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Public Comments Processing
Attn: FWS-R5-ES-2016-0135
Division of Policy, Performance, and Management Programs
U.S. Fish and Wildlife Service
5275 Leesburg Pike, ABHC-PPM
Falls Church, VA 22041-3803.

Re: NEPA Scoping Comments for Proposed Incidental Take Permit and Habitat Conservation Plan; Docket No. FWS-R5-ES-2016-0135

To Whom It May Concern:

On behalf of the Center for Biological Diversity, the Sierra Club and its Ohio, Pennsylvania, and West Virginia Chapters, Delaware Riverkeeper Network, Defenders of Wildlife, Ohio Valley Environmental Coalition, Ohio Environmental Council, West Virginia Highlands Conservancy, Allegheny Highlands Alliance, Friends of Beautiful Pendleton County, Mountain Lakes Preservation Alliance, West Virginia Environmental Council, Berks Gas Truth, Athens County Fracking Action Network, Buckeye Environmental Network (formerly Buckeye Forest Council), PennFuture, Indian Creek Watershed Association, Protect Our Water Heritage Rights Coalition, West Virginia Rivers Coalition, Laurel Mountain Preservation Association, Allegheny Defense Project, Appalachian Mountain Advocates, Animal Welfare Institute, and Darwin Raymond (collectively, "Commenters"), we respectfully submit these NEPA scoping comments for a proposed Incidental Take Permit ("ITP") and Habitat Conservation Plan ("HCP") to cover 50 years of oil and gas exploration, production, and maintenance activities in Ohio, Pennsylvania, and West Virginia, which would provide nine companies with ITP coverage for five bat species: The endangered Indiana bat (*Myotis sodalis*), the threatened northern long-eared bat (*Myotis septentrionalis*), the little brown bat (*Myotis lucifugus*), the eastern small-footed bat (*Myotis leibii*), and the tri-colored bat (*Perimyotis subflavus*).

We urge the U.S. Fish and Wildlife Service ("FWS") to deny the application, because an ITP – especially one that lasts for 50 years – cannot legally be issued for these bat species. Specifically, the Endangered Species Act ("ESA") prohibits the issuance of an ITP if the proposed taking will "reduce the likelihood of the survival and recovery of the species in the wild." 16 U.S.C. § 1539(a)(2)(B)(iv). Given the recent dramatic decline in bat populations from habitat loss and white-nose syndrome, any additional habitat loss and fragmentation from oil and gas activities could reduce the likelihood of the survival and recovery of these species. Consequently, the issuance of an ITP for take of these bats would violate the ESA and the FWS implementing regulations, and should be denied.

However, should FWS continue to consider granting this ITP, Commenters urge FWS to provide for a much shorter coverage period, and to issue a draft EIS for comment that considers the cumulative impacts to these bat species from oil and gas activities in these three states in conjunction with impacts to the species from white nose syndrome, other habitat loss and fragmentation, climate change and the contamination of waterbodies these species rely on, and to require extensive protection and mitigation measures to ensure that they will not be jeopardized.

I. Legal Background

Congress enacted the National Environmental Policy Act ("NEPA") in 1969, directing all federal agencies to assess the environmental impact of proposed actions that significantly affect the quality of the environment. 42 U.S.C. § 4332(2)(C). The Council on Environmental Quality ("CEQ") has promulgated uniform regulations to implement NEPA, which are binding on all federal agencies. 42 U.S.C. § 4342; 40 C.F.R. §§ 1500-1508.

The CEQ regulations implementing NEPA require FWS to disclose and analyze the environmental effects of the proposed action. 40 C.F.R. § 1500.1(b). Specifically, the regulation explains that "NEPA procedures must ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." *Id*. The purpose of this requirement is to ensure that the public has information that allows it to question, understand, and, if necessary, challenge the decision made by the agency.

NEPA requires that agencies consider a full range of environmental impacts, including "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, [and] cultural" impacts, "whether direct, indirect, or cumulative." 40 C.F.R. § 1508.8. Cumulative impacts are:

> Impact[s] on the environment which result[] from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Id. § 1508.7. Pursuant to NEPA, actions that are connected or result in cumulative impacts when viewed with other proposed actions should be discussed in the same EIS. 40 C.F.R. § 1508.25. Similarly, Section 7 of the ESA requires FWS to consider the "interrelated, interdependent, and cumulative" impacts of its proposed decision, in order to ensure that its actions are "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat of such species…." HCP Handbook at 1-14; 16 U.S.C. § 1536(a)(2).

Consideration of cumulative effects pursuant to NEPA further requires "some quantified or detailed information," because "[w]ithout such information, neither the courts nor the public, in reviewing the [agency's] decisions, can be assured that the [agency] provided the hard look that it is required to provide." *Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F.3d 1372, 1379 (9th Cir. 1998); *see also Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 993–94 (9th Cir. 2004) ("A proper consideration of the cumulative impacts of a project

requires some quantified or detailed information; general statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided.") (internal quotation marks and citations omitted).

This is especially important here, where FWS is undertaking the NEPA analysis to determine the impacts related to the issuance of an ITP. The issuance of an ITP requires the development of an HCP that specifies, among other things, the impacts to affected species likely to result from such taking, the steps the applicant will take to minimize and mitigate such impacts, and how the applicant will ensure that adequate funding for the plan will be provided. 16 USC § 1539(a)(2)(A) and (B); 50 CFR 17.22(b)(2). FWS must therefore quantify the impacts from this ITP to the bat species, and if there are ways to minimize the impacts beyond what has been proposed, it is FWS' duty to work with the applicant to see that such alternatives are fully vetted, and FWS may not issue an ITP unless an alternative is chosen that sufficiently minimizes the impacts to listed species. *See* 16 USC § 1539(a)(2)(B)(ii) (stating that an ITP may only issue if the applicant has minimized and mitigated the impacts "to the maximum extent practicable"); *see also Id*. § 1536(a)(1) (all federal agencies must "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species …"); *Southwest Ctr. for Biological Diversity v. Bartel*, 470 F. Supp. 2d 1118, 1158 (S.D. Cal. 2006) ("If FWS finds that the HCP fails to mitigate and minimize harm to the species 'to the maximum extent practicable' — because the applicant rejected another alternative that would have provided more mitigation or caused less harm to the endangered species and FWS determined in its expert judgment that the rejected alternative was in fact feasible—then FWS cannot approve the application for an ITP using that less protective proposal.").

II. Factual Background

a. Endangered Bats

In recent years, populations of North American bats, particularly in the Eastern, Southern, and Midwestern U.S., have suffered steep declines. Millions of bat fatalities have been attributed to white-nose Syndrome ("WNS"), a deadly fungal disease first identified in 2006. WNS is a fatal disease affecting hibernating bats that is named for a white fungus that appears on the muzzle and other parts of bats. The disease has spread rapidly across the eastern half of the United States, and is estimated to have killed more than 6 million bats in the Northeast and Canada.[1] In May 2016, WNS was discovered for the first time in the western United States, near Seattle, Washington.[2] WNS is now a continent-wide threat to bats. Bats with WNS "act strangely during cold winter months, including flying outside during the day and clustering near the entrances of caves and other hibernation areas."[3] These abnormal behaviors "may contribute

[1] USFWS, White-nose syndrome: The devastating disease of hibernating bats in North America (May 2016), *available at* https://www.whitenosesyndrome.org/sites/default/files/resource/white-nose_fact_sheet_5-2016_2.pdf.
[2] USFWS, Bat with white-nose syndrome confirmed in Washington state (March 31, 2016), *available at* https://www.whitenosesyndrome.org/news/bat-white-nose-syndrome-confirmed-washington-state
[3] USFWS, White-nose syndrome: The devastating disease of hibernating bats in North America (May 2016), *available at* https://www.whitenosesyndrome.org/sites/default/files/resource/white-nose_fact_sheet_5-2016_2.pdf.

to the untimely consumption of stored fat reserves causing emaciation, a characteristic documented in a portion of the bats that die from WNS."[4]

According to the FWS, WNS is the cause of "the most precipitous decline in North American wildlife in our history."[5] Recent studies have estimated an 88% decrease in the total number of hibernating bats – with 98% and 72% declines in hibernating northern long-eared and Indiana bats, respectively[6] – and have concluded that these perilous population declines are exacerbated by the additive nature of both WNS and numerous human-induced environmental stressors.[7]

Indeed, the FWS recently determined that the listing of the northern long-eared bat was warranted, primarily due to the species' catastrophic decline caused by WNS.[8] There is no evidence the impact of the disease will lessen as it continues to spread west and northward across the rest of the species' range.

WNS has spread across much of the area proposed for this 50-year ITP. WNS has spread to 16 counties in Ohio,[9] including in the Wayne National Forest in Lawrence County.[10] The pathogenic fungus, *Pseudogymnoascus destructans* ("Pd"), is further found in another two Ohio counties.[11] WNS has spread to in 28 counties in Pennsylvania, including Forest and Warren counties,[12] where the Allegheny National Forest is located. Pd is documented in another six Pennsylvania counties.[13] In West Virginia, WNS has spread to 13 counties to date,[14] and has

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[4] USGS, National Wildlife Health Center, White-Nose Syndrome, *available at* http://www.nwhc.usgs.gov/disease_information/white-nose_syndrome/.

[5] Consensus Statement of the Second WNS Emergency Science Strategy Meeting, Austin, Texas, May 27-28, 2009, *available at* http://www.batcon.org/pdfs/whitenose/ConsensusStatement2009.pdf

[6] Bat Conservation Int'l, Impacts of Shale Gas Development on Bat Populations in the Northeastern United States 7 (June 2012), *available at* http://www.delawareriverkeeper.org/resources/Reports/Impacts_of_Shale_Gas_Development_on_Bats.pdf.

[7] *Id.*

[8] U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List the Eastern Small-Footed Bat and the Northern Long-Eared Bat as Endangered or Threatened Species; Listing of the Northern Long-Eared Bat as an Endangered Species, 78 Fed. Reg. 61,046 (Oct. 2, 2013) (hereinafter "Northern Long-Eared Bat Proposed Listing").

[9] Ohio Dept. of Natural Resources, White-nosesSyndrome.org, *available at* https://www.whitenosesyndrome.org/partner/ohio-department-natural-resources; White-nose Syndrome.org, Updated white-nose syndrome map (May 10, 2016) https://www.whitenosesyndrome.org/resource/updated-white-nose-syndrome-map-may-10-2016.

[10] USFS, White-nose Syndrome Detected in Ohio (Mar. 30, 2011), *available at* http://www.fs.usda.gov/wps/portal/fsinternet/!ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gjAwhwtDDw9_AI8zPyhQoY6BdkOyoCAGixyPg!/?ss=110914&navtype=BROWSEBYSUBJECT&cid=STELPRDB5288711&navid=180000000000000&pnavid=null&position=News&ttype=detail&pname=Wayne%20National%20Forest-%20News%20&%20Events.

[11] USFWS, Bat White-nose Syndrome, Occurrence by County/District (Aug. 2, 2016). https://www.whitenosesyndrome.org/sites/default/files/resource/wns_map_20160802.jpg

[12] *Id.*

[13] *Id.*

[14] *Id.*

been found on the Monongahela National Forest.[15] Pd has also been found in one other West Virginia county.[16]

Population declines of bats from WNS are continuing in affected states. In West Virginia, bat surveys in 2013 and 2015 showed that "little brown bats and Indiana bats both declined an additional 26%, and tricolored bats an additional 52%." [17] Overall, declines of several species in West Virginia have been severe: "…White Nose Syndrome has greatly impacted some species which before White Nose Syndrome arrived were extremely common and now these species are quite rare. Little brown bats declined about 97% since 2009!"[18]

The FWS further estimates that the little brown bat has declined 93 percent across the agency's Northeast, Midwest, and Southern regions. Using a somewhat different metric, the proportion of hibernacula populations that dropped by 80-100 percent from the pre-WNS ten-year average is 89 percent for the Northeast, 52 percent for the Midwest, and 39 percent for the South. While the impact of WNS seems most severe in the Northeast, the Service cautions that WNS detection in many areas "has only occurred in the last two or three years. Conversely, WNS has been present in the northeastern United States for 5 to 9 years. Turner et al. (2011) suggested there may be a lag between the discovery of the fungus (*Pseudogymnoascus destructans*) and when observable population declines occur."[19] This last point is important for the purposes of considering a long-term HCP and take permit, because declines of WNS-affected bat species could continue for many years after the advent of the disease. The full effects of the disease, let alone synergistic effects with other threats, may not be known for years into the future.

In addition to the threats posed by WNS, bats are vulnerable to a host of other dangers, including wind energy development, habitat modification, destruction, and disturbance (e.g., vandalism to hibernacula, roost tree removal, habitat fragmentation), effects of climate change, and contaminants.

Oil and gas activities pose significant risk of harm to bat species. Wastewater pits from fracking operations pose serious threats when insects that become trapped on the surface of these pits attract bats, which may then become exposed to toxic chemicals, or entangled in netting covering the pit's surface.[20] In addition, fracking threatens bats' habitat by reducing and

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[15] Statement of Joel Holtrop, Deputy Chief, National Forest System, before the U.S. House of Representatives, Committee on Natural Resources, regarding "White-nose Syndrome: What is Killing Bats in the Northeast," (June 4, 2009), *available at* http://caves.org/WNS/Hearing_090604/testimony_holtrop.pdf

[16] USFWS, Bat White-nose Syndrome, Occurrence by County/District (Aug. 2, 2016). https://www.whitenosesyndrome.org/sites/default/files/resource/wns_map_20160802.jpg

[17] Craig Stihler, WV Dept. of Natural Resources, West Virginia Bat Surveys – Winter 2014/2015.

[18] Craig Stihler, email "2015 update on White Nose Syndrome and bat populations in WV," (May 20, 2015).

[19] Karl Tinsley, "Status Review of the Eastern Sub-Species of the Little Brown Bat *Myotis lucifugus lucifugus*" (Nov. 21, 2016), U.S. Fish and Wildlife Service, Region 3, unpublished manuscript.

[20] *See* Ramirez, Pedro, U.S. Fish and Wildlife Service, Reserve Pit Management: Risks to Migratory Birds at 9 (Sept. 2009), available at https://www.fws.gov/migratorybirds/pdf/management/reservepitmanagementriskstomigbirds.pdf (noting bats can be attracted to wastewater pits).

fragmenting areas for foraging and roosting, and risks degradation of streams from spills and contamination.

While Pennsylvania epitomizes the catastrophic impact of WNS on bat populations—the Commonwealth has lost 99% of its northern long-eared bat population,[21] and the Indiana bat has declined 76% since WNS[22]—Pennsylvania's sizable State lands are vital to the recovery and survival of rare, forest-dependent species, such as bats. The recovery of WNS-decimated bat populations will depend in substantial part on the availability of high-quality summer habitat as well as secure hibernacula; however, Pennsylvania forests are at risk from further development, such as the recently proposed Renovo Energy natural gas plant, which would be in the heart of Pennsylvania's state forest system.[23]

The FWS has assessed the summer habitat needs of both the Indiana bat[24] and the northern long-eared bat.[25] In addition the Center for Biological Diversity's petition for listing the northern long-eared bat summarized available scientific literature regarding the species' summer habitat needs.[26] While specific geographic location, sex, and reproductive status all appear to influence the selection of habitat by both species, the overarching conclusions of applicable research are that both the Indiana bat and the northern long-eared bat appear moderately to strongly dependent on the availability of larger, older trees and snags for roosting, and on larger patches of relatively undisturbed forest, preferably near bodies of water, for foraging. Large, older trees that are located in areas of forest with lower canopy cover are of particular importance because they serve as the location of Indiana bat maternity colonies. Thus, the removal of trees from forested lands, either by clearcutting or other techniques, and the fragmentation of habitat, whether by logging, road-building, construction of pipeline corridors, or other oil and gas related activities, creates a real threat to the recovery and survival of these vulnerable species.

The northern long-eared bat, in particular, appears highly sensitive to forest fragmentation and reduction in canopy cover.[27] Given the threat of WNS to northern long-eared

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[21] Greg Turner, Endangered Mammal Specialist, Pennsylvania Game Commission, 2013 unpublished data.
[22] *Id.*
[23] *See* Army Corps notice at http://www.nab.usace.army.mil/Missions/Regulatory/Public-Notices/Public-Notice-View/Article/996927/pn-16-60-comment-period-for-renovo-natural-gas-powered-power-plant-clinton-coun/
[24] FWS, Indiana Bat Draft Recovery Plan, First revision (2007), http://www.fws.gov/midwest/Endangered/mammals/inba/inba_drftrecpln16ap07.html; *see also* Luensmann, Peggy S. 2005. *Myotis sodalis*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer), *available at* http://www.fs.fed.us/database/feis/ [2013, December 5].
[25] Northern Long-Eared Bat Proposed Listing Pp. 40-43.
[26] Center for Biological Diversity, Petition to List the Eastern-Small Footed Bat *Myotis leibii* and Northern Long-Eared Bat *Myotis septentrionalis* as Threatened or Endangered Under the Endangered Species Act (2010), *available at* http://www.biologicaldiversity.org/species/mammals/eastern_small-footed_bat/pdfs/petition-Myotisleibii-Myotisseptentrionalis.pdf
[27] Caceres, M.C., and R. Barclay. 2000. *Myotis septentrionalis*. Mammalian Species 634: 1-4; Caceres, M. C., and M. J. Pybus. 1997. Status of the Northern Long-eared Bat (*Myotis septentrionalis*) in Alberta. Alberta Environmental Protection, Wildlife Management Division, Wildlife Status Report No. 3, Edmonton, AB; Ford, W.M., Menzel, M.A., Rodrigue, J.L., Menzel, J.M., and Johnson, J.B. 2005. Relating bat species presence to simple habitat measures in a central Appalachian forest. Biological

bats, the FWS has recognized that "[o]ther sources of mortality could further diminish the species' ability to persist as it experiences ongoing dramatic declines," since WNS has "reduced these populations to the extent that they may be increasingly vulnerable to other stressors that they may have previously had the ability to withstand."[28]

The FWS has expressed similar concerns about threats to the little brown bat, which has also declined dramatically in the eastern United States as a consequence of WNS:

- "This [sharp decline] has likely resulted in a reduced eastern population comprised of increasingly isolated local populations, which may elevate the risk of the remaining individuals to additional stressors or stochastic events."[29]

- Because MYLU-LU [little brown bat eastern sub-species] populations are continuing to decline, and a majority of the MYLU-LU's range has become contaminated with *P. destructans*, remaining populations are particularly vulnerable to local extirpation if habitat is further degraded. Any additional stressors in the environment are also likely to have a disproportionate effect on local populations.[30]

While the eastern small-footed bat has been less severely affected by WNS than other hibernating bat species in the eastern United States,[31] as a summer ground-roosting species the potential for oil and gas activity to cause harm to this species could be significant.[32] This species is particularly known to favor talus slopes, rock piles, cliff faces, and other rocky substrates. Surface ground disturbance caused by drill pad installation, creation of wastewater ponds, forest clearing, road construction, and other activities could therefore directly cause injury and death to roosting eastern small-footed bats.

i. Indiana bat status

The federally-listed Indiana bat has suffered substantial population declines attributable to the spread of WNS, and the species' range now is entirely coincident with the area affected by WNS. A 2013 study by U.S. Geological Survey and FWS scientists projected the Indiana bat population will fall to just 14% of its pre-WNS numbers range-wide by 2022, [33] less than six

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Conservation 126: 528-539; Forest Service Manual 2600 – Wildlife, Fish, and Sensitive Plant Habitat Management. Chapter 2670 – Threatened, endangered, and sensitive plants and animals. September 2005; Veilluex, J.P. and S. Reynolds. 2006. Northern Myotis. Pp. A317-A323 in New Hampshire Wildlife Action Plan. *Available at* http://extension.unh.edu/resources/files/Resource001071_Rep1315.pdf

[28] *See* U.S. Fish and Wildlife Service, Northern Long-Eared Bat Interim Conference and Planning Guidance, USFWS Regions 2, 3, 4, 5 & 6 (2014).

[29] Karl Tinsley, Infra note 19 at 63.

[30] *Id*. at 129.

[31] Kate E. Langwig et al., "Sociality, density-dependence and microclimates determine the persistence of populations suffering from a novel fungal disease, white-nose syndrome," Ecology Letters (2012): 1-8. doi: 10.1111/j.1461-0248.2012.01829.x

[32] Joseph S. Johnson, James D. Kiser, Kristen S. Watrous and Trevor S. Peterson, "Day-Roosts of *Myotis leibii* in the Appalachian Ridge and Valley of West Virginia," Northeastern Naturalist 18(1):95-106. 2011.

[33] Thogmartin, W.E., C.A. Sanders-Reed, J.A. Szymanski, P.C. McKann, L. Pruitt, R.A. King, M.C. Runge, and R.E. Russell. 2013. White-nose syndrome is likely to extirpate the endangered Indiana bat over large parts of its range. Biological Conservation 160: 162-172.

years from now. Another 2013 study determined that white nose syndrome threatens the Indiana bat with a high risk of extirpation throughout large parts of its range.[34]

Indeed, data from 2015 surveys of Indiana bat hibernacula show that the species not only continues to decline, but also likely has its most significant losses still in the future, as WNS takes hold in its core range, in the Midwest and Central regions of the country. Rangewide, the Indiana bat population declined "only" 9.8% from 2013 to 2015.[35] However, in Northeast states, where WNS struck first, decline between 2009 and 2011 was catastrophic: 98.8% decline in New Jersey, 95.3% decline in Vermont, and 52.9% decline in New York.[36] The locus of peak mortality has now shifted to the Appalachians. In the Indiana Bat Appalachia Recovery Unit, WNS killed a dramatic 70% of the Indiana bats between 2013 and 2015. More recently, WNS has reached the Midwest and Ozark/Central Recovery Units, and while declines have been relatively modest to date (13.8% and 0.3% declines in each recovery unit, respectively, between 2013 and 2015) 96% of the Indiana bat population hibernates in Midwest and Ozark/Central hibernacula. As previously mentioned above, peak mortality from WNS tends to be delayed several years after first documentation of WNS in a site. Thus, it appears highly probable that the worst is still to come for Indiana bats.

ii. Northern long-eared bat

The most recent, readily available population data on the northern long-eared bat appears to be the FWS' own April 2015 final rule listing the species as threatened. The Service provides follow-up discussion on the species' status at its northern long-eared bat webpage,[37] reconfirming declines of 90% or greater through most of the WNS-affected parts of the species' range where the disease has been present several years. This finding is based on both winter and summer survey data. The Service has "no evidence to expect the impact of WNS to be any different in the West than it was in the Northeast,"[38] and therefore, as WNS spreads to the final few states in its range not yet affected by WNS, it can be expected that the species will suffer the same severe population declines that have occurred elsewhere.

iii. Little brown bat

The FWS calculates little brown bats have declined 97% at Northeast hibernacula since the advent of WNS.[39] [40] [41] Since the initial, precipitous declines following the arrival of WNS,

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[34] Thogmartin, Wayne E. et al. White-nose syndrome is likely to extirpate the endangered Indiana bat over large parts of its range, Biological Conservation, Vol. 160, pp. 162-172 (April 2013), *available at* http://www.sciencedirect.com/science/article/pii/S0006320713000207.

[35] FWS. 2015. Indiana bat population estimates, *available at* https://www.fws.gov/Midwest/endangered/mammals/inba/pdf/2015IBatPopEstimate25Aug2015v2.pdf.

[36] FWS. 2011. Indiana bat population estimates, *available at* http://pbadupws.nrc.gov/docs/ML1426/ML14265A502.pdf

[37] FWS. 2016. Northern long-eared bat, *available at* https://www.fws.gov/midwest/endangered/mammals/nleb/FAQsFinalListNLEB.html

[38] *Id.*

[39] Karl Tinsley, "Status Review of the Eastern Sub-Species of the Little Brown Bat *Myotis lucifugus lucifugus*" (Nov. 21, 2016), U.S. Fish and Wildlife Service, Region 3, unpublished manuscript.

[40] The geographical regions names in this section refer specifically to the FWS' administrative regions.

[41] The FWS' estimate is based on calculating the median decline at surveyed hibernacula in the region.

counts have increased at 16 of 95 sites.[42] Some colonies of little brown bats, unlike other species, appear to be persisting in the region, suggesting the development of resistance.[43] Even with an apparent rise in winter numbers at these few sites, winter populations are still only at 15% of the pre-WNS 10-year average.[44] In the Midwest, the FWS has estimated little brown bats have declined 80% post-WNS, relative to the pre-WNS 10-year average. Of 32 hibernacula examined, three have shown increases in little brown bat numbers, following initial post-WNS declines.[45] The FWS' calculates a 73% decline among little brown bats post-WNS in the Southeast. Overall, the decline in numbers of hibernating little brown bats in the three regions is estimated at 95%.

iv. Tricolored bat

Among WNS-affected species, the tricolored bat has suffered some of the worst mortality rates. After initial onset of WNS, peak mortality seems to occur a year or two later for tricolored bats than for other bat species. In 2011 tricolored bat counts were down by 75 percent in the Northeast.[46] More recent data indicate tricolored bat declines as severe, or nearly so, within another couple years. For example, the Akron Mine in New York, which had the most sizeable colony of tricolored bats in the state, went from 968 tricolored bats in 2008 to 7 in 2014, a decline of over 99 percent. Meanwhile, Benson Cave, which had 39 tricolored bats in 2006, had none in 2014—a 100 percent mortality rate.[47]

In Virginia, the tricolored bat declined by nearly 90 percent between 2009 and 2012.[48] More recent data from Virginia has shown that tricolored bats hibernating at sites where little brown bats were absent declined 81 percent post-WNS. However, declines were worse for tricolored bats that shared hibernacula with little brown bats. At these sites, tricolored bats declined 94 percent.[49] In Pennsylvania, the tricolored bat population had dropped by 98 percent by 2012.[50] In one West Virginia cave, a colony of tricolored bats dropped by 99 percent after the arrival of WNS.[51] In another study, post-WNS capture rates for the tricolored bat in West

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[42] *Id.*
[43] Langwig,KE, Hoyt JR, Parise, KL, Frick WF, Foster JT, Kilpatrick AM. 2017 Resistance in persisting bat populations after white-nose syndrome invasion. Phil. Trans. R. Soc.
[44] Karl Tinsley, "Status Review of the Eastern Sub-Species of the Little Brown Bat *Myotis lucifugus lucifugus*" (Nov. 21, 2016), U.S. Fish and Wildlife Service, Region 3, unpublished manuscript.
[45] *Id.*
[46] Turner, G.G., D.M. Reeder, and J.T.H. Coleman. 2011. A five-year assessment of mortality and geographic spread of white-nose syndrome in North American bats and a look to the future. Bat Research News 52(2): 13-27.
[47] Herzog, C.J. and O'Connor, K.E. 2015. New York state update. Presentation to Northeast Bat Working Group, Jan. 21-23, Portland, Maine. Accessed Nov. 20, 2015. http://www.nebwg.org/AnnualMeetings/2015/nebwg15.html
[48] VDGIF (Virginia Dept. of Game and Inland Fisheries). 2012. News release: White-nose syndrome continues to decimate bat population in Virginia, 3/29/2012. http://www.dgif.virginia.gov/news/release.asp?id=328.
[49] Reynolds, R. 2015. Virginia state report. Presentation to Northeast Bat Working Group, Jan. 21-23, Portland, Maine. Accessed Nov. 20, 2015. http://www.nebwg.org/AnnualMeetings/2015/nebwg15.html
[50] PGC (Pennsylvania Game Commission). 2012. Actions for Protection of Remaining Populations of Northern Long-Eared Bat, Tricolored Bat (Formerly Known as the Eastern Pipestrelle) and the Little Brown Bat; Request for Public Comment. 42 Pa.B. 5310, Aug. 11, 2012.
[51] Herzog, C. and R. Reynolds. 2013. An update from the heart of WNS country. A presentation to Northeast Bat Working Group 2013 annual meeting, January 2013, Albany, NY.

Virginia were just 22.9 percent of the historical rate, on par with decreased capture rates for the northern long-eared bat and little brown bat.[52]

Mortality rates similar to those seen in the Northeast are now emerging in the southern Midwest.[53] For example, in Ohio, three years after WNS first appeared, counts of hibernating tricolored bats have declined 98 percent. In other areas more recently hit by the disease, declines are less severe to date, but it remains to be seen what the impact of WNS will be over the next several years. In Indiana, for example, the tricolored bat has declined by 71 percent.[54] As has been seen in the Northeast, mortality of the tricolored bat is likely to "catch up" after a few years.

b. Effects of Oil and Gas Development on Bat Species

i. Oil and Gas Extraction Activities

There are substantial threats posed by oil and gas development across a significant portion of the range of the five bat species being considered for the HCP. New technologies have allowed companies to access oil and natural gas reserves previously inaccessible, such as from shale and coalbeds.[55] As a result, extraction activities have greatly expanded, especially in the eastern United States. There has been a 6,000 percent increase in shale natural gas development in the United States from 2007 to 2013,[56] and the Marcellus Shale in the Appalachian Basin is the most rapidly growing source of natural gas in the country.[57] The construction of wells and associated infrastructure and the use of vast quantities of water and an array of toxic chemicals in the extraction process degrade bat habitat.[58]

The primary method of natural gas development is called hydraulic fracturing ("fracking" or "hydrofracking"). This involves fracturing rock formations using highly pressurized fluids consisting of water and various chemicals.[59] The Marcellus and Utica shales underlie the Appalachian Basin from the Mohawk and Hudson Rivers of New York, through Pennsylvania,

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[52] Francl, K.E., W.M. Ford, D.W. Sparks, and V. Brack Jr. 2012. Capture and reproductive trends in summer bat communities in West Virginia: Assessing the impact of white-nose syndrome. Journal of Fish and Wildlife Management 3(1): 33–42.

[53] Halley, C. 2015. Bats with white-nose syndrome: An interview with David Blehert. JSTOR Daily, Feb. 11. Available at: http://daily.jstor.org/bats-with-white-nose-syndrome/

[54] Indiana Dept. of Natural Resources. 2016. White-nose syndrome in bats, *available at* http://www.in.gov/dnr/fishwild/5404.htm.

[55] Environmental Protection Agency (EPA). 2015. Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources – External Review Draft. June 2015 at p. ES-3. Available at: www.epa.gov/hfstudy.

[56] Malakoff, D. 2014. The gas surge. Science (80: -) 344: 1465–1467, cited in Entrekin, S. A., Maloney, K. O., Kapo, K. E., Walters, A. W., Evans-White, M. A., & Klemow, K. M. 2015. Stream vulnerability to widespread and emergent stressors: a focus on unconventional oil and gas. PloS one, 10(9), e0137416.

[57] Souther, S., Tingley, M. W., Popescu, V. D., Hayman, D. T., Ryan, M. E., Graves, T. A.... & Terrell, K. 2014. Biotic impacts of energy development from shale: research priorities and knowledge gaps. Frontiers in Ecology and the Environment, 12(6), 330-338, 330.

[58] *Id*. at 335.

[59] Hein, C. D. 2012. Potential impacts of shale gas development on bat populations in the northeastern United States. An unpublished report submitted to the Delaware Riverkeeper Network, Bristol, Pennsylvania by Bat Conservation International, Austin, Texas (Hereinafter, "Hein 2012"). Available at http://cqrcengage.com/delawareriverkeeper/file/SOrngPLDhpt/Impacts_of_Shale_Gas_Development_on_Bats.pdf.

Ohio, West Virginia, and parts of Maryland, Virginia, and Ontario.[60] Overall, high-volume horizontal fracking ("HVHHF") could potentially occur over 280,000km^2 in the eastern United States. For reference, that is roughly the size of New York, Pennsylvania, and New Jersey combined.

Each fracking installation constitutes a wellpad, access road, storage areas for water, chemicals, sand, and wastewater, a compressor station, and a collector pipeline.[61] The average size of a forest well installation in Pennsylvania in 2008 was 3.56ha; given the secondary components of the natural gas infrastructure (such as access roads, water/wastewater storage, compressor stations, and gathering pipelines) and associated edge effects, that constitutes approximately 15ha of disrupted habitat per well.[62] In Pennsylvania alone, 2,000 Marcellus shale wells have been drilled or permitted,[63] and an estimated 60,000 new wells will be in place by 2030.[64] Fracking activities will therefore result in a significant amount of habitat loss for bats in the eastern United States.[65]

The magnitude of shale gas development over the next few decades will have the same impacts that other anthropogenic activities have had on bat habitat, but potentially at much greater levels.[66] Bats rely on forests for foraging and roosting activities,[67] and the negative impacts on bats from forest cover loss are well documented in studies on logging,[68] urban expansion,[69] and agricultural development.[70] It is therefore clear that habitat fragmentation and loss from oil and gas development poses significant risks to bat populations across the Eastern U.S.[71] Furthermore, the bats considered for the HCP exhibit site fidelity, especially among pregnant females.[72] The loss of forested habitat puts additional stress on already struggling

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[60] Kiviat, E. 2013. Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales. Annals of the New York Academy of Sciences, 1286(1), 1-14. (Hereinafter, "Kiviat 2013").
[61] *Id.*
[62] Johnson, N. 2010. Pennsylvania energy impacts assessment. Report 1: Marcellus shale natural gas and wind. Nature Conservancy, Pennsylvania Chapter. Harrisburg, PA. Accessed: September 8, 2012. http://www.nature.org/media/pa/pa_energy_assessment_report.Pdf.
[63] *Id.* at 8, 13.
[64] Davis, J.B. & G.R. Robinson. 2012. A geographic model to assess and limit cumulative ecological degradation from Marcellus shale exploitation in New York, USA. Ecol. Soc. 17: article 25.
[65] Souther et al. 2014, Infra note 37 p. 335.
[66] Hein 2012, p. 11.
[67] Fenton, M. B. 2003. Science and the conservation of bats: where to next? Wildlife Society Bulletin 31:6–15; Lane, D. J. W., T. Kingston, and B. P. Y. H. Lee. 2006. Dramatic decline in bat species richness in Singapore, with implications for Southeast Asia. Biological Conservation 131:584–593; Henderson, L. E., L. J. Farrow, and H. G. Broders. 2008. Intra-specific effects of forest loss on the distribution of the forest-dependent northern long-eared bat (Myotis septentrionalis). Biological Conservation 141:1819–1828.
[68] Grindal, D. R. 1996. Habitat use by bats in fragmented forests. In R. Barclay and R. Brigham (eds.), Bats and forests symposiums. British Columbia Ministry of Forest, Victoria, BC, Canada;
[69] Duchamp, J. E., D. W. Sparks, and J. O. J. Whitaker. 2004. Foraging-habitat selection by bats at an urban-rural interface: comparison between a successful and a less successful species. Canadian Journal of Zoology 82:1157–1164.
[70] Hein 2012, p. 10.
[71] *See* Hein 2012, p. 11.
[72] Kalcounis, M. C., and K. R. Hecker. 1996. Intraspecific variation in roost-site selection by little brown bats (Myotis lucifugus). In R. M. R. Barclay and R. M. Brigham (eds), Bats and forests symposium. British Columbia Ministry of Forests, Victoria, Canada; Brigham, R. M., M. J. Vonhof, R. M. R. Barclay, and J. C. Gwilliam. 1997. Roosting behavior and roost-site preferences of forest-dwelling California bats

females emerging from their hibernacula at a time of the year when prey availability is already low.[73]

Fracking operations require extraordinary amounts of water as well, resulting in the loss or degradation of wetland and other aquatic sites in areas where water is less available or where drought is occurring.[74] Aquatic habitats provide both a main source for insect prey as well as water and therefore play a critical role in the ecology of bats.[75] Bats may drink up to 26 percent of their daily water intake from open water sources, and these sources are especially important for reproductive success to provide sufficient nutrition for females' young.[76] Thus, the extensive withdrawal of water from bat habitat, especially in sensitive areas, will impact site-selection, reproductive success, and prey availability.[77]

In addition to direct habitat loss, it is also becoming increasingly clear that fracking contaminates groundwater and poses serious ecosystem health risks. The EPA recently identified 1,076 chemicals used in hydrofracking fluids, including acids, alcohols, aromatic hydrocarbons, bases, hydrocarbon mixtures, polysaccharides, and surfactants such as lead, ethylene glycol, benzene, toluene, and xylene compounds.[78] The majority of 453 chemicals that were measured for their physiochemical properties associated strongly with soils and organic materials, meaning that they have the potential to persist in the environment for long periods of time.[79] At least 65 of these are listed as hazardous by the federal government.[80] As much as a third of the injected drilling fluids remain in the ground following drilling, and numerous incidences of related water contamination have been reported across the country. However, the type and number of

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(Myotis californicus). Journal of Mammalogy 78:1230–1239; Weller, T. J., and C. J. Zabel. 2001. Characteristics of fringed Myotis day-roosts in northern California. Journal of Wildlife Management 65:489–497; Willis, C. K. R., and R. M. Brigham. 2004. Roost switching, roost sharing and social cohesion: forest-dwelling big brown bats (Eptesicus fuscus) conform to the fission-fusion model. Animal Behaviour 68:495–504; Perry, R.W. and R.E. Thill. 2007. Tree roosting by male and female eastern pipistrelles in a forested landscape. J. Mammal. 88(4): 974-981; *see also* Hein 2012, p. 10-11.

[73] Kurta, A., K. J. Williams, and R. Mies. 1996. Ecological, behavioural, and thermal observations of a peripheral population of Indiana bats (Myotis sodalis). Pp. 102-117 in R.M.R. Barclay and R. M. Brigham (eds.), Bats and Forests Symposium. Research Branch, British Columbia Ministry of Forests, Victoria, BC, Canada.; Murray, S. W. 1999. Diet and nocturnal activity patterns of the endangered Indiana bat, Myotis sodalis. M.S. Thesis. Eastern Michigan University, Ypsilanti, MI. 77 pp.; *See also* Hein 2012, p. 11.

[74] Hein 2012.

[75] Racey, P. A., and S. M. Swift. 1985. Feeding ecology of Pipistrellus pipistrellus (Chiropter: Vespertilionidae) during pregnancy and lactation. 1. Foraging behavior. Journal of Animal Ecology 54:205–215; Grindal, S. D., J. L. Morissett, and R. M. Brigham. 1999. Concentration of bat activity in riparian habitats over an elevational gradient. Canadian Journal of Zoology 77:972–977; Downs, N. C., and P. A. Racey. 2006. The use by bats of habitat features in mixed farmland in Scotland. Acta Chiropterologica 8:169–185; Hayes, J. P. and S. C. Loeb. 2007. The influence of forest management on bats in North America. Pp 207-235 in Bats in Forests: Conservation and Management (M. J. Lacki, J. P. Hayes, and A. Kurta, eds.). Johns Hopkins University Press; *See also* Hein 2012, p. 7.

[76] Hein 2012, p. 7-8.

[77] *Id.*

[78] Environmental Protection Agency (EPA). 2015. Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources – External Review Draft. June 2015. Available at: www.epa.gov/hfstudy; Hein 2012, p. 2.

[79] *Id.*

[80] Environmental Protection Agency (EPA). 2004. Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs. June 2004, Chapter 1, pp. 1-11.

chemicals used in any given well are unidentified.[81] Contamination from wastewater can occur at any time during fracking operations, and extensive transport and use of these chemicals in various supplies, vehicles, and equipment increase the risk of spills or leaks.[82]

Cadmium, mercury, and lead are three well-studied and commonly associated heavy metals that can be found in HVHHF operations.[83] These metals cause a wide array of health issues in mammals, including reproductive and renal failure, reduced immune function, hormonal changes, impaired function to the central nervous system, motor skill impairment, and hematological issues;[84] though the direct impacts on bats is poorly studied. These toxins, as well as others mentioned above, often end up in wastewater ponds or inadequately treated in wastewater treatment plants.[85] As a result, many aquatic insects and insectivores such as bats are at an increased risk of exposure to these toxins by being attracted to these water sources, which then become ecological traps.[86] Bats are known to congregate and drink from other industrial and toxic holding ponds.[87] Similar to the cyanide poisoning of bats drinking from gold mine sites, HVHHF operations can easily result in bat mortality from poisoning.[88] They could also suffer from reduced prey availability as insect populations decrease due to contamination. At least 80 percent of Marcellus Shale gas wells are located within 200m of riparian areas and 100 percent are within 300m.[89]

Finally, the noise and light pollution associated with natural gas extraction could impair bats' ability to forage.[90] HVHHF diesel compressors run 24 hours a day and can be heard from long distances, and installations are very brightly lit through all hours of the night.[91]

The geographic coincidence of the Marcellus Shale and the current distribution of WNS is striking.[92] While drilling, mining, and other subsurface exploration have the potential to harm bat populations under normal circumstances, the presence of WNS greatly amplifies the threats these activities pose by compromising the health and stability of these populations.[93] The pipelines, drilling and related development activities contemplated for this ITP are likely to spur

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[81] Kiviat, E. 2013. Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales. Annals of the New York Academy of Sciences, 1286(1), 1-14.
[82] Hein 2012, p. 4.
[83] Hein 2012, p. 9
[84] *Id.*
[85] Kiviat, E. 2013. Risks to biodiversity from hydraulic fracturing for natural gas in the Marcellus and Utica shales. Annals of the New York Academy of Sciences, 1286(1), 1-14.
[86] *Id.*
[87] Huie, K. M. 2002. Use of constructed woodland ponds by bats in the Daniel Boone National Forest. MS thesis, Eastner Kentucky University, Richmond, KY; Hein 2012, p. 8.
[88] Hein 2012, p. 8.
[89] Hein 2012, p. 4.
[90] Legakis, A., C. Papadimitriou, M. Gaethlich & D. Lazaris. 2000. Survey of the bats of the Athens metropolitan area. Myotis 38: 41–46; Schaub, A., J. Ostwald & B.M. Siemers. 2008. Foraging bats avoid noise. J. Exp. Biol. 211: 3174– 3180; Francis, C.D., N.J. Kleist, C.P. Ortega&A.Cruz. 2012.Noise pollution alters ecological services: enhanced pollination and disrupted seed dispersal. Proc. R. Soc. B.-Biol. Sci. 279: 2727–2735; *See also* Kiviat 2013, p. 5.
[91] Kiviat 2013, p. 5.
[92] Hein 2012, p. 7.
[93] US Geological Survey (USGS). 2009. Investigating White Nose Syndrome in Bats: Fact Sheet 20093058. Accessed February 2012. http://pubs.usgs.gov/fs/2009/2058/Pdf/fs2009-3058.Pdf; Hein 2012, p. 7.

a dramatic increase in fossil fuel exploitation, with the corresponding increase in greenhouse gas emissions, habitat loss and fragmentation, and water contamination. The habitat loss, direct disturbance, and environmental contamination associated with oil and gas extraction are significant, and have the potential to further imperil regional bat populations.

ii. Pipeline Development

Although concerns about impacts from oil and gas development have focused a great deal on well pads, drill pits and hazardous fracking fluids as sources of harm, pipelines associated with increased gas production are particularly powerful drivers of habitat harm and fragmentation. Increasingly, as pipelines have proliferated across the eastern U.S., they have become a major environmental concern in their own right.

Over the past few years, hundreds of miles of new natural gas pipeline have been laid in the Northeast.[94] The natural gas industry will require tens of thousands of new "midstream" pipeline in North America in the coming two decades, according to an industry study.[95] Regions experiencing growth in "unconventional" gas sources (e.g., Marcellus shale) will see a greater proportion of new pipeline construction.[96]

Gathering lines—the pipelines used to carry gas from wells to pipelines used for long-distance transport—are barely regulated in most states, and most regulators do not even know where they are located. Yet gathering lines are proliferating across the East as well; an industry group estimates that by 2035 there will be need for 400,000 more miles of gathering line in the United States.[97] The Pennsylvania chapter of The Nature Conservancy estimates the state could see tens of thousands of miles of new pipelines over the next two decades. Most of this new pipeline will be gathering line.[98]

Similarly, a 2014 study found that future development could cause the level of fragmentation in Pennsylvania to "more than double throughout the lifetime of gas development," and gathering lines, which are responsible for approximately 94% of the incremental fragmentation in the core forest study region, cause "irreversible alterations to the forest ecosystem" that "result in increased predation, brood parasitism, altered light, wind, and noise intensity, and spread of invasive species."[99] Moreover, "while habitat loss can have an

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[94] Northeast gas drilling boom threatens forest wildlife, scientists say. Huffington Post, April 2, 2013. http://www.huffingtonpost.com/2013/04/02/northeast-gas-drilling-boom_n_3000449.html.

[95] Tubb, R. 2009. Billions needed to meet long-term natural gas infrastructure supply, demands. Pipeline and Gas Journal. April 2009 Vol. 236 No. 4. http://pipelineandgasjournal.com/billions-needed-meet-long-term-natural-gasinfrastructure-supply-demands?page=show.

[96] *Id*. ("Since shifts in supply from traditional to unconventional sources have been, and are projected to continue to be the key driver of pipeline construction, regions with growing unconventional production will experience a higher proportion of infrastructure development.").

[97] Sadasivam, N. 2013. Gas pipeline boom fragmenting Pennsylvania's forests. Inside Climate News, Dec. 10, 2013. *Available at* http://insideclimatenews.org/news/20131210/gas-pipeline-boom-fragmenting-pennsylvaniasforests?page=show.

[98] Johnson, N. et al. 2011. Natural gas pipelines. Excerpt from Report 2 of the Pennsylvania Energy Impacts Assessment. The Nature Conservancy, Pennsylvania Chapter. 9 pp. http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/pennsylvania/ng-pipelines.pdf.

[99] Abrahams, L.S., Griffin, W.M., and Matthews, H.S. 2015. Assessment of policies to reduce core forest fragmentation from Marcellus shale development in Pennsylvania. Ecological Indicators, Vol. 52, Pp. 153-160. Available at http://www.sciencedirect.com/science/article/pii/S1470160X14005664.

immediate impact on wildlife population, the ecological response to fragmentation is lagged, and affects different species at varying time scales."[100] This makes it even harder to assess the impacts to bats from pipeline development in the proposed HCP area over the course of 50 years.

In Pennsylvania, concerns about these pipelines are growing because many of them are being built in the state's 16 million acres of forest, which include some of the largest contiguous blocks of forestland east of the Mississippi River.[101] In the USGS' study of landscape change in Allegheny and Susquehanna counties, both of which have been areas of active fracking in the last decade, forest fragmentation and edge increased from 2004 to 2010, while forest cover decreased. These changes are due to natural gas development. In Susquehanna County, much of the increase in fragmentation was due specifically to installation of pipelines. The loss of interior forest—the habitat with which the Indiana and northern long-eared bat are associated—outpaced the rate of overall forest loss by 2-3 times.[102] These changes point to a "declining resilience of the natural land cover and movement of species," and a "substantially disturbed landscape."[103]

Further, pipeline companies continue to keep pipeline right-of-way areas cleared, causing sustained forest fragmentation.[104] This results in less forest cover for wildlife habitats, leaving wildlife more vulnerable and with fewer trees for bats to perch upon.[105] Since FWS will have no idea where any of these pipelines will be proposed over the next 50 years, it is not possible to even attempt to analyze the actual land clearing impacts that this proposal would have on listed bats.

For forest-dependent species like the Indiana and northern long-eared bat, the escalation of forest fragmentation and ongoing decline of interior forest area indicates a landscape less and less suited to match the species' needs for suitable roosting sites, security from predators, competitive advantage over other nocturnal insectivores, or appropriate foraging habitat. In parts of the East already intensively developed for shale gas and other petroleum and natural gas products, biologists are increasingly painting a picture of a radically transformed landscape, from one that used to be dominated by continuous, mature forest to one in which forest habitat is segmented into smaller and smaller parcels, and invasive plants and animals become more common as the disturbed habitats that favor them become proportionally more abundant.[106] This poses a significant risk of harm to the species at issue in this ITP.

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[100] *Id.*
[101] Sadasivam, N. 2013. Gas pipeline boom fragmenting Pennsylvania's forests. Inside Climate News, Dec. 10, 2013; FracTracker Alliance. 2013. U.S. Shale Viewer.
[102] Slonecker, E.T., Milheim, L.E., Roig-Silva, C.M., and Malizia, A.R. 2013. Landscape consequences of natural gas extraction in Allegheny and Susquehanna Counties, Pennsylvania, 2004-2010. USGS Open-File Report 2013- 1025, 34pp. *Available at* http://pubs.usgs.gov/of/2013/1025/OFR2013_1025.pdf.
[103] *Id.* at 21.
[104] See Food & Water Watch. [Fact sheet]. "Fracking Infrastructure Is Carving Up Pennsylvania." December 2013; Messersmith, Dave. Penn State Extension. "Negotiating pipeline rights-of-way in Pennsylvania." Available at http://extension.psu.edu/natural-resources/natural-gas/publications/negotiating-pipeline-rights-of-way-in-pennsylvania. Accessed November 15, 2013.
[105] Food & Water Watch "Fracking Infrastructure Is Carving Up Pennsylvania." (December 2013).
[106] Sadasivam, N. 2013. Gas pipeline boom fragmenting Pennsylvania's forests. Inside Climate News, Dec. 10, 2013; FracTracker Alliance. 2013. U.S. Shale Viewer. http://maps.fractracker.org/3.0/?appid=ad67d1d697104a4bbc1c238319f03eeb

III. The ESA Prohibits the Issuance of a Permit that Authorizes the Taking of Endangered Bats that Would Jeopardize the Recovery and Survival of the Species.

The ESA provides for the issuance of an ITP only where the proposed taking will not "reduce the likelihood of the survival and recovery of the species in the wild." 50 C.F.R. § 17.22(b)(2)(D). Given the dramatic declines in bat populations across the proposed HCP area discussed herein, which have brought these species to the brink of extirpation across the Eastern U.S., further loss from oil and gas activities could imperil the recovery and survival of the species. Applicants for the ITP bear the burden of demonstrating that issuance of an ITP will not jeopardize survival and recovery of the bats. Given the significant risk of harm to bats and bat habitat from oil and gas activities, there is no scientific evidence to support such a conclusion. Thus, the blanket permission sought by the proposed ITP to disturb unlimited acres of potential bat habitat across Ohio, Pennsylvania and West Virginia to take endangered bats is impermissible under the ESA.

Commenters urge the FWS to analyze thoroughly the significance of *any* additional species losses that might be caused by the proposed oil and gas activities, and that the analysis also take into account other activities that are or may affect the viability of the bat species. Members of the species that have survived the WNS epidemic thus far may possess immunological, physiological, or behavioral traits that will allow the species to persist and eventually recover in the face of WNS. Thus, every individual bat is now of potentially critical value to the maintenance of the species as a whole and should be protected accordingly. The proposed ITP would violate the purpose of the ESA, which is to allow these imperiled species to recover, and therefore should be denied.

IV. Scope of NEPA Review.

In the unlikely event the FWS determines that the issuance of an ITP is legally and scientifically appropriate, the Service must fully analyze the environmental impacts of such issuance in an EIS. As part of its preparation of an EIS, the FWS must "[r]igorously explore and objectively evaluate" a range of alternatives to the proposed federal action, here, the issuance of an ITP and HCP and the required minimization and mitigation of impacts. 40 C.F.R. § 1502.14(a).

Commenters urge that the EIS avoid the kind of tunnel view that can lead to neglect of species' overall needs, in favor of focus on a singular aspect of life history or habitat preference that happens to conveniently coincide with the goals of the Applicants. For example, while the creation of open areas around a few, select trees deemed suitable for bat roosting may mesh with oil/gas exploration goals, such measures should not be regarded as sufficient to protect a species where other habitat needs—e.g., need for intact densely vegetated forest for foraging—may conflict with oil/gas activities. The FWS should ensure that the EIS carefully analyzes and considers the need to preserve large, intact forest tracts in areas near historic or current hibernacula and summer-roosting habitat.

An EIS for the proposed action must also include a hard look at the cumulative impact of the action when considered in connection with other activities that affect Ohio, Pennsylvania and

West Virginia's forests and adjacent lands. Such activities include forestry projects,[107] road construction, mining, wind energy projects, and other industrial and residential development that result in bat habitat loss.

Of particular importance, the EIS should include an analysis of the combined impact of physical forest disturbance and WNS on bat populations. The fragmentation effects of the recent boom in shale gas extraction and pipeline construction have been particularly profound on both public and private land, and scientists are deeply concerned about the long-term consequences of such significant landscape alteration on wildlife.[108] Given the unprecedented collapse of WNS-affected bat populations, any other adverse impacts to the species are likely to be significant and must be assessed in tandem with the proposed oil/gas activities, and must be evaluated as part of the determination as to whether issuance of an ITP will reduce the likelihood of survival and recovery of these species.

In addition to presenting a full analysis of the potential environmental impacts of the proposed action, an EIS must identify measures for avoiding or mitigating such impacts. Specifically, the analysis must show that Applicants will minimize and mitigate the impacts of its take "to the maximum extent practicable." 16 U.S.C. § 1539(a)(2)(B)(ii). As explained in *Southwest Ctr. for Biological Diversity v. Bartel*,

> If FWS finds that the HCP fails to mitigate and minimize harm to the species "to the maximum extent practicable'—because the applicant rejected another alternative that would have provided more mitigation or caused less harm to the endangered species and FWS determined in its expert judgment that the rejected alternative was in fact feasible—then FWS cannot approve the application for an ITP using that less protective proposal.

470 F. Supp. 2d 1118, 1158 (S.D. Cal. 2006). In other words, if the Service determines that the applicant may minimize its take through other feasible alternatives, then the Service may not issue the proposed ITP. In most cases, these bat species are likely to benefit more from existing habitat being left alone than from active habitat manipulation. Thus, conservation measures should focus on avoiding, not simply mitigating, additive sources of mortality.

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[107] For example, Pennsylvania is currently pursuing a separate HCP for bats on Pennsylvania State Game Lands, State Forests and State Parks, which would allow for increased timber removal and controlled burns in sensitive bat habitat. *See http://www.pgc.pa.gov/Wildlife/HabitatManagement/Pages/StateLandsHabitatConservationPlan.aspx.*

[108] Slonecker, E.T., Milheim, L.E., Roig-Silva, C.M., and Malizia, A.R. 2013. Landscape consequences of natural gas extraction in Allegheny and Susquehanna Counties, Pennsylvania, 2004-2010. USGS Open-File Report 2013-1025, 34pp. *Available at* http://pubs.usgs.gov/of/2013/1025/OFR2013_1025.pdf; Begos, K. 2013. Northeast gas drilling boom threatens forest wildlife, scientists say. Huffington Post, April 2, 2013. http://www.huffingtonpost.com/2013/04/02/northeast-gas-drilling-boom_n_3000449.html; Sadasivam, N. 2013. Gas pipeline boom fragmenting Pennsylvania's forests. Inside Climate News, Dec. 10, 2013. *Available at* http://insideclimatenews.org/news/20131210/gas-pipeline-boom-fragmenting-pennsylvanias-forests?page=show; Drohan, P. J., M. Brittingham, J. Bishop, and K. Yoder. 2012. Early trends in landcover change and forest fragmentation due to shale-gas development in Pennsylvania: a potential outcome for the Northcentral Appalachians. Environmental Management 49:1061-1075; Drohan, P. J., J. C. Finley, P. Roth, T. M. Schuler, S.L. Stout, M. C. Brittingham, N.C. Johnson. 2012. Oil and Gas Impacts on Forest Ecosystems: findings gleaned from the 2012 Goddard Forum at Penn State University. Environmental Practice 14:394-399.

The EIS must also address the impacts of hydraulic fracturing or horizontal drilling on the bats. As noted above, water depletions and wastewater pits from fracking operations could pose a serious threat to bats, and fracking threatens the bat's habitat by reducing and fragmenting areas for foraging and roosting, and risks degradation of streams.

Furthermore, the EIS must consider the significance of habitat loss and fragmentation from oil/gas activities – especially pipeline construction – in the context of the ongoing threats from WNS and climate change, as well as private surface development. Moreover, FWS must consider how the proposed activities, which have not yet been adequately defined, could fragment the bats' remaining habitat for spring staging/fall swarming and foraging, disrupt breeding and foraging patterns, pollute and degrade the bat's drinking water sources, and result in death traps for bats in the form of wastewater pits.

Climate change is projected to shift the range of these bats, because the species' reproductive cycles, hibernation patterns, and migration are closely linked to temperature. One landmark study projects that warming summer temperatures will cause "maternity colonies in the western portion of the range [including Ohio]…to begin to decline and possibly disappear in the next 10–20 years," causing the range to shift northeast-ward.[109] The researchers note that "the effects of climate change should be considered in future threats analyses and conservation strategies for the Indiana bat," and that "management actions which foster high reproductive success and survival…will be critical for the conservation and recovery of the species."[110] FWS must therefore account for climate change effects in its analysis of the proposed ITP/HCP.

Furthermore, this HCP is for activities that will themselves exacerbate climate change, and FWS must fully analyze the climate impacts associated with the emission from all likely facilities authorized by such an ITP, as well as from the burning of that oil and gas. According to the U.S. Energy Information Administration, on average burning one thousand cubic feet of natural gas produces 119.9 pounds of CO2 emissions.[111] Further, fugitive emissions from pipeline and compressor stations will contain high levels of GHGs, most notably methane, which the Intergovernmental Panel on Climate Change ("IPCC") estimates to have 34 times the global warming potential ("GWP") of carbon dioxide over a 100-year period.[112] EPA estimates that 23 percent of annual US methane emissions come from natural gas systems and that 34 percent of all methane emissions from the natural gas industry come from the transmission and storage sector, with emissions totaling 54.4 million metric tons in 2013.[113] Recent studies suggest that EPA may be underestimating the methane emissions from all sources by as much as 75 percent.[114] According to

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[109] Loeb, Susan C.& Eric A. Winters, Indiana bat summer maternity distribution: effects of current and future climates, Ecology and Evolution 2013; 3(1):103–114, *available at* http://onlinelibrary.wiley.com/doi/10.1002/ece3.440/abstract.

[110] *Id.*

[111] Carbon Dioxide Emissions Coefficients, http://www.eia.gov/environment/emissions/co2_vol_mass.cfm.

[112] Working Group I Contribution to the IPCC Fifth Assessment Report, Climate Change 2013: The Physical Science Basis 8-58 (June 7, 2013), *available at* http://www.climatechange2013.org/images/uploads/WGIAR5_WGI-12Doc2b_FinalDraft_All.pdf.

[113] U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013 (April 2015)* at 3-69 – 3-70, available at http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html#fullreport.

[114] Subramanian, *et al.*, Methane Emissions from Natural Gas Compressor Stations in the Transmission and Storage Sector: Measurements and Comparisons with the EPA Greenhouse Gas Reporting Program

EPA, "methane losses can occur from leaks (also referred to as fugitive emissions) in all parts of the infrastructure, from connections between pipes and vessels, to valves and equipment."[115] Therefore, in addition to addressing the likely impacts of 50 years of climate change on bat populations, FWS must analyze the acceleration in climate change associated with all facilities covered under the proposed ITP.

While FWS must analyze these matters in the EIS, it is Commenters' position that in light of the continuing impacts to these bats species from WNS, climate change and habitat loss, an ITP that would allow for take coverage from oil and gas activities for the next 50 years would jeopardize these species, and therefore violate the ESA. 16 U.S.C. § 1539(a)(2)(B)(iv).

V. A 50-Year ITP/HCP Timeframe is Unwarranted

The Applicants are requesting take coverage for an unspecified number of oil and gas related activities, including pipeline construction, over unspecified lands across three states for the next 50 years. Providing such extensive and yet unspecified take coverage for such an extended period of time for oil and gas exploration and associated pipeline infrastructure is inconsistent with the requirements of the ESA, and would eliminate valuable opportunities for the public to participate in decisions regarding the protection of these species in the future.

First, it is entirely impractical to suggest that the Applicants or FWS can adequately determine the needs of these bat species over the next 50 years. Bat populations are plummeting, and population modeling suggests that current rates of decline could result in virtual extinction of the Indiana bat within less than thirty years.[116] The species' rapidly shifting baseline, which can reasonably be expected to continue shifting over the next decade or longer, means that a 50-year period for an ITP is biologically indefensible. The EIS should evaluate the proposed 50-year duration of the ITP in light of this information, which strongly suggests that the proposed duration is much too long and that a time frame of ten years or less is more appropriate.

Second, it remains unclear how the Applicants will ensure that adequate funding for the plan will be provided, as required pursuant to section 10(a)(2)(B) of the Act. The oil and gas industry is notoriously volatile, and therefore relying on these energy companies to fund the required mitigation and minimization necessary to address the impacts of widespread midstream and upstream oil and gas exploration, production, and maintenance activities across 3 states for such an extensive period of time seems unwarranted – especially given the precipitous decline of these species and the subsequent need for continued monitoring and adaptive management to mitigate impacts and prevent extirpation. In fact, in light of the 'no surprise assurances' that accompany HCPs, it is not clear how FWS could possibly ensure that sufficient mitigation would be put in place to prevent potentially extensive oil and gas operations and pipelines from contributing to the extensive loss of these species from WNS, which has left them on the brink of extinction.

Moreover, the costs associated with harm from oil and gas activities can be immense. For example, between 1991 and 2010, pipeline operators reported over 850 onshore "significant

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Protocol, *Environ. Science & Technology*, 49, 3252−61 (2015) at 3252, available at http://pubs.acs.org/doi/abs/10.1021/es5060258.

[115] EPA Natural Gas Star, Basic Information, http://www.epa.gov/methane/gasstar/basic-information/index.html.

[116] Thogmartin et al. 2013, infra note 34.

incidents"—i.e., incidents involving fatalities or injuries requiring in-patient hospital care, unintentional fires or explosions, substantial costs, or unintentional releases of highly volatile liquids—dealing with gas transmission alone.[117] Property damage from these incidents totaled over $1 billion dollars. It is therefore not clear what costs the oil and gas activities may themselves pose, and how the HCP would ensure that any such harm was sufficiently mitigated, and that funds are available to do so.

Furthermore, FWS cannot possibly specify "the impacts to affected species likely to result from such taking" as required pursuant to 16 U.S.C. § 1539(a)(2)(B). As discussed above, bat populations are in precipitous decline, and it is impossible to assess the impacts to these species when the extent of the proposed activities has not been specified. The geographic area and extensive timeframe being considered are simply too large to adequately specify the impacts to listed bat species, which is critical to ensuring that the activities do not end up jeopardizing those species. Moreover, the activities themselves have been very broadly defined. In the Notice, "Midstream and upstream oil and gas exploration, production, and maintenance activities" are defined to include all sorts of activities – from access roads to well field development, all types of production and operation activities, as well as all types of construction related to pipelines. The actual techniques used, however, are not specified, suggesting that take coverage is being provided regardless of what technique is used. This could include not only existing extraction techniques that have been shown to cause surface and groundwater contamination (i.e. fracking), but also techniques that may be developed over the course of the next 50 years, which may be even more water or energy intensive, or have increased risk of leaks and contamination as technology is developed to push deeper and to extract more.

In sum, the proposed 50-year lifetime for the HCP is problematic for several reasons. It is simply not possible to develop a plan for this timeframe that adequately predicts what management actions may be necessary to protect these species and their habitats over the course of 50 years of oil and gas exploration, or what advancements in technology, science, and industry practice could lead to more effective conservation in the future, but may never be employed due to "no surprise assurances." There are substantial uncertainties associated with the proposed oil/gas extraction and transportation activities, especially near aquatic and riparian areas. Further, the impact of these activities is even more difficult to predict with the tremendous uncertainties posed by climate change. Current landscape-level changes are likely to become even more dramatic over the next few decades. Applicants should develop an alternative plan with a more reasonable timeframe (i.e. 10 years) that can be extended or modified based on specific monitoring results.

To meet its obligations under NEPA to "[r]igorously explore and objectively evaluate all reasonable alternatives," 40 C.F.R. § 1502.14, the Service's EIS must analyze the impacts of implementing the HCP, including any limitations on flexible and effective response, and base the alternatives analysis on an understanding of these limitations and the value provided by variable permit durations. An ITP that is 10 years or less is viable and would minimize take. Similarly, a 10-year permit would reduce the uncertainty associated with a number of significant factors, including, the implementation of covered activities, take analysis, adaptive management, and environmental consequences.

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[117] See U.S. Dep't of Transp., Pipeline and Hazardous Materials Safety Admin. (‚PHMSA'), Natural Gas Transmission Onshore: Significant Incidents Summary Statistics: 1991– 2010, (last accessed Dec. 8, 2011) http://primis.phmsa.dot.gov/comm/reports/safety/SigPSI.html?nocache=7595#_ngtrans.

VI. Mitigation and Minimization

At this early scoping stage, with no information on the location of the proposed oil/gas activities and no discussion provided as to the potential mitigation measures that FWS may impose, it is difficult for commenters to provide guidance as to the minimization and mitigation that should be required in a ITP/HCP, should Applicants' request be granted. Commenters provide the following points to consider regarding mitigation, and will supplement this discussion if and when a draft EIS and draft HCP are provided:

- Require "closed systems" for storing wastewater instead of wastewater ponds and prohibit netting, to protect the ESA-listed bats. Note: because wastewater ponds and netting are allowed under Ohio law, *see* OAC § 1501:9-3-08, ORC 1509.22(C)(4), it is essential to include this to prevent these hazards for bats on private lands.[118]
- Maintenance of densely vegetated forest for foraging and preservation of large, intact forest tracts in areas near historic or current hibernacula and summer-roosting habitat.
- Buffers of at least 1.5 miles for maternity roost trees and 5 miles for hibernacula. These areas must be permanently protected, not merely seasonally, such that maternity roost trees are not cut down during winter months.
- Require pre-project surveys for maternity roost trees and hibernacula, if an area has not been surveyed specifically for affected bat species in the past 3 years.
- Protections for bats should include analysis and pre-planning for sudden, catastrophic events, such as toxic spills and mass streambank failure. Applicants should also be required to calculate the likelihood of lesser crises, such as unanticipated pipeline failures at stream crossings or frac outs, and assess the risk to bats in the overall project area.
- If and when projects are sited, the Service should notify local conservation groups in the affected area and ensure their active participation, including acting as compliance monitors for the projects. In addition, the Service should require Applicants to include funding for technical experts to assist the public.
- The Service should identify the circumstances that, if they were to occur within the covered geographic area, would require Applicants and the Service to determine if additional conservation and mitigation measures are necessary. This should include factors such as climate change, droughts, floods, fires, tornadoes, disease, invasive species, species range expansion/contraction, species listing/delisting, and gas pipeline leaks and explosions (e.g., caused by human error, corrosion, terrorism, earthquakes, or other threats). Given that gas pipeline leaks and explosions can be reasonably anticipated to occur, the HCP should include additional conservation and mitigation measures to protect the identified species.

[118] Ramirez, Pedro, U.S. Fish and Wildlife Service, Reserve Pit Management: Risks to Migratory Birds at 9 (Sept. 2009), available at https://www.fws.gov/migratorybirds/pdf/management/reservepitmanagementriskstomigbirds.pdf (noting bats can be attracted to wastewater pits) ("Ramirez 2009"); *see also* Ohio Department of Natural Resources, Wastewater (Flowback) from Hydraulic Fracturing, *available at* https://oilandgas.ohiodnr.gov/portals/oilgas/pdf/Wastewater-flowback.pdf (noting wastewater can be stored in pits).

- Develop monitoring protocols for detecting bats at very low densities. As these species decline, greater portions of the affected area are likely to be surveyed without yielding any observations of the species. But these areas may in fact still harbor individuals, albeit at much lower densities than prior to the onset of WNS. It may be that these few surviving bats are crucial for the species' continued existence and future recovery. Monitoring may need to be intensified, or conducted over a longer period of time, to detect the rare individuals that remain.
- Bats already stressed by WNS may require stricter habitat protections, in order to increase the proportion that survive and successfully reproduce in the wake of disturbances such as forest clearing and the placement of drilling waste pits in their summer or fall habitats. Seasonal restrictions on covered activities at or near known habitat sites may be insufficient to assure adequate protection of imperiled bats. These activities may need to be much reduced in intensity or area, or they may need to be prohibited completely. These stricter protections may include the reduction of forest acreage that Applicants can clear, or an outright prohibition on logging of any sort, at any time of year, in known or suspected maternity roost areas, or other summer and fall habitats.
- Individuals that could have been expected to emerge from hibernation and then readily tolerate the disappearance of traditional roosting areas that were logged during the hibernation period may now have lower margins of survival. Bats that survive a winter of WNS infection are likely to be in a weakened state that could predispose them to higher rates of mortality or reproductive failure from a variety of other causes. With the additional factor of WNS, the increased energy expenditure compelled by the loss of spring, summer, or fall habitat may be the difference between survival and death. We recommend that effectiveness monitoring be re-evaluated every two or three years, at most.
- Require colocation of pipeline infrastructure in existing pipeline or road right-of-ways to avoid the need for tree removal.

VII. CONCLUSION

For the reasons set forth above, we ask FWS to deny the proposed application for an ITP. At the very least, we urge the FWS to conduct a comprehensive analysis of the proposed action and its environmental impact in compliance with NEPA. We appreciate the opportunity to submit these comments and look forward to further participation in this proceeding.

Respectfully submitted,

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