Region (Region 3)

Ecological Services - Endangered Species

5600 American Blvd. W., Suite 990

Bloomington, Minnesota 55437-1458

(612/713-5343; fax 612/713-5292)

permitsR3ES@fws.gov

J.2. Minnesota/Wisconsin Ecological Services Field Office



U.S. Fish and Wildlife Service - Midwest Region (Region 3)

Field Office Supervisor

4101 American Blvd. E.

Bloomington, Minnesota 55425

(952/252-0052; fax 952/646-2873)

J.3. Regional Recovery Permits Coordinator

U.S. Fish and Wildlife Service - Southeast Region (Region 4)

Endangered Species Division

1875 Century Blvd

Atlanta, Georgia 30345-3319

(404/679-7097; fax 404/679-7081)

permitsR4ES@fws.gov

J.4. Regional Recovery Permits Coordinator

U.S. Fish and Wildlife Service - Northeast Region (Region 5)

Endangered Species Division, Suite 200

300 Westgate Center Drive

Hadley, Massachusetts 01035-9589

(703/358-2402; fax 413/253-8482)

permitsR5ES@fws.gov

K. Additionally, based on geographic area where surveys were conducted, reports and publications shall be submitted to the offices listed under Field Office Contact Information at:

[<https://www.fws.gov/midwest/endangered/permits/index.html>](https://www.fws.gov/midwest/endangered/permits/index.html).

All correspondence related to this permit should reference the permit number shown above. Any questions you may have regarding this permit should be directed to Carlita Payne, the Region 3 Endangered Species Permits Coordinator at (612) 713-5339.

cc: FWS/Region 4 and 5 (Attn: Regional Recovery Permits Coordinator)
FWS/ES/ Endangered Species Coordinators MN-WI, IA-IL, MI, OH, IN



DNR, Endangered Species Coordinators MN, WI, IA, IL, MI, OH, IN

9.2. West Virginia Scientific Collecting Permit



DIVISION OF NATURAL RESOURCES

**Wildlife Resources Section
Elkins Operations Center
738 Ward Rd., PO Box 67
Elkins, WV 26241
Telephone 304-637-0245
Fax 304-637-0250**

**Stephen S. McDaniel
Director**

NUMBER 2019.365

SCIENTIFIC COLLECTING PERMIT

Under Authority Conferred by Chapter 20, Article 2, Section 50, Code of West Virginia, As Amended

**Leif Richardson
Stone Environmental, Inc.
535 Stone Cutters Way
Montpelier, VT 05602**

is hereby permitted to collect specimens according to the attached application and the Special Provisions on the reverse side of this permit.

This permit is not transferable and expires on August 31, 2019.

A complete list of all specimens collected will be kept and reported to the Director of the Division of Natural Resources of West Virginia no later than 45 days after the expiration date of this permit.

PERMIT PROVISIONS

I understand that (1) The privileges granted under this permit are not transferable, and to allow anyone other than myself to use my permit is unlawful and will be considered cause for revocation of said permit; (2) A Federal Scientific Collection Permit issued by the U.S. Department of Interior must be obtained before any migratory birds, or their nests or eggs, are collected or held in captivity; (3) The Federal Permit does not extend the privileges of the permittee beyond those granted by the Division of Natural Resources; (4) Permission must be obtained from either the owner or the custodian of any fenced or posted land before entering same for the purpose of collecting scientific specimens; (5) It is unlawful to carry a revolver or pistol contrary to Article VII, Chapter 61, Code of West Virginia; (6) It is unlawful to collect specimens with a gun on a Sunday; (7) It is unlawful to sell, offer for sale, barter, or offer to barter any wild animals, wild birds, fish or frogs collected; (8) When traps or nets or other devices are used UNATTENDED while exercising the privileges of this permit, said traps, nets, or devices must have attached thereto a tag bearing the name, address and number of the Scientific Collecting Permit; (9) It is unlawful to take or attempt to take any wild animals, wild birds, fish or frogs under said permit except for scientific and propagation purposes; (10) A hunting or fishing license must be obtained before specimens may be taken for sport; (11) Only those species or classes of wild birds, wild animals, fish or frogs listed below, and in the numbers stated, may be lawfully taken under said permit; and (12) I am required by law to carry my Scientific Collecting Permit, on my person while exercising the privileges granted thereunder, and to exhibit the permit to anyone requesting to see the same.

Must be signed before valid.

Signature of permittee

Chief, Wildlife Resources, WVDNR

Date of issue 8/12/19

IMPORTANT

THE ATTACHED APPLICATION FORM INDICATING SPECIES TO BE COLLECTED, LOCATIONS OF COLLECTIONS, MANNER OF COLLECTION, AND PURPOSE OF COLLECTION IS TO BE CONSIDERED A PART OF THIS PERMIT AND SHOULD REMAIN ATTACHED.

YOU ARE SUBJECT TO THE FOLLOWING COLLECTING AND REPORTING PROVISIONS. FAILURE TO MEET THESE CRITERIA IS GROUNDS FOR REVOCATION OF THE PERMIT AND/OR DENIAL OF FUTURE PERMIT APPLICATIONS AND/OR PENALTIES OR OTHER STRICTURES.

SPECIAL PROVISIONS:

US Fish and Wildlife Service protocols for non-lethal survey methods must be followed:

<https://www.fws.gov/midwest/endangered/insects/rpbb/pdf/SurveyProtocolsRPBB28Feb2018.pdf>

All rusty patched bumble bees shall be reported to the WVDNR and US Fish and Wildlife Service within 48 hours: barbara.d.sargent@wv.gov; barbara_douglas@fws.gov. The following data must be included in report: date of survey, county, coordinates of capture location, sex of specimen, habitat, landowner, and photographs of the bee and habitat. Any dead specimens shall be turned over the WVDNR.

Please provide disposition of any voucher specimens of other bee species, including the collection number if available.

The WVDNR requests a copy of any papers, reports or theses published as a result of this research.

Reporting: A reporting spreadsheet will be provided via email. The report is due within 45 days of the expiration date of your permit, and should be sent to barbara.d.sargent@wv.gov.



APPLICATION FOR WEST VIRGINIA SCIENTIFIC COLLECTING PERMIT

Name: Leif Richardson

Institution/Affiliation: Stone Environmental, Inc.

Street: 535 Stone Cutters Way

City: Montpelier State: VT Zip: 05602

Telephone: 802-793-6449 Email: leif@stone-env.com

Profession: Ecologist Major professor: _____

Specific manner of collection I wish to make non-lethal catch-and-release identifications of bumble bees using methods developed by the USFWS for the scientific study of the rusty-patched bumble bee.

Purpose for which specimens are to be collected (attach project proposal): I am an environmental consultant working for a private client to better understand the potential risks of construction of the Atlantic Coast Pipeline to the rusty-patched bumble bee (*Bombus affinis*). I do not have a project proposal to attach.

How will specimens be disposed? I will collect no specimens.

Date on which collecting is to be: August 18, 2019 to August ³¹~~22~~, 2019 (approximate)
(Commence) (Terminate)

County(s) & nearest town(s): Pocahontas County (area around town of Dunmore)

If aquatic, indicate stream(s) and nearest town(s): _____

Attach separate pages if additional space is required.
(Over)

Report that will result from studies and additional comments or information which may be pertinent to issuing this permit I will be preparing a report for our private client, and will also be sending a report containing all data to the USFWS. I can supply this report to the state of WV also.

Have you received a WV permit in previous years? No. Most recent year _____

