ENVIRONMENTAL LAW & POLICY CENTER
Protecting the Midwest's Environment and Natural Heritage

May 13, 2020

Paul Strong, Forest Supervisor
Objection Reviewing Officer
USDA Forest Service
500 Hanson Lake Road
Rhinelander, WI 54501

BY EMAIL: objections-eastern-region@fs.fed.us

Notice of Objection, Fourmile Vegetation Project

Dear Mr. Strong:

Thank you for the opportunity to submit a Notice of Objection to the draft decision notice and finding of no significant impact for the proposed Fourmile Vegetation Project ("Project").

Pursuant to the requirements of 36 CFR 218.8(d):

1. *Objector's name and address, with a telephone number, if available*

The objectors are Dr. Don Waller, Dr. David Zaber, and the Environmental Law and Policy Center, joined by Clean Wisconsin, the Center for Biological Diversity, Midwest Environmental Advocates, and the Sierra Club - John Muir Chapter. Please direct all inquiries to:

Justin Vickers
Environmental Law and Policy Center
35 East Wacker Drive, Suite 1600
Chicago, IL 60601
Telephone: (312) 795-3736
Email: jvickers@elpc.org

2. *A signature or other verification of authorship upon request (a scanned signature for email may be filed with the objection)*

A scanned signature is included in this letter.

3. *When multiple names are listed on an objection, identification of the lead objector (verification of the identity of the lead objector shall be provided upon request)*

Lead objector for purposes of this notice of objection is the Environmental Law and Policy Center.

4. *The name of the proposed project, the name and title of the Responsible Official, and the name of the National Forest and Ranger District on which the proposed project will be implemented*

Fourmile Vegetation Project
Paul Strong, Forest Supervisor
Chequamegon-Nicolet National Forest
Eagle River-Florence Ranger District

5. *A description of those aspects of the proposed project addressed by the objection, including specific issues related to the proposed project if applicable, how the objector believes the environmental analysis or draft decision specifically violates law, regulation, or policy; suggested remedies that would resolve the objection; supporting reasons for the reviewing officer to consider*

Our concerns about the Fourmile Project are summarized in our previous comment letter from June 27, 2019 and we object to the Draft Decision Notice and FONSI ("draft FONSI") and the Environmental Assessment ("EA") on all those grounds. The detailed objections following this letter focus on instances where the EA and the draft FONSI have ignored aspects of the Project that are highly controversial or uncertain and therefore require the Forest Service to conduct an Environmental Impact Statement ("EIS").

6. *A statement that demonstrates the connection between prior specific written comments on the particular proposed project or activity and the content of the objection, unless the objection concerns an issue that arose after the designated opportunity for comment*

The issues raised in these objections were also raised in ELPC's June 27, 2019 comments. Additional details and citations to the scientific literature are provided here in response to the final EA and additional information received in the biological evaluation prepared by the Forest Service. In some places, new aspects of the Project are addressed where the Forest Service provided new information in the EA and its accompanying appendices, including the biological evaluation ("BE").

We hope that these objections are helpful. We request a meeting with Mr. Strong and other appropriate US Forest Service officials to discuss these issues further.

Sincerely,

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Submitted on behalf Dr. Don Waller, Dr. David Zaber, and the Environmental Law & Policy Center

OBJECTIONS

Contents

I. Legal Standard: An EIS is required when "organizations with subject matter expertise" make "concrete objections to an agency's analytical process and its findings" that are unresolved in an EA/draft FONSI

Under the National Environmental Policy Act ("NEPA"), an EIS is required "[i]f any significant environmental impacts might result from the proposed agency action."[1] The Council on Environmental Quality's environmental review rules, in turn, provide that determining whether environmental impacts are "significant" requires examination of both the "context" and the "intensity" of those impacts. Intensity refers to the severity of the impact. When looking at intensity, an agency must consider ten factors.[2] "Implicating any one of the factors may be sufficient to require the preparation of an EIS."[3]

Those "intensity" factors include "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial" and "[t]he degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks."[4] The "highly controversial" factor is not a measure of public opposition; the test is whether there is a "substantial dispute [about] the size, nature, or effect of the major Federal action."[5] A "substantial dispute" exists when evidence "casts serious doubt upon the reasonableness of an

[1] *Grand Canyon Trust v. FAA,* 290 F.3d 339, 340 (D.C. Cir. 2002); *see generally* 42 U.S.C. § 4332(C).
[2] 40 C.F.R. § 1508.27(b).
[3] *National Parks Conservation Ass'n v. Semonite,* 916 F.3d 1075, 1082 (D.C. Cir. 2019).
[4] 40 C.F.R. § 1508.27(b)(4) & (5).
[5] *Native Ecosystems Council v. U.S. Forest Service,* 428 F.3d 1233, 1240 (9th Cir. 2005).

agency's conclusion."[6] Serious doubt exists where there is "scientific or other evidence that reveals flaws in the methods or data relied upon by the agency in reaching its conclusions."[7]

The Ninth and D.C. Circuits have recently issued opinions clarifying the "highly controversial" standard. In *National Parks Conservation,* the U.S. Army Corps of Engineers had decided that it did not need to prepare an EIS for a power line project that would cross the James River and run through historic Jamestown. Several commenters challenged the Corps' conclusion that the power lines would not significantly impact the historic properties in its vicinity. Some challenged the Corps' methodologies, pointing out that the Corps had conflated a cultural resource analysis with a visual resource analysis, others pointed out that the Corps had relied on an incomplete and misleading set of photo simulations, and others criticized the alternatives analysis. The court characterized the comments as "concrete objections to the Corps's analytical process and findings, from agencies entrusted with preserving historic resources and organizations with subject-matter expertise."[8] The court concluded that when an agency receives those kinds of concrete, substantive comments from organizations and individuals with subject-matter expertise, it is not good enough for the agency to "acknowledge and try to address" commenters' substantive concerns in an EA/FONSI. As the court said: "But that misses the point. The question is not whether the Corps attempted to resolve the controversy, but whether it succeeded."[9]

In *Bark v. United States Forest Service*, the Forest Service had decided it did not need to prepare an EIS for a planned thinning that it claimed would be helpful for fire suppression and

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[6] *In Def. of Animals v. U.S. Dep't of Interior,* 751 F.3d 1054, 1069 (9th Cir. 2001).

[7] *Standing Rock Sioux Tribe v. U.S. Army Corps of Engineers,* 2020 WL 1441923 at *7 (D.D.C. Mar. 25, 2020), *quoting WildEarth Guardians v. Zinke,* 368 F.Supp.3d 41, 81 (D.D.C. 2019).

[8] [8] *National Parks,* 916 F.3d 1075. at 1086.

[9] *Id.* at 1085-86.

safety.[10] The court found that "[s]ubstantial expert opinion presented by the Appellants during the administrative process disputes the US Forest Service's conclusion that thinning is helpful for fire suppression and safety."[11] The court concluded that when "one factor alone raises 'substantial questions' about whether an agency action will have a significant environmental affect, an EIS is warranted."[12]

In addition to the requirement that the Forest Service conduct an EIS where a project is highly controversial or highly uncertain, NEPA requires that the Forest Service analyze the cumulative impacts of a project.[13] A cumulative impact is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future action regardless of what agency . . . undertakes such other actions."[14] "This cumulative analysis 'must be more than perfunctory; it must provide a useful analysis of the cumulative impacts of past, present, and future projects."[15] In *Bark*, the Ninth Circuit found that the Forest Service's cumulative impacts analysis "is insufficient because there is no meaningful analysis of any of the identified projects."[16] Mere conclusory statements that there are no cumulative impacts does not suffice.[17]

In this proceeding, several commenters have raised serious objections to the Project. Our June 27, 2019 comments included concerns about aspects of the Project that include the value of proposed cuts and the impacts on several species in the forest. These science-based concerns

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[10] *Bark v. United States Forest Service*, No. 19-35665, 2020 WL 2110976, at *3 (9th Cir. May 34, 2020).

[11] *Id.* at *4.

[12] *Id.* at 6 (citing *Ocean Advocates v. U.S. Army Corp of Eng'rs*, 402 F.3d 846, 865 (9th Cir. 2005).

[13] 40 C.F.R. § 1508.27(b)(7).

[14] 40 C.F.R. § 1508.7.

[15] *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 868 (9th Cir. 2005) (quoting *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1075 (9th Cir. 2002)) (internal quotation marks omitted).

[16] 2020 WL 2110976, at *8

[17] *Id.* at *9.

about the Project reveal controversies that require the Forest Service to conduct an EIS for the Project. Our objections below further clarify these controversies and provide a clear basis for the need to conduct an EIS for the Fourmile project.

II. Overview

Given the size, scope, location, and lack of scientific consensus on the management practices of the Project, the decision to issue a draft FONSI and not conduct an EIS is simply not in line with the requirements of NEPA or the interests of the CNNF. An EIS will better ensure that the valuable and vulnerable aspects of the affected forest will be protected and that the Forest Service properly evaluates alternatives.

The lack of an EIS is largely out of step with previous Forest Service practice. Between 2003 and 2015, most of the larger vegetation management projects proposed and appropriately analyzed in the CNNF were supported by preparation of an EIS. However, since that time some similarly large projects have been supported by preparation of an EA, often with only a single action alternative analyzed in depth. This move to less rigorous analysis for large projects increases the risk that actions will damage natural resources and other values, particularly given marked recent increases in harvest levels on the Forest.

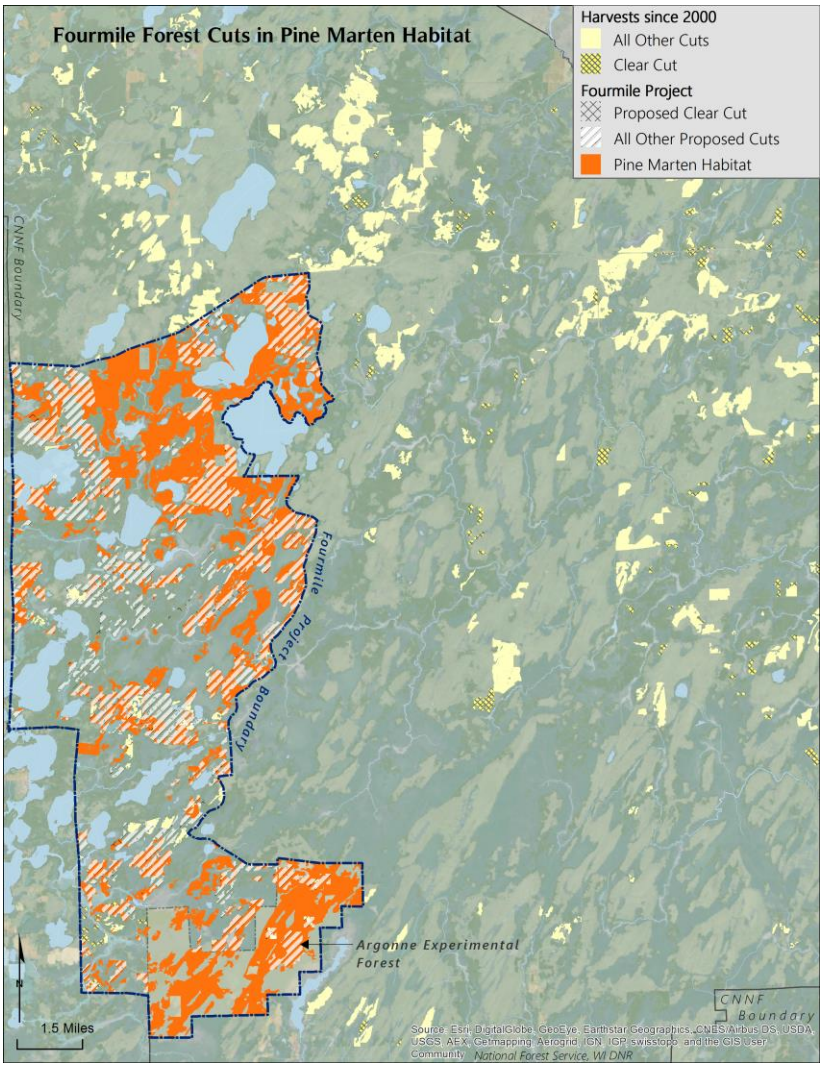

Figure 1: Map of Fourmile project area with pine marten habitat

The draft FONSI begins with the Forest Supervisor noting that his "decision and findings are based upon my expertise and knowledge of the project area, review of the Fourmile Vegetation EA, the biological evaluation, other resource analyses." It is therefore important to ensure that the expertise and knowledge the Forest Service is using are appropriate, suited to these issues, factually correct, and conceptually adequate to support the decisions the Forest Service is making on this large timber cutting project. To that end, we focus here on questions regarding whether the documents, findings, and analyses used to support the Forest Service's decisions on this project meet these criteria. We find repeated cases where the information,

analyses, and arguments that the Forest Service has relied on for deciding details of the Fourmile project are based on:

1. faulty premises or mischaracterizations of the ecological situation;

2. tradeoffs between conflicting or contradictory goals that are not adequately or clearly explained;

3. incomplete or inadequate consideration of relevant biological and ecological factors affecting the dynamics of the forest and/or its resident populations;

4. a failure to candidly recognize and acknowledge several outstanding and ongoing scientific controversies surrounding key aspects of forest management (controversies that demand acknowledgment and further analysis in the form of an EIS); and/or

5. excessive extrapolation from models or lines of inference based on faulty assumptions and/or inadequate data.

The separate and cumulative effects of these biases and errors is that the Forest Service makes several inferences that may be either incorrect or unsupported. At the same time, these factors lead the Forest Service to credit their conclusions and projections with considerably more confidence than is warranted. Because the Forest Service solicits informed input on this project, we provide the objections below to add relevant information and correct some errors of interpretation. We also argue that these errors, omissions, and biases are substantial and important enough to trigger action in the form of requiring the Forest Service to complete a full EIS for this large-scale project.

The Forest Service has argued instead that no further environmental analyses are warranted. To make this argument, the Forest Service relies heavily on repeated reassurances regarding the adequacy of existing rules and practices including "Forest Plan standards and guidelines, Wisconsin Best Management Practices, and design features as identified in the EA, Appendix B: Direction for Activities Explained – Design Features & Criteria and Forest Plan Direction" which will "reduce or prevent environmental impacts" if they are "effectively

implemented."[18] In addition, the Forest Service argues that no significant impacts have been found beyond those analyzed and addressed in past projects involving environmental reviews, including the Townsend EIS, Morgan Lake EA, Greenwood EA, and Blacktorch EA.[19] Whether or not the limited scope of environmental review was appropriate for those past projects, the EA/draft FONSI for this project leaves substantial impacts unaddressed, including widespread failures of tree regeneration and continuing failures of vulnerable species to thrive.

While many Forest Service staff have indeed worked to improve forest management practices with clear payoffs in terms of protecting soils, avoiding direct impacts on particular sensitive plant species, etc., these efforts fall short of fully addressing and protecting the broad range of forest biotic values that concern us. That is, a project of this scope and scale has many indirect, delayed, and cumulative impacts that have yet to be fully acknowledged or addressed in this project's planning documents. The number and significance of these impacts demand further analyses in the form of a full EIS for this project.

III. The EA/draft FONSI's reliance on "age-class diversity" as the Project's primary objective is not consistent with recent ecological science and predetermines the outcome

The plainly stated mission of the Forest Service is to "sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations."[20] Goal 1 of the Forest Plan is "Ensure Healthy and Sustainable Ecosystems."[21] As explained in detail below, the Project directly conflicts with Goal 1 of the Forest Plan by proposing to thin large fragments of old-growth forest. There is ample scientific information demonstrating that these practices negatively affect these stands, directly conflicting with what

[18] Draft FONSI at 1.
[19] EA, Appendix C at 23.
[20] 2004 CNNF Forest Plan at 1-1.
[21] *Id.* at 1-2.

the Forest Service claims it is trying to achieve through the Project. This genuine controversy requires that the Forest Service conduct an EIS to fully evaluate the impacts of the Project.

The draft FONSI identifies five of nine needs for the Project as supporting Purpose A: "Maintain and restore vegetation communities to their desired conditions in Management Areas (MA) 2A, 2B, 4A, 4B, and 8A (Forest Plan Objective 1.4a)."[22] These five needs focus on an alleged overstocking and sub-optimal species composition/age class distribution within the stands. The Forest Service proposes timber cutting activities to remedy those supposed deficiencies.

This form of managing vegetation communities characterizes the controversies that continue to surround how this public forest is managed. In short, the Forest Service approaches managing the CNNF and this project from the perspective of a forester trained to generate a certain kind of forest and one that produces a certain kind of timber. This form of management favors short-term timber production from large older trees over long-term ecological management, contrary to the terms of the Forest Plan. Given that most of the forest in this region is still recovering from the great cut-over of the late 19th and early 20th centuries and that forests in the project area are mostly mixed hardwoods, the trees and forests are gaining value as they age. Older forests with bigger trees also fix and sequester more carbon, better protect watersheds, provide more habitats for wildlife, and better support species dependent on less-disturbed forest interior conditions. Mature old-growth forests that are good for wildlife naturally have a variety of big and small trees of various species and age classes, without the need for active management. These traits emerge over time as individual trees die, create gaps in the forest canopy, and are replaced by the growth of other trees.

[22] Draft FONSI at 2-3.

Rather than embrace these natural dynamic processes of gap-phase replacement, however, the Forest Service fixes on age-class diversity as the primary objective for the forest stands it is managing with the Project. There is, however, a great deal of scientific controversy around this use and focus on "age-class diversity" when this means excluding other forest characteristics and values. For example, Jerry Franklin, former US Forest Service and University of Washington forest biologist (often considered the "Dean" of old-growth forests) served as lead author for the 2007 U.S. Forest Service Technical Report, *Natural disturbance and stand development principles for ecological forestry*.[23] It is worth quoting at length statements in this Report where Dr. Franklin and his colleagues describe single-tree selection and group selection harvests, the dominant mode of forest management in the Fourmile project:

> Theoretically, selection practices are modeled closely on individual tree or gap-based natural disturbance regimes. In practice, these approaches can be highly formalized, such as where **selection of trees to harvest is driven by efforts to create balanced diameter distributions** (Sidebar 4), even though most natural stands fail to exhibit such regularity or balance (Matthews 1989, O'Hara 1996). **The ecological problem with this approach is that most selection prescriptions remove different sizes of trees and in different spatial patterns than small-scale natural disturbances (Seymour and Hunter 1999), with significant consequences for biological legacies** (Table 3).
>
> As with even-aged management, multi-aged management regimes can also result in **homogenizing of structure** (Seymour and Hunter 1999). For example, traditional selection systems for northern hardwood ecosystems in the Great Lakes region effectively **drive overstory composition to sugar maple** (*Acer saccharum* Marsh.) dominance (Strong et al. 1997), whereas unmanaged mature and old-growth stands often support four or five species in abundance and 10 or more species in total (Curtis 1959).[24]

Here, Franklin is alerting his forestry colleagues to the fact that their prescriptions for selective forest harvests are misdirected in not adequately mimicking natural disturbance dynamics and not sustaining diversity, but rather driving homogenization of forest structure and canopy

[23] Leak, William B.; Yamasaki, Mariko; Holleran, Robbo. 2014. Silvicultural guide for northern hardwoods in the northeast. Gen. Tech. Rep. NRS-132. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.

[24] *Id*. at 12 (emphasis added).

composition to sugar maple. Despite these clear concerns and warnings, the Forest Service's updated silvicultural guide for northern hardwoods makes the situation even worse by removing more large trees. That is, it replaces the reverse J-shaped stand structure that Franklin et al. criticized with new guidelines for "a more efficient structure" that would produce "an abundance of small sawtimber, producing high rates of value growth, and a decline in larger sawtimber due to harvesting of mature trees".[25] This new prescription thus moves in the opposite direction from Franklin et al.'s recommendations. This reveals the considerable controversy that persists over how selective harvests should be designed, even within the Forest Service. We see a clear fault line between ecologists, including Forest Service scientists, trying to redress threats to ecological values and processes and production foresters relying on outmoded ideas about how selective harvests can somehow both maximize current and future economic returns while fully protecting diversity by mimicking natural ecological processes. Nowhere in the Fourmile planning documents do we find any acknowledgement, let alone an informed discussion, of the literature criticizing this reliance on "age class diversity" and evolving notions about just how to apply selective harvests. Alverson et al. document and discuss the efforts made by the Forest Service to conflate age-class diversity with ecological diversity and protecting natural values.[26]

A. <u>This project is not needed to address overstocking</u>

The Forest Service claims the Project is needed because of "a variety of vegetation types that are overstocked."[27] This leads directly to the proposal in this project to "[r]educe stocking

[25] *Id.*

[26] Alverson, W.S., Kuhlmann, W. & Waller, D.M. 1994. *Wild forests: Conservation biology and public policy*. Island Press, Washington, DC.

[27] Draft FONSI at 2.

levels in overstocked forested stands" over some 6004 acres of hardwood forest, 139 acres of birch forest, and 3496 acres of softwood forest.[28]

These statements lack scientific support. Tree mortality occurs inevitably and regularly (e.g., via gap-phase dynamics), eliminating slow-growing trees that lack vigor via a process termed self-thinning. [29] This is a natural process that occurs without any active intervention or efforts by the Forest Service or its contractors to build roads, enter stands, and log trees to thin the stand or harvest timber.[30] An EIS is required to determine whether the Project is actually needed to manage alleged overstocking.

B. Timber cuts such as the Fourmile project are unnecessary to achieve uneven-aged conditions

The Forest Service claims that there is a need to "[m]aintain or move northern hardwood stands toward an uneven-aged condition . . . in management areas 2A, 2B, 4A, 8A, and 8D of the Fourmile Project area where the Forest Service has identified 6,982 acres as overstocked, in need of improved stand structure, and suitable for timber production."[31] Forests naturally move toward uneven-aged conditions via the processes of natural tree mortality, gap dynamics, and self-thinning described above. The Forest Service has not demonstrated any commanding or even reasonable necessity or need to pursue active management to achieve these goals. In addition, completing the active management interventions prescribed in this project will themselves incur environmental consequences that violate the purpose of (and work directly against) the stated goals for this project.[32] Maine foresters, working in similar forest types, note that:

[28] EA, Appendix E at Table EA-4.

[29] Alverson et al. 1994, Chap. 4; D'Amato, A.W., Raymond, P. & Fraver, S. 2018. Old-growth disturbance dynamics and associated ecological silviculture for forests in northeastern North America. In: *Ecology and Recovery of Eastern Old-Growth Forests* (A. M. Barton & W. S. Keeton, eds), pp. 99–118. Island Press, Washington D. C.

[30] D'Amato et al. 2018 at 99–118.

[31] Draft FONSI at 2.

[32] *See* Alverson et al. 1994.

> Single-tree selection harvesting is best in small or confined areas for a variety of reasons. One is that this harvesting method requires more roads. In addition, surrounding trees can be damaged during harvests, and frequent use of logging equipment in a given area may compact the soil.[33]

These statements leave unclear why the Project's potentially damaging and homogenizing form of selective logging will be applied so extensively throughout almost all of the MA 2B "Adaptive Management Areas" in the Fourmile project area. At the very least, an EIS is needed to assess its many serious ecological impacts.

Wisconsin's Draft Forest Action Plan 2020 ("Wisconsin Plan") explicitly analyzes the age-structures that currently exist in Wisconsin's forests and its relevance for managing our forests using silviculture. The Wisconsin Plan presents clear data to show that although Wisconsin still supports many young forest habitats, it now increasingly lacks older, more mature forests. In particular, the Wisconsin Plan shows about 1.9 million and 2.5 million acres of 0-20 and 21-40 year-old forest, respectively, in Wisconsin in 2017. In stark contrast, less than 0.1 million acres of older (>150 years) forests exist in the entire state, even though we have many forest types wherein trees routinely can live to be 200-300+ years old. Furthermore, the acreage of forests over 100 years old has dramatically decreased in recent decades (a 24% decline between 1983 and 2017).[34]

What that data shows is that the Forest Service's efforts should be focused on increasing stands and acreage in older age classes and sustaining older trees, not subjecting these maturing stands to thinning that will remove many older and larger trees in a misbegotten effort to achieve the goal of enhancing "age-class diversity." Note, too, that we are not objecting to the Forest Service regenerating younger forests when this is explicitly acknowledged as being pursed to

[33] https://www.maineforestry.net/timber-harvest-methods

[34] Wisconsin Draft Forest Action Plan 2020 at 26.

attain silvicultural objectives, as with the clearcutting of aspen stands. Rather, we are asking the Forest Service to fully analyze impacts and to consider other alternative management methods rather than applying selective cutting so universally and uncritically to so many maturing hardwood stands.

C. It is unnecessary to alter age-class distribution in many stands

The draft FONSI claims that the Project is needed to "improve age class distribution".[35] The Forest Service argues that these forest stands are "terribly skewed towards the older age classes."[36] This, it is argued, will markedly reduce "species in that area" and "resiliency against insects and disease" causing "stagnation of a stand." These assertions reappear later in the draft FONSI: "stands . . . are overstocked and prone to forest insects and diseases, thinning these stands will create healthier forest into the future that is more resilient to threats of possible insect and disease outbreaks."[37] Yet the EA provides no direct evidence or citations from the primary scientific literature to support these dire conclusions, and in fact there is scientific evidence to the contrary.

Invasions of Dutch Elm disease, the Emerald Ash Borer, Hemlock Wooly Adelgids, and other pests and diseases have heretofore not been blocked or slowed by timber harvest activities.[38] In fact, the Wisconsin Plan notes the opposite. With regard to Heterobasidion Root Disease (*Heterobasidion irregulare*) which affects pines, spruces, fir, and red cedar, "Increased

[35] Draft FONSI at 2.

[36] *Id.*

[37] *Id.* at 4.

[38] Gunn, J.S. & Orwig, D.A. 2018. Eastern old-growth foress under threat: Changing dymamcis due to invasive organisms. In: *Ecology and Recovery of Eastern Old-Growth Forests* (A. M. Barton & W. S. Keeton, eds), pp. 217–236. Island Press, Washington D. C.

entries into these aging stands for thinnings and other management will increase the risk for further spread of HRD."[39] These potential impacts are not admitted or analyzed the EA.

This effort to "improve" age class distributions by imposing "Selection / Improvement" harvests across 5,130 acres of Hardwood/Hemlock and 39 acres of Red Oak forest is contrary to how many ecologists think about these stands. Ecologists studying forest stand dynamics observe continuing active processes (e.g., strong competition resulting in differential growth and self-thinning) in maturing forest stands .[40] Far from being "stagnant", maturing trees in these stands are actively fixing carbon, storing it (in the form of increasing bole size, coarse woody debris, and underground), and establishing more complex interactions with a myriad of other organisms, both above and below ground.[41]

Substantial recent research on the ecology of old-growth forests in the eastern and midwestern U.S. reveals that northern hardwood forests, like those that dominate the 2A, 2B, 4A, 8A, and 8D Areas of the Project, support trees that easily live to become 150, 200, or 250+ years old.[42] Thus, the trees and forests in this project can only be considered "middle-aged" and hardly "stagnant" or "overmature." Management in such forests is increasingly designed to imitate natural forest dynamics and the several types of natural disturbance that occur in such forests.[43]

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[39] Wisconsin Draft Forest Action Plan 2020 at 62.

[40] D'Amato et al. 2018; Alverson et al. 1994, Chap. 4.

[41] Fahey, T.J. 2018. Belowground ecology and dynamics in eastern old-growth forests. In: *Ecology and Recovery of Eastern Old-Growth Forests* (A. M. Barton & W. S. Keeton, eds), pp. 179–196. Island Press, Washington D. C.;Keeton, W.S. 2018. Source or sink? Carbon dynamics in eastern old-growth forests and their role in climate change mitigation. In: *Ecology and Recovery of Eastern Old-Growth Forests* (A. M. Barton & W. S. Keeton, eds), pp. 267–288. Island Press, Washington D. C.

[42] Barton, A.M., and W.S. Keeton, eds. 2018. *Ecology and Recovery of Eastern Old-Growth Forests*, Island Press, Washington DC.

[43] D'Amato, A.W., Raymond, P. & Fraver, S. 2018. Old-growth disturbance dynamics and associated ecological silviculture for forests in northeastern North America. In: *Ecology and Recovery of Eastern Old-Growth Forests* (A. M. Barton & W. S. Keeton, eds), pp. 99–118. Island Press, Washington D. C.

Yet foresters commonly misapply ideas about age-structure causing them to actually disrupt the forest processes they intend to imitate:

> The earliest silvicultural guidelines for managing northern hardwood forests emphasized uneven-aged approaches, particularly single-tree selection, to generate "balanced" (equal canopy area allocated to each age class), uneven-aged structures. This approach was based on natural size structures observed in the old-growth shade-tolerant forests of Europe and eastern North America . . resulting in the unfortunate misapplication of size structures observed at broad spatial scales . . to management guides designed for stand-scale application. An important ecological consequence of this management approach has the been the general loss of mid-tolerant species [e.g., yellow birch] from these forests.[44]

Thus, controversy exists over how our knowledge of natural forest dynamics should be applied to manage uneven-aged forest stands, and, at least according to these authors, the Forest Service is misapplying these concepts in deciding how to manage maturing forest stands in this project.

D. There is no need to improve tree species composition

In the draft FONSI, the Forest Service argues that there is a need to "[i]mprove tree species composition to more closely reflect Forest Plan desired conditions."[45] This reinforces the Forest Service's view that existing forests within the Project (and particularly the northern hardwood stands we are most concerned about) are somehow inadequate and inappropriate because they do not yet match the Forest Plan's desired conditions. There is simply no evidence that active logging is needed to correct this situation to achieve "a diverse forest." The proposed Project and its emphasis on active timber management will do little to protect the elements of diversity and forest processes that are most threatened within the CNNF and the project area. In fact, for reasons we outline, they are more likely to threaten those diversity elements and processes that are most at risk and thus most in need of protection.

[44] *Id.* at 107.
[45] Draft FONSI at 2.

The draft FONSI argues that "in the absence of active management, tree species that require disturbance to regenerate – including aspen, paper birch, oak, red pine, and jack pine – would decline over time."[46] Early successional tree species like those listed are highly unlikely to suffer any substantial decline for two reasons. First, the intensive forms of silviculture (often coppice clearcuts) that dominate most of the state's vast county forests and industrial private forest lands generate ample early-successional habitat to support all early successional species in the region.[47] Second, northern Wisconsin does not lack for natural disturbances that generate additional early successional habitat. Any large area of forest, like the 55,000 acres of the Fourmile Project area, is continually subject to disturbances that will naturally create openings in the forest canopy capable of favoring the establishment, recruitment, and regeneration of seedlings of early successional species like those listed.[48] These disturbances act intermittently but continually, at various scales and intensities, to open the forest canopy without requiring active silviculture. This was most conspicuously evident came recently in the form of the "macroburst" windstorms that swept over northern Wisconsin on July 19, 2019. These blew down hundreds of thousands of trees over an area of >150 square miles.[49] The area affected included large swaths of the CNNF. These almost immediately became the target of salvage sales to make use of the downed timber, adding additional artificial disturbances. Wind- and ice-storms of various size and intensity recur with regularity across the Northwoods, ensuring the persistence of all species dependent on early successional habitats. This is evident as well in the Wisconsin Plan 2020 which documents (in Fig. 8) that huge areas of younger forest dominate

[46] Draft FONSI at 4.

[47] Wisconsin Draft Forest Action Plan 2020

[48] D'Amato et al. 2018; Alverson et al. 1994, Ch. 4

[49] https://www.greenbaypressgazette.com/story/news/2019/08/01/july-19-macrobursts-wisconsin-affected-150-square-miles/1889442001/

Wisconsin's forestland (~1.9M and 2.5M acres of 0-20 and 21-40 year-old forest, respectively, in 2017).

There is a genuine dispute at issue in this Project. The Forest Service contends that active management of old-growth stands is necessary to protect the forest and move it to desired conditions. On the contrary, evidence presented here and earlier in this process suggests an alternative view that active management of maturing northern hardwood stands can be destructive of ecological values. These impacts require full analysis in an EIS.

IV. This project will not enhance the diversity and quality of recreation experiences in the CNNF

In the draft FONSI, the Forest Service claims that the Project is needed to "[m]aintain or enhance the diversity and quality of recreation experiences" (said to match Forest Plan Goal 2.1). Little diversity is in evidence here, however, given that the only recreational activity addressed is hunting, and the only activity said to enhance the quality/diversity of this activity is maintain hunter access trails and the "wildlife openings" associated with those. While hunting is clearly a popular activity, and one we endorse and support in the project area, we oppose efforts to artificially maintain "wildlife openings." Such openings are intended to support the population growth of game species including grouse and white-tailed deer and to provide open lines of sight to facilitate rifle hunting.

However, populations of white-tailed deer in this area already exceed the long-term ecological carrying capacity of the region, greatly reducing forest tree regeneration and understory plant and animal diversity (see below). Given the current high population of deer, exceeding ecological carrying capacity for these habitats, the Forest Service should actively strive in its forest management to limit or reduce deer densities, not sustain them at high levels or boost them further. In addition, a Forest Service truly interested in promoting a "diversity and

quality of recreation experiences" should strive to protect and augment the natural scenic and wildlife values of its lands in ways that appeal to broad segments of the public.

V. The EA/draft FONSI do not adequately analyze the Project's impacts on deer population, and in turn the growing deer population's impacts on the CNNF

The EA does not fully account for the Project's impacts on the already high deer population in the CNNF and the often severe impacts deer are having on species directly or indirectly harmed by deer browse.[50] Deer at their current high densities act as a "keystone" herbivore within the forests of northern Wisconsin.[51] There is significant literature regarding the negative impacts that deer have on regenerating forest tree seedlings and understory plant diversity.[52] In fact, deer now essentially curtail the regeneration of northern white cedar, eastern hemlock, yellow birch, white pine, and northern red oak across most sites in northern Wisconsin.[53] This places the future existence of forest types containing these species in doubt.

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[50] *See e.g.*, Allison, T. D. 1990. The Influence of Deer Browsing on the Reproductive Biology of Canada Yew (*Taxus canadensis* marsh.). I. Direct effect on pollen, ovule, and seed production. Oecologia 83:523-529; Balgooyen, C. P. and D. M. Waller. 1995. The Use of Clintonia-Borealis and Other Indicators to Gauge Impacts of White-Tailed Deer on Plant-Communities in Northern Wisconsin, USA. Natural Areas Journal 15:308-318; Côté, S. D., T. P. Rooney, J.-P. Tremblay, C. Dussault, and D. M. Waller. 2004. Ecological Impacts of Deer Overabundance. Ann. Rev. Ecol. Evol. System. 35:113-147; Foster, D. K. 1993. *Taxus canadensis* Marsh. Its Range, Ecology, and Prospects in the State of Wisconsin. M.S. Univ. of Wisconsin – Madison; Waller, D. M. and W. S. Alverson. 1997. The White-Tailed Deer: A Keystone Herbivore. Wildlife Society Bulletin 25:217-226.

[51] Waller, D. M. and W. S. Alverson. 1997. The White-Tailed Deer: A Keystone Herbivore. Wildlife Society Bulletin 25:217-226.

[52] Côté, *et. al*. 2004; Rooney, T. P. 2001. Deer impacts on forest ecosystems: a North American perspective. Forestry 74:201-208; Rooney, T. P., and D. M. Waller. 2003. Direct and indirect effects of white-tailed deer in forest ecosystems. Forest Ecology & Management 181:165-176.

[53] Anderson, R. C. and O. L. Loucks. 1979. White-tail deer (*Odocoileus virginianus*) influence on structure and composition of *Tsuga Canadensis* forests. Journal of Applied Ecology 16:855-861; Blewett, T. J. 1976. Structure and dynamics of the McDougall Springs lowland forest. Pp. 86. Department of Botany, University of Wisconsin – Madison; Buckley, D. S., T. L. Sharik, and J. G. Isebrands. 1998. Regeneration of northern red oak: positive and negative effects of competitor removal. Ecology 79:65-78; Eckstein, R. G. 1980. Eastern Hemlock (Tsuga canadensis) in North Central Wisconsin. Wisconsin Department of Natural Resources, Madison, WI; Frelich, L. E., and P. B. Reich. 1995. Spatial patterns and succession in a Minnesota southern-boreal forest. Ecol. Monogr. 65:325-246; Martin, J.-L., and C. Baltzinger. 2002. Interactions among deer browse, hunting, and tree regeneration. Can. J. Forest Res. 32:1254-64; Rooney, T. P., R. J. McCormick, S. L. Solheim, and D. M. Waller. 2000. Regional variation in recruitment of eastern hemlock seedlings in the Southern Superior Uplands Section of the Laurentian

Further, the Forest Service's own Forest Inventory and Analysis data make clear that deer have had sustained and cumulative impacts on the ability of these tree species to regenerate over the past 40 years.[54] The impacts of the Project on deer densities, browse levels, forest diversity, and tree regeneration cannot just be ignored. Those impacts should be thoroughly analyzed in an EIS.

We argue here that there is a direct link between high deer populations and logging in the CNNF. Recurring and large-scale clearcuts contribute directly to deer overpopulation.[55] The Forest Service failed to take a hard look at the effects of the Project on deer overabundance and consequent impacts of deer populations on tree regeneration.

In response to comments from ELPC, the Forest Service noted that "managing white-tailed deer below 20 deer/sq mi is recommended to avoid significant impacts on forest vegetation."[56] Yet more recent results from the Upper Midwest show that deer have substantial negative impacts on forest regeneration and understory richness when their density exceeds 12 per square mile.[57] At their chronically high levels in the CNNF, the scientific literature is conclusive that deer *do* cause harm to plant diversity. Without conducting an EIS, the Forest

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Mixed Forest Province, USA. Ecological Applications 10:1119-1132; Rooney, T. P., S. L. Solheim, and D. M. Waller. 2002. Factors affecting the regeneration of northern white cedar in lowland forests of the Upper Great Lakes region, USA. Forest Ecology & Management. 163:119-130; Rooney, T. P., and D. M. Waller. 1998. Local and regional variation in hemlock seedling establishment in forests of the upper Great Lakes region, USA. Forest Ecology and Management 111:211-224; Townsend, D. S., J. S. Seva, C. Hee, and G. Mayers. 2000. Structure and composition of a northern hardwood forest: Consequences of browsing by white-tailed deer; Woods, K. 2000. Long-term change and spatial pattern in a late-successional hemlock-northern hardwood forest. J. Ecol. 88:267-282.

[54] Bradshaw, L. & Waller, D.M. 2016. Impacts of white-tailed deer on regional patterns of forest tree recruitment. *For. Ecol. Manage.* 375. DOI: 10.1016/j.foreco.2016.05.019

[55] *See, e.g.*, Van Deelen, Timothy R. Research on deer ecology, management and environmental impacts, at 20, *available at* http://council.wisconsinforestry.org/pdf/DeerResearch.pdf (citing Michigan DNR researcher Robert Doepker's research for the proposition that "[h]igher pulpwood harvest is associated with more deer").

[56] EA, Appendix C at 31.

[57] Côté, *et. al*. 2004; Rooney, T. P. 2001. Deer impacts on forest ecosystems: a North American perspective. Forestry 74:201-208; Rooney, T. P., and D. M. Waller. 2003. Direct and indirect effects of white-tailed deer in forest ecosystems. Forest Ecology & Management 181:165-176.

Service cannot adequately understand the impacts of the Project on deer populations and the downstream effects of deer on the forest.

We have raised these concerns about high deer populations repeatedly, noting the ways in which the Forest Service's active logging activities (including selective, shelterwood, and clearcuts) sustain and promote high deer populations. Despite these efforts, planning documents for the Fourmile project fail to analyze the full nature, extent, and range of these impacts or to address these impacts in any meaningful way. Instead, they argue:

> Deer populations are influenced by many factors (weather, baiting, and hunting) that are beyond the control of the Forest Service and thus not dictated solely by aspen management (Quinn et al. 2006). Many factors influence the size of a deer population . . .[58]

We have never argued that deer populations are determined only by levels of logging (nor are aspen clearcuts the only kinds of logging that boost deer populations). Rather, we documented the close associations that exist between pulpwood harvests and deer densities in our region in the specific form of research done by R. Doepker (Michigan DNR) in the western UP of Michigan. Nevertheless, the Forest Service argues in Appendix C that it has no control over, and thus no responsibility for high deer numbers in northern Wisconsin:

> The Natural Resource Board approved objectives for 2018-19 in these counties to increase the deer herd populations in Forest and to maintain it in Vilas and Oneida counties. With these recommendations, it would indicate that the WDNR believes these deer populations are not problematic.[59]

The Forest Service may not be solely responsible for high deer numbers, but it does bear responsibilities that include acknowledging the seriousness of the issue (including widespread failures to regenerate the trees that compose the forest they manage, threatening its future productivity and persistence), working with wildlife and forest managers on other land bases to

[58] EA, Appendix C at 29.
[59] *Id*. at 31.

address high deer densities, and ceasing to argue that cutting more trees and creating more early successional habitats will ameliorate or eliminate deer browsing impacts.

The Forest Service goes on to mis-cite the scientific literature in succeeding passage:

> Miller et al. (2009) conclude that providing approximately 14% of an area in well-distributed, even-aged managed forests can have substantial impacts on reducing herbivory rates.

The Forest Service's argument that clearcuts (even-aged management) act to reduce deer confuses short-term with longer-term effects. In fact, Miller et al. 2009 themselves directly contradict this assertion in their abstract:

> [L]ocalized management only produces temporary voids within high-density deer herds. Localized management may not effectively reduce negative impacts of deer in areas of high deer density.

It is logical and common knowledge among wildlife biologists and ecologists that logging, by providing forage to deer in the form of logging "tops" and a flush of rapid growth at ground level, acts to increase deer growth, survival, and reproduction, contributing directly to growth of the deer population. This regular, consistent, and predictable outcome must not be confused with how logging residues may temporarily attract and concentrate deer. This effect only diverts deer in the short-term from browsing on seedlings and saplings.

Higher deer populations sustained by logging also have significant deleterious impacts on ground and shrub-nesting forest birds[60] and facilitate invasions of exotic weedy plants and Eurasian earthworms.[61] Dense deer also harm public health as they appear to boost populations

[60] Côté, S.D., Rooney, T.P., Tremblay, J.-P., Dussault, C. & Waller, D.M. 2004. *Ecological impacts of deer overabundance*;Chollet, S. & Martin, J.L. 2013. Declining woodland birds in North America: Should we blame Bambi? *Divers. Distrib.* 19: 481–483; Rushing, C.S., Rohrbaugh, R.W., Fiss, C.J., Rosenberry, C.S., Rodewald, A.D. & Larkin, J.L. 2020. Long-term variation in white-tailed deer abundance shapes landscape-scale population dynamics of forest-breeding birds. *For. Ecol. Manage.* 456: 117629. Elsevier.

[61] Dobson, A. & Blossey, B. 2015. Earthworm invasion, white-tailed deer and seedling establishment in deciduous forests of north-eastern North America. *J. Ecol.* 103: 153–164; Eisenhauer, N., Fisichelli, N.A., Frelich, L.E. & Reich, P.B. 2012. Interactive effects of global warming and "global worming" on the initial establishment of

of deer ticks, contributing to recent increases in Lyme disease.[62] None of these impacts were analyzed or discussed in Fourmile planning documents.

VI. The EA/draft FONSI do not adequately assess the Project's impact on the American marten

The Fourmile Project area encompasses most of the American marten reintroduction zone on the Nicolet side of the CNNF. The project area contains numerous sensitive and rare ecological features, including tracts of high-quality forests providing habitat for numerous rare species including American marten. Forest Service fails to adequately address our comments in Appendix C. Responses to our comments on American marten are simply a reiteration of the contents of the BE. The EA has not addressed numerous controversial issues relevant to marten viability and recovery in the CNNF.

Despite the documented presence of marten in the project area, proposed logging will reduce total marten habitat by 15.5% by 2023.[63] While over 41% of suitable marten habitat in the project area will be logged during project implementation, the Forest Service maintains that most of the logged northern hardwood stands will not become unsuitable for marten. Of the aspen/mixed aspen stands that are suitable for marten in the project area, 86% will be logged within the 10-year cycle while 376 of 529 acres of suitable birch stands in the project area would be logged. These aspen/mixed aspen and birch stands will be unsuitable for marten for 50 years.[64] Overall, nearly half of all suitable habitat for marten will be logged in the heart of the

native and exotic herbaceous plant species. *Oikos* 121: 1121–1133; Williams, S.C., Ward, J.S. & Ramakrishnan, U. 2008. Endozoochory by white-tailed deer (Odocoileus virginianus) across a suburban/woodland interface. *For. Ecol. Manage.* 255: 940–947.

[62] Kilpatrick, H.J., Labonte, A.M. & Stafford, K.C. 2014. The Relationship Between Deer Density, Tick Abundance, and Human Cases of Lyme Disease in a Residential Community. *J. Med. Entomol.* 51: 777–784; Telford, S.R. 2017. Deer reduction is a cornerstone of integrated deer tick management. *J. Integr. Pest Manag.* 8: 25.

[63] BE at 73.

[64] *Id.*

marten management zone, yet impacts to marten (and other species) are deemed acceptable on the basis of unverified habitat models and untested habitat relationships.

A. The EA ignores the distinction between occupied and unoccupied marten habitat

The EA and BE do not differentiate between suitable and occupied marten habitat, despite the documented presence of marten in and around the project area. The failure of Forest Service to differentiate between occupied and unoccupied marten habitat in the Fourmile Project area ignores the fact that the vast majority of suitable habitat in the Nicolet is unoccupied.[65] This approach fails to reflect the fact that marten have not established themselves outside of the reintroduction area and therefore fails to reflect the higher risks to marten from logging in occupied versus unoccupied habitat. Bull et al. 2005 found significant differences in occupied versus unoccupied marten habitat characteristics in Oregon; unoccupied areas contained lower levels of critical features for marten. The authors suggest that tailoring management recommendations to the habitat requirements of the local population and specific forest types may be essential for managing marten populations.[66]

The CNNF's "one size fits all" approach to habitat suitability fails to address the site-specific needs of existing marten populations on the Forest. Conducting logging in forest stands that are occupied currently by marten has a much greater potential risk to the small population of marten in the forest than logging in stands that Marten do not occupy. Without a proper analysis that differentiates affected habitat, the Forest Service cannot evaluate the impacts of the Project on this sensitive species.

[65] Draft Supplement to the Environmental Impact Statement for the Northwest Howell Project, Appendix B (2006).

[66] Bull, E.L., T.W. Heater and J.F. Shepard. 2005. Habitat selection by the American marten in Oregon. Northwest Science 79(1):37-43.

The Forest Service has conducted such an analysis in the past. The Draft Supplement to the Northwest Howell EIS differentiated between occupied and unoccupied habitat in its marten effects analysis.[67] Occupied territory was determined from telemetry of collared individuals or, without telemetry data, the average home range size of 655 acres in the shape of a circle centered on the sighting/trap location**.**[68] This analysis found that only 9,100 acres of marten habitat were occupied on the entire Eagle River-Florence Ranger District and that no suitable habitat was occupied on the Lakewood-Laona Ranger District.[69] These results documented the relatively low amount of occupied suitable habitat in the Eagle River-Florence Ranger District. Clearly, given the low numbers of marten on the Nicolet side of the forest and their failure to disperse from original reintroduction zones, further analysis of marten home ranges and fragmentation for this struggling population is essential, particularly for an area that represents the core of their population. The Forest Service has made no effort to identify occupied habitat in the Fourmile project area and includes no analysis of differences between occupied and unoccupied habitats in their analysis.

B. Marten population is heavily impacted by climate change

Despite the overwhelming body of evidence showing climate change impacts to ecological systems worldwide, no mention of climate change is made in the EA and only one mention is made in the BE. Failure to address climate change impacts on plants and animals within the Fourmile project area ignores this overarching issue. Notwithstanding the complete lack of analysis of the impacts of climate change in the EA, several of the sources cited include climate change as threats to species in question:

[67] Draft Supplement to the Environmental Impact Statement for the Northwest Howell Project, Appendix B, 35 (2006).

[68] *Id.*

[69] *Id.*

1. The Population Viability Analysis for marten prepared for the 2004 CNNF Forest Plan explicitly mentions climate change as an "additional threat" to marten viability on the Forest. This document was cited by the Forest Service in the Fourmile Response to Comments.[70]
2. In the BE, the Forest Service cites the WDNR *Management and Conservation Plan for American Martens in Wisconsin*. This plan considers climate change a significant threat to marten. Because of this threat, WDNR recommends "development of adaptive strategies to lessen this impact (e.g. improve American Marten Plan forest habitat, reduce habitat fragmentation) should begin now to maximize the probability of long-term marten survival in Wisconsin."[71] As discussed in detail below, the Forest Service has not adequately analyzed the effects of the Project on marten habitat fragmentation.
3. Wisconsin's draft program guidance also includes climate change in their list of threats to marten:

> Current threats to martens in Wisconsin include (1) low population abundance, (2) fragmented and isolated habitat, (3) climate change, (4) predation and incidental trapping, and (5) low recruitment into existing populations (Woodford and Dumyahn 2012).[72]

4. Other researchers have addressed the potential impacts of climate change on marten populations. In a 2007 paper published in Conservation Biology, Carroll finds that

[70] EA, Appendix C.

[71] Wisconsin Department of Natural Resources. Management and conservation plan for American martens in Wisconsin, 19-20 (2011).

[72] Wisconsin Department of Natural Resources. American marten (*Martes americana*) Species Guidance, 3 (2014) (available at https://dnr.wi.gov/news/input/documents/guidance/MartenGuidance.pdf)

"[c]limate change interacted with logging in its effects on the marten . . . increasing vulnerability."[73]

The failure of the Forest Service to address climate change when analyzing the Fourmile project is a significant and controversial lapse that calls into question many of the conclusions provided in the BE and EA regarding marten and other sensitive species. The effects of climate change must be included in a cumulative effects analysis for impacts to marten and other species of concern given the clear interactions with logging and other habitat-altering activities and the potential to adversely affect marten in the CNNF. Without an EIS that includes an evaluation of climate change in relation to the Project, these impacts of the Project will remain unknown.

C. The EA does not adequately evaluate impacts on marten habitat connectivity

Habitat connectivity is an essential component of suitable habitat for marten. The Fourmile EA fails to evaluate connectivity of habitat patches suitable for marten despite the documented presence of marten in the project area. This analysis is critically important given the marten's life history and ecology in the region and an alternative should have been developed that addressed this issue.

In our previous comments we asked whether the Forest Service had studied the impacts of habitat fragmentation and dispersal corridors for marten. [74] Forest Service did not directly respond to these questions, but merely reiterated statements from the EA, pointing to the BE and conclusively stating that "nearly all proposed actions do not change the connectivity of the forest, as these plots have all been managed by the Forest Service in the past."[75] Neither the

[73] Carroll, C. Interacting effects of climate change, landscape conversion, and harvest on carnivore populations at the range margin: marten and lynx in the northern Appalachians. Conservation Biology Volume 21, No. 4, 1092-1104 (2007).

[74] ELPC June 27, 2019 Comments at 9.

[75] EA, Appendix C at 35.

Forest Service's reply to our comments nor the BE include an actual analysis of how marten habitat fragmentation from the Project will affect marten. In fact, there is no actual analysis of the effects of habitat fragmentation or corridor restrictions for the Project. The BE focuses on the effect of the Project on habitats at the stand level but does not evaluate the effects on fragmentation or travel corridors. This despite the BE's reference to WDNR 2016 Best Management Practices that includes a recommendation to "[c]onsider maintaining travel corridors to avoid isolating suitable American marten habitat."[76] There is significant scientific evidence that these are crucial aspects to the success of the marten, which is particularly relevant here given the importance of the project area to the marten's success in the CNNF.

Wisconsin Department of Natural Resources has issued draft program guidance for the marten that cites "fragmented and isolated habitat" as threats to the species.[77] Further, WDNR's 2011 Management and Conservation Plan for American Martens in Wisconsin specifically called for "reduce[d] habitat fragmentation" as a means to protect the species nearly a decade ago.[78] WDNR's plan calls for the "protection and enhancement" of marten movement corridors.[79]

Beyond WDNR's recognition on the importance limiting habitat fragmentation and prioritizing movement corridors, recent research in Wisconsin indicates the importance to population viability of marten moving into Wisconsin from Michigan.[80] In that study, researchers concluded:

> Because even low rates of immigration can lead to important increases in population viability, our findings highlight the importance of considering connectivity and the

[76] BE at 70.

[77] "American marten (*Martes americana*) Species Guidance, Wisconsin Department of Natural Resources, 3 (2014) (available at https://dnr.wi.gov/news/input/documents/guidance/MartenGuidance.pdf)

[78] "Management and Conservation Plan for American Martens in Wisconsin", Wisconsin Department of Natural Resources, 20 (2011) (available at https://dnr.wi.gov/files/PDF/pubs/ER/ER0697.pdf)

[79] *Id*.at 26.

[80] Grauer, J. A., J. H. Gilbert, J. E. Woodford, D. Eklund, S. Anderson and J. N. Pauli. Modest immigration can rescue a reintroduced carnivore population. J. Wildlife Management 83(3):567-576 (2019).

> potential for immigration prior to the release of individuals. Ensuring connectivity between populations should be prioritized for marten populations in Wisconsin and Michigan outside of marten protection areas to provide suitable habitat and allow greater movement between areas of suitable habitat.

The lack of analysis of habitat connectivity in the EA is indicative of the need for an EIS to fully understand the impacts of the Project.

D. The EA does not adequately evaluate the impacts on patch size on marten

American marten are sensitive to habitat fragmentation and disturbance.[81] Larger patches of contiguous forests are necessary for marten viability. Actions that reduce habitat patch size[82] ignore the need to maintain large patches on the landscape.[83]

The CNNF has become increasingly fragmented and has lost structural characteristics and tree types needed to sustain forest interior species of concern. Northern hardwoods in the CNNF are "immature and/or highly fragmented."[84] Using 30, 90, and 300 meter buffers around fragmenting features, the amount of "mature northern hardwood interior habitat" in the Forest is 52,000 acres, 18,600 acres, and 300 acres, respectively.[85] Only 15% of northern hardwood patches are larger than 100 acres.[86] These conditions are "a byproduct of management decisions" that resulted in the "creation of more, smaller, and simpler patches, and a cumulatively more simplified and fragmented landscape."[87] Similarly, a study of the Washburn Ranger District found a 69% decrease in mean patch size and a 60% increase in edge density from 1986 to

[81] Chapin et al. 2008; Hargis et al. 2001

[82] The Northwest Howell Project EIS defined patch size as "common age groupings by species or forest type". Draft Supplement to the Environmental Impact Statement: Northwest Howell Project at 13 (January 2006).

[83] T.G. Chapin, D.J. Harrison and D.D. Kratnik. 1998. Influence of Landscape Pattern on Habitat Use by American Marten in an Industrial Forest. Conservation Biology 12(6):1327-1337; Hargis, C.D., J.A. Bissonette, and D.L. Turner. 1999. The influence of forest fragmentation and landscape pattern on American marten. J. Applied Ecology 36(1):157-172.

[84] CNNF Forest Plan Final EIS at 3-155.

[85] *Id.*

[86] *Id.* at 3-95.

[87] *Id.* at 3-94.

present. Such changes reflect increased fragmentation "caused by an extensive road network and forest management activities, primarily timber harvesting."[88]

In addition, the evidence is clear that what little old growth remains in the Forest is declining, that yellow birch and hemlock, which provide important habitat for pine marten and other species are "experiencing region-wide regeneration failure,"[89] and that plant communities and stand structure are "becoming more simplified and homogenized."[90]

The Forest Service's response to comments on the Fourmile project includes the following statement explicitly mentioning patch size as an important variable to consider for marten habitat:

> The 2011 Management Plan for marten states the overall management objective is to establish and maintain two or more self-sustaining American marten populations in Wisconsin. This diversity of forest communities used strongly suggests that tree species composition is not as important as overhead cover and residual patch size (WDNR, 2011).

The Forest Service then dismisses use of important marten habitat variables in defining suitable habitat without any scientific support:

> Additional variables such as slope, the density of predators, the amount of tip-up mounds in the stand, a fragmentation metric, patch size and proximity to water either could not be included in a habitat model because no data exists or, if included in the model, any threshold (e.g. minimum patch size) criteria would have been poorly linked to the biology of these species on the CNNF.[91]

However, patch size and estimates of fragmentation are critical components for assessing impacts to marten habitat and Forest Service has conducted assessments of these variables in previous projects. The Northwest Howell project included fragmentation and patch size analysis

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[88] Bresee M.K., 2004. Disturbance and landscape dynamics in the Chequamegon Nicolet National Forest, USA, from 1972 to 2001. Landscape Ecology 19:291-309.

[89] CNNF Forest Plan Final EIS at 3-115.

[90] *Id.* at 3-36.

[91] BE at 15.

in their assessment of potential effects to marten habitat. In that analysis, Forest Service used four specific landscape metrics as "indicators of disturbance and fragmentation of interior habitat".[92] These indicators included:

- Acres of interior habitat
- Acres of edge affected habitat
- Miles of edge
- Size of interior forest patches
- Edge/interior ratio (miles/acres)

Results of that analysis revealed that adoption of the preferred alternative would result in the loss of 1 of 3 remaining forest patches in the largest size category (1001 – 2000 acres) and loss of 6% of smaller patches (10-50 acres) in the project area. The analysis also showed a reduction of 1.8% in mean patch size in the project area and a reduction of interior habitat in northern hardwoods of 3.6%.[93]

There is no reason a similar analysis was not conducted for the Fourmile project, especially given its location in the heart of the marten management area as defined by WDNR. Failure to account for fragmentation and habitat patch size, as well as the location of marten home ranges with regard to cutting units, calls into question the validity of the model used to predict effects of logging and road management.

E. The EA does not adequately evaluate the impacts of marten prey availability

The EA fails to address the issue of prey availability and quality for marten in the project area. American marten hunt small mammals by looking under logs, stumps, rocks and in crevices.[94] Access to prey is essential for marten throughout the year and coarse woody debris

[92] Northwest Howell DEIS at 40 (2001).

[93] *Id.* at 43.

[94] Spencer, W.D., and W.J. Zielinsky. 1983. Predatory behavior of pine martens. Journal of Mammalogy 64:717-720; Thompson, I. D., and P. W. Colgan. 1987. Numerical responses of martens to a food shortage in northcentral Ontario. Journal of Wildlife Management 51:824–835.

influences marten access to prey. In forests, physical structure partly comes from logs, fallen trees, broken tree limbs, and stumps. These forest structural elements are collectively called coarse woody debris. The amount and size of coarse woody debris is a function of forest age, and may be diminished by logging that removes trees before senescence.[95] Coarse woody debris is an essential component of mammal, bird, amphibian, arthropod, and microbial habitats.[96]

Studies have shown significant differences in coarse woody debris between logged and unlogged forests.[97] Forest Service asserts that snag and woody debris retention standards provide sufficient coarse woody debris to maintain suitable habitat for marten in harvested stands. However, no verification of the sufficiency of these standards and guidelines for woody debris and snags to maintain marten habitat suitability have been conducted on the CNNF. Forest Service provides no evidence that their primary habitat variable for marten – canopy closure – correlates with the sufficient size, quantity, and spatial arrangement of coarse woody debris in harvested stands.

Research on marten prey availability in logged forest stands shows that the frequency of prey encounter, prey attack, and prey kill were higher in old uncut forests, even though small-mammal density was similar to that in younger logged forests. These differences in predation efficiency were linked to higher abundance of coarse woody debris, which seems to offer

[95] Andruskiw, M., J.M. Fryxell, I.D. Thompson, and J.A. Baker. 2008. Habitat-mediated variation in predation risk by the American marten. 89(8):2273-2280.

[96] Harmon, M. E., J. F. Franklin, F. J. Samson, P. Sollins, S. V. Gregory, J. D. Lattin, N. H. Anderson, S. P. Cline, N. G. Aumen, J. R. Sedell, G. W. Lienkaemper, K. Cromack Jr., and K. W. Cummings. 1986. Ecology of coarse woody debris in temperate ecosystems. Advances in Ecological Research 15: 133-302; Crow, T. R., D. S. Buckley, E. A. Nauertz, and J. C. Zasada. 2002. Effects of management on the composition and structure of northern hardwood forests in upper Michigan. Forest Science 48:129-145.

[97] Monfils, M. J., M. A. Kost, C. R. Weber, M. L. Donovan, and P. W. Brown. 2011. Decay and Size Class Characteristics of Coarse Woody Debris in Northern Michigan Forests. Michigan Natural Features Inventory, Report Number 2011-13, Lansing, MI ("In comparison to unmanaged forests, the managed northern hardwood and aspen stands we sampled had significantly less CWD as measured by mean CWD length, CWD volume, snag basal area, and snag DBH.").

sensory cues to martens, thereby increasing the odds of hunting success. Red-backed voles in regenerating forest stands exhibited increased wariness compared to voles living in old uncut forest, suggestive of a behavioral response to habitat mediated variation in predation risk.[98] Recent research on the CNNF evaluated marten diets and found martens were using lower quality prey or prey that created high-risk to marten and could be contributing to the delayed recovery of marten.[99] A full EIS is necessary for the Forest Service to adequately determine whether there will be sufficient prey availability in the project area.

VII. The EA/draft FONSI do not adequately assess the Project's impact on the wood turtle

Wood Turtles are declining across many parts of their geographic distribution, and the decline in population size over the past three generations (~ 50 years) may be substantial. The BE states, "The global rank for this species in 2004 was G4, which is apparently secure. However, the global rank currently is G3, which is vulnerable."[100] The global ranking referred to in the BE has not been updated since 2010. Wood turtles are considered Globally Endangered by the International Union for Conservation of Nature, listed as Threatened in Wisconsin, and are under review for listing under the Endangered Species Act.

Wood Turtles have very specialized habitat requirements and large home ranges, which may make them more susceptible to local extirpation due to habitat fragmentation.[101] A model developed by Compton (1999) predicted that the annual removal of only two adult wood turtles

[98] Andruskiw et al. 2008.

[99] Carlson, J.E., J.H. Gilbert, J.W. Pokallus, P.J. Manlick, W.E. Moss, and J.N. Pauli. Potential role of prey in the recovery of American martens in Wisconsin. J. Wildlife Management 78(8):1499-1504.

[100] BE at 60.

[101] Remsberg, A. J., T. L. Lewis, P. W. Huber, and K. A. Asmus. 2006. Home ranges of Wood Turtles (Glyptemys insculpta) in northern Michigan. Chelonian Conservation and Biology 5:42−47; Willoughby, J.R., M. Sundaram, T.L.Lewis, and B.J. Swanson. 2013. Populationu deline in a long-lived species: the Wood turtle in Michigan. Herpetologica, 69(2):186–198.

from a stable population of 100 individuals would result in the extirpation of the population in less than 80 years.[102]

Recent monitoring of populations in Wisconsin revealed estimated annual survival rates low enough to cause concern.[103] Wood turtles are found within the project area and 566 acres of timber harvest is planned within the 300 m buffer zone along the subset of stream reaches Forest Service assumes provides suitable habitat.[104] However, the amount of timber harvest within 300 m of other streams not deemed suitable using the current habitat model for effects analysis is unknown.

Monitoring wood turtle populations across their range is considered a top priority for conservation and long-term management.[105] The Forest Service has conducted no monitoring of wood turtle on the CNNF or in the project area and justifies this shortfall by claiming monitoring is too difficult. Forest Service also did not substantially respond to comments on wood turtles and instead reiterates findings in the BE.

The failure of Forest Service to conduct monitoring for a species with high home range and site fidelity, low reproductive rates, ongoing population declines, vulnerability to predators and vehicles, and a sensitivity to even small changes in adult survival means that the EA is

[102] Compton, B.W. 1999. Ecology and Conservation of the Wood turtle (Clemmys insculpta) in Maine. M.S. Thesis, University of Maine, Orono, Maine. 91 pp.

[103] Lapin, et al., 2019. A Regional Analysis of Glyptemys insculpta (Wood Turtle) Survival in the Upper Midwest of the USA. Herpetological Conservation and Biology 14(3):668–679.

[104] BE at 63.

[105] Bowen, K.D. and J.C. Gillingham. R9 Conservation assessment for Wood turtle – Glyptemys insculpta (LeConte, 1830). US Forest Service, Eastern Region, Milwaukee, WI, 2004; Thompson, D.G., T. Swystun, J. Cross, R. Cross, D. Chartrand and C.B. Edge. (2018) Fine- and coarse-scale movements and habitat use by Wood Turtles (*Glyptemys insculpta*) based on probabilistic modeling of radiotelemetry and GPS-telemetry data. *Canadian Journal of Zoology* 96:10, 1153-1164.

insufficient.[106] This failure also calls into question conclusions in the BE regarding effects to wood turtles. The Forest Service provides no evidence that Forest Plan standards and guidelines adequately protect individuals and populations of wood turtle across the CNNF and in the Fourmile Project area. Moreover, the Forest Service's determination that individual wood turtles may be lost but that the species would remain viable ignores the high sensitivity to adult mortality in wood turtles.

Contrary to the Forest Service's assertion that monitoring wood turtles is too difficult, numerous monitoring studies have been conducted, including studies in Wisconsin and Michigan in similar habitats.[107] Moreover, Forest Service ignores that fact that a verified methodology for monitoring wood turtles is available.[108] Surveys to inventory potential wood turtle nesting sites have also been incorporated into state lands biotic inventory work in support of state property Master Planning.[109]

The Forest Service's failure to adequately evaluate the impacts of the Project on the wood turtle mean that an EIS is necessary to adequately determine whether the Project will have a significant impact.

VIII. The EA/draft FONSI do not address the scientific literature that would suggest that the Project may well have a greater negative impact on water resources than the EA/FONI acknowledge

[106] Arvisais, M., et al. (2002) Home range and movements of a wood turtle (*Glyptemys insculpta*) population at the northern limit of its range. Can. J. Zool. 80: 402–408; Schneider, A.C. et al. (2018) An 18-Year Mark–Recapture Study of Wood Turtles (*Glyptemys insculpta*) in Michigan. J. of Herpetology 52(2):193-200.

[107] Schneider, A.C. et al. (2018) An 18-Year Mark–Recapture Study of Wood Turtles (*Glyptemys insculpta*) in Michigan. J. of Herpetology 52(2):193-200.

[108] D.J. Brown, M.M. Cochran and R.A. Moen. 2017. Survey and analysis design for wood turtle monitoring. J. Wildlife Management 81(5):868-877.

[109] Wisconsin Department of Natural Resources. 2016. Wisconsin Wood Turtle (Glyptemys insculpta) Status Assessment and Conservation Strategy. PUB NH-935 2016. Wisconsin Department of Natural Resources, Madison, Wisconsin, USA.

The EA claims that "[a]ctivities associated with mechanical operations for timber harvest, in addition to permanent road construction, road re-construction, and road decommissioning, would not impair long-term water quality."[110] The EA, however, does not adequately demonstrate this lack of long-term water quality impairment. In order to actually determine whether the project will impair long-term water quality, the Forest Service must conduct an EIS.

A. The EA does not adequately evaluate harvest thresholds

The Forest Service has not adequately justified its claim that the two watersheds selected for clearcutting of aspen fall below the "harvest thresholds for peak snowmelt and storm runoff." In fact, evidence indicating that clearcutting affects peak flow and snowmelt is readily available. Chapter 13 of *Peatland Biogeochemistry and Watershed Hydrology at the Marcel Experimental Forest* by Sebestyen et al. includes documented effects of clearcutting on peak flow and snowmelt in a large-scale whole watershed experiment (similar to Hubbard Brook).[111] The research also found effects of upland forest harvesting on streamflow peaks. Similar adverse effects have been found due to aspen clearcutting on watersheds in Minnesota similar to those in the CNNF.[112] The EA for the Project does not report the proposed percent harvest area or DBA harvest in the two watersheds selected for aspen clearcuts in Alternative 2. An EIS is required to fully understand the impairment effects of these clearcuts.

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[110] EA at 37.

[111] Chapter attached as Attachment A to these objections.

[112] Verry, E.S. 1972. Effect of an aspen clearcutting on water yield and quality in northern Minnesota. In: *Proceedings of a symposium on Watersheds in Transition,* eds., S.C. Csallany, T.G. McLaughlin, and W.D. Striffler, Fort Collins, CO, June 19–22, 1972. Urbana, IL: American Water Resources Association, pp. 276–284; Verry, E.S., J.R. Lewis, and K.N. Brooks. 1983. Aspen clearcutting increases snowmelt and storm flow peaks in north central Minnesota. *Water Resources Bulletin* 19(1):59–67; Verry, E.S. 1987. The effect of aspen harvest and growth on water yield in Minnesota. In: *Forest Hydrology and Watershed Management–Hydrologie forestière et aménagement des bassins hydrologiques*. Wallingford, UK: International Association of Hydrological Sciences, Vol. 167, pp. 553–562; Verry, E.S. 2004. Land fragmentation and impacts to streams and fish in the central and upper Midwest. In: *Lessons for Watershed Research in the Future; A Century of Forest and Wildland Watershed Lessons*, ed. G.G. Ice and J.D. Stednick. Bethesda, MD: Society of American Foresters, pp. 129–154.

B. Clearcutting in the Riparian Management Zone Will Impact Water Quality

The EA identifies the size of the riparian management zone (RMZ) that must be protected based on the 2010 WDNR Best Management Practices (BMPs) (35 – 100 feet depending on the designation of the stream as a trout stream and the width of the stream). Using the WDNR 2010 BMPs to justify that "management practices can be modified to protect water quality, fish and other aquatic resources", the EA states that "alternative 2 proposes up to 105 acres of RMZ harvest treatments where the desired future condition of the stand is to promote the growth and retention of long lived tree species appropriate to the site."[113] That language implies that the Wisconsin BMPs for water quality justify clearcutting 105 acres in the RMZ. Yet the Wisconsin BMPs counsel against clearcutting in an RMZ.[114]

The BMPs specifically note that "[w]hen aspen is the dominant cover type within an RMZ, a conflict may result in terms of managing for regeneration of aspen and managing riparian functions."[115] The field guide goes on to describe options for managing aspen that do not involve clearcuts across the RMZ. In other words, the very BMPs that the Forest Service relies on indicate that a clearcut is inappropriate in an RMZ specifically because clearcuts negatively impact the riparian functions that are to be protected. The EA provides nothing to demonstrate that harvesting within the forbidden harvest zone (RMZ) will not "impair long-term water quality." To the contrary, scholarly literature suggests that these clearcuts within the RMZ could negatively impact water quality.[116] Further, the Forest Service later argues against its own itself by stating that decommissioning roads in the RMZ and removing stream crossings will "improve

[113] EA at 37.

[114] Wisconsin's Forestry Best Management Practices for Water Quality at 94.

[115] *Id.*

[116] *See* Kiffney, P.M., J.S. Richardson and J.P. Bull. 2003. Responses to periphyton and insects to experimental manipulation of riparian buffer width along forest streams. Journal of Applied Ecology 4:1060-1076.

hydrologic functions by reducing sediment inputs."[117] Those same hydrologic and water quality impacts from roads occur when RMZ's are clearcut.

The Forest Service must conduct an EIS to determine whether clearcuts within the RMZ are appropriate.

IX. The cumulative impacts and indirect impacts analyses in the EA/draft FONSI are insufficient

The cumulative impacts analysis provided in the EA is insufficient for properly analyzing the impacts of the Project and other projects on the CNNF. There is no cumulative impacts analysis to speak of in the main text of the EA. Rather, it references a cumulative effects assessment methodology and then provides a table of past, present, and foreseeable projects considered in the Fourmile project area.[118] The BE references cumulative impacts for various species but in general simply dismisses the impacts by making reference to available habitat following the harvests. There is no analysis provided of how the management practices utilized in past, present, and future projects affect the future of CNNF. Because no alternative practices were analyzed other than a no-cut alternative, there is no effort by the Forest Service to properly evaluate the effectiveness of the Project's forest management practices, which are substantially similar to the practices in many other vegetation projects throughout the CNNF.

It is not possible to properly conduct a cumulative impacts assessment without trying to understand the effects on the forest and the project area to date. The Forest Service should conduct an EIS that rigorously and adequately examines the effects of continued management using the practices proposed in this Project, many of which are criticized throughout our

[117] EA at 37.
[118] EA at 22.

comments and in these objections, on the CNNF. Merely noting that business as usual will not cause any unusual harm fails to meet the standards of NEPA.

Further, in response to our previous comments, the Forest Service acknowledges that it did not study indirect impacts of the Project. Its rationale is simply that it is following the Forest Plan and therefore no indirect impacts would result.[119] Such a response is unwarranted and reckless, given that several known and well-documented indirect impacts of logging are known to extend for distances of hundreds of meters to kilometers beyond project activities. These indirect impacts include boosting populations of white-tailed deer (from logging residues ["tops"], clearcuts, and ensuing early successional habitat conditions); augmenting invasions of invasive plants and animals; and boosting populations of meso-predators that pose serious threats to nesting songbirds. In responding to these concerns, the Forest Service specifically stated:

> Although these types of effects were probably not uncommon during logging a century ago, they are uncommon these days because over the years, monitoring has helped to develop modern practices that eliminate or minimize these types of effects. Examples of practices can be found in the Forest Plan standards and guidelines (chapter 2) and in the Wisconsin state BMPs.[120]

Yet the EA/draft FONSI provides no specific monitoring plan, data, or citations.

Instead, the Forest Service asserts that merely by following the 2004 Forest Plan they will automatically prevent or protect against these indirect effects. In addition to ignoring known and relevant science like that cited above, this assertion places inappropriate and undue confidence in analyses that are now almost 20 years old. This might be reasonable if the BE provided clear and sufficient monitoring data to support these claims, but it does not. Rather, the BE relies primarily on a "house of cards" approach for most species wherein it first asserts that it can predict occurrences and persistence for Regional Forester Sensitive Species and other species

[119] EA, Appendix C at 29.
[120] *Id.* at 33.

on the basis of "suitable habitat", then defines this habitat so as to include most maturing age classes of existing northern hardwood forest stands – including those to be subjected to selective and thinning cuts. The Forest Service then concludes that because these cuts do not diminish the amount of what they have defined as "suitable" habitat for many species, their activities will have no impacts.

For most species "analyzed," the EA contains no new data or analyses regarding their actual locations, occurrences, or trends. Instead, the Forest Service relies on the false assumption that acres of suitable acres are an accurate proxy for the well-being of species. The Forest Service should not be allowed to substitute flawed assumptions or definitions for actual data and analyses of trends. To allow this is to ignore the considerable and long-standing scientific controversies that exist over the use and application of habitat suitability models, including Krohn (1992) and Graham and Kimble (2019).[121]

[121] Krohn, W.B. 1992. Sequence of Habitat Occupancy and Abandonment: Potential Standards for Testing Habitat Models. Wildlife Society Bulletin 20: 441-444; Graham, J. & Kimble, M. 2019. Visualizing uncertainty in habitat suitability models with the hyper-envelope modeling interface, version 2. Ecol. Evol. 9: 251–264.