Addendum to Heather Cantino comments on NNIS EA 3-26 re 2025 Non-Native Invasive Plant Control Project #66326, addendum added to comments previously submitted (on 3-29-26) as letter # 66326-6884-4

I would like to submit these first two chapters of the Managing Biological Diversity report, submitted to the Wayne in 2020 as part of the Plan Revision process, a process subsequently aborted by USFS, leaving the Wayne with its atrocious 2006 Forest Management Plan still "guiding" management more than 20 years after it was written. Shame!

I have attached this addendum to a copy of my comments previously submitted as letter # 66326-6884-4 Please accept this material in support of my opposition to the NNIS EA, 2025 Non-Native Invasive Plant Control Project #66326

from:

Managing biological diversity in deciduous forests of southeastern Ohio

Report of the Biodiversity Working Group, Wayne National Forest management plan revision, Phase 1

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Section 1. Forest Health

1a. Increase and response to non-native invasive species

Issue

A key driver of change is the invasion of ecosystems by alien species, many of which attain sufficiently high abundance to influence biodiversity. Most meta-analysis studies have in fact shown either a neutral or negative effect of alien species upon native species—at both the community and ecosystem levels (Vila et al. 2011). The main issue haunting land managers at this point is how to respond to such a large-scale problem. FIA data (2001-2008) revealed that two-thirds of all plots in R9 contained one or more non-native invasive species (Schulz and Gray 2012).

Best Available Science

Geographical variation in numbers of non-native species reflects landscape characteristics that drive non-native species invasions. For example, forest pest species are much more concentrated in the northeastern region (R-9) of the USA than in other parts of the country. This pattern most likely reflects the combined effects of propagule pressure (pest arrival), habitat invasibility (pest establishment), and invasion spread indicating the importance of anthropogenic movement in that spread (Liebhold et al. 2013).

Exotic insect pests and pathogens pose a serious and immediate threat to the forests of eastern North America. The litany of exotic introductions is long and includes historically well-known and more recent introductions (Lovett et. Al. 2006). Important pests and pathogens include well-known examples such as chestnut blight (*Cryphonectria parasitica*), Dutch elm disease (*Ophiostoma ulmi*), gypsy moth (*Lymantria dispar*), beech bark disease (*Neonectria* spp.), hemlock woolly adelgid (*Adelges tsugae*), dogwood anthracnose (*Discula destructiva*), and emerald ash borer (*Agrilus planipennis*). Top invasive plant species include such familiar species as Japanese honeysuckle (*Lonicera japonica*), garlic mustard (*Alliaria petiolata*), Japanese barberry (*Berberis thunbergerii*), Norway maple (*Acer platanoides*), Kudzu (*Pueraria montana*), Japanese stiltgrass (*Microstegium vimineum*), multiflora rose (*Rosa multiflora*), Tree-of-heaven (*Ailanthus altissima*), etc. The point of this list is not so much to single out or document the species, but to recognize that most of the eastern deciduous forest biome is literally under siege, and likely to change dramatically in the coming decades.

There is a growing shift among scientists and land managers on the philosophy of how to respond. The problem is too pervasive. A “fix” is highly improbable. The solution is not to saturate the environment with chemicals (see below), or try to pull or cut every herb and shrub—all of these methods are likely to result in failure. A much more targeted approach is needed, and is likely the only approach to succeed.

From a purely biological perspective, exotic invasive species and native species are not fundamentally different. The carbon capture strategy of a species is strongly associated with disturbance, with species from disturbed sites having traits that confer capacity for fast growth. Thus, differences between exotic invasives and natives may simply reflect differences in the environmental conditions of the sites where they occur rather than differences between exotic invasives and natives per se (Leishman et al. 2010). In fact, most invasive species are not shade tolerant and will disappear from a plant community on their own over the course of natural succession (Matlack and Schaub 2011). Thus, we need to begin consideration of plant community change and acceptance of these new species into an ecological world that is different than it was in Pre-Columbian times.

To paint the invasive species issue as a choice between the native environment and alien species, between preservation and human meddling, obscures the real issue. Ecosystems change over time with shifts in climate, nutrients inputs, rainfall patterns, and the relative abundance of species in the plant community. How should we manage the new system that contains species that existed prior to European settlement or since the last ice age, relative to new alien species that seem well adapted to the environment? Do the benefits of removing NNIS justify the economic and ecological costs (Kauffman and Kauffman 2012)?

Condition of the WNF

The WNF is currently inhabited by hundreds of invasive plant and animal species, some of which have established large populations. Some of those species develop large and persistent seed or spore banks (Redwood et al. 2018). USFS management practices on the WNF have been implicated in the spread of at least one invasive (*Microstegium vimineum*; Christen and Matlack 2006) and road maintenance is widely recognized as a problem contributing to spread of NNIS (Rauschert et al. 2017).

General Remedy

Ultimately, reducing the impacts of exotic pests and pathogens on eastern forests requires that we minimize new introductions through concerted national and international policy efforts aimed at eliminating the transfer of pests and diseases between countries (beyond the scope of a specific forest plan). However, individual national forests can play a strong role in reducing the local spread of pests and pathogens by demanding high standards of those conducting operations within their jurisdictional boundaries (logging, road work, right-of-way maintenance, etc.), as well as careful supervision of internal operations involving USFS vehicles that may move pests and pathogens throughout the landscape. Importantly, Huebener et al. (2018) note that by keeping forest cover above 85% when conducting logging operations (often thinning to promote oak regeneration) will result in a dramatic reduction in the most problematic NNIS.

Moreover, based upon shifting mind sets of scientists and managers, there is a growing trend towards thinking about invasive species differently. A large-scale control effort will be fruitless. Agencies should consider prioritization (triaging): 1. Target only small (i.e. newly-established), isolated populations rather than large, well-established populations, 2. Target shade tolerant species (most other NNIS will disappear naturally as the canopy closes), 3. Avoid disturbance (fire, harvesting, trail creation, road grading, etc.)

near existing NNIS populations, 4. WNF staff should be required to report any observation of new species or new populations of existing NNIS to the staff botanist and wildlife specialist.

Forest managers must base NNIS management decisions on: (1) the urgency of control relative to the degree of threat posed to biodiversity, and (2) the likelihood of achieving a successful conservation outcome as a result of alien plant control (Downey et al. 2017).

Supporting Literature

Christen, D and G Matlack. 2006. The role of roadsides in plant invasions: a demographic approach. Conservation Biology 20: 385–391.

Downey, P., M. Williams, L. Whiffen, B. Auld, M. Hamilton, A. Burley, and P. Turner. 2017. Managing alien plants for biodiversity outcomes—the need for triage. Invasive Plant Science and Management, 3: 1-11. doi:10.1614/IPSM-09-042.1

Huebner, C.D., A.E. Regula, D.W. McGill. 2018. Germination, survival, and early growth of three invasive plants in response to five forest management regimes common to US northeastern deciduous forests. Forest Ecology and Management 425:100-118. https://doi.org/10.1016/j.foreco.2018.05.037

Lovett, G.M., C.D. Canham, M.A. Arthur, K.C. Weathers, R.D. Fitzhugh. 2006. Forest ecosystem responses to exotic pests and pathogens in eastern North America. BioScience 56: 395– 405. https://doi.org/10.1641/0006-3568(2006)056[0395:FERTEP]2.0.CO;2

Kaufman, S.R. and W. Kaufman. 2012. Invasive Plants: A guide to Identification, Impacts, and Control of Common North American Species, 2nd ed. Stackpole Books, Mechanisburg, PA.

Leishman, M. R., Thomson, V. P. and Cooke, J. 2010. Native and exotic invasive plants have fundamentally similar carbon capture strategies. Journal of Ecology 98: 28-42. doi:10.1111/j.1365-2745.2009.01608.x

Liebhold, A.M., D.G. McCullough, L.M. Blackburn, S.J. Framkel, B. Von Holle, and J.E. Aukema. 2013. A highly aggregated geographical distribution of forest pest invasions in the USA. Diversity and Distributions 19: 1208-1216. https://doi.org/10.1111/ddi.12112

Matlack, GR and JE Schaub. 2011. Long-term persistence and spatial assortment of nonnative plant species in deciduous forests of varying age. Ecography 34:649–658.

Meekins, J.F. and B.C. McCarthy. 2001. Effects of environmental variation on the invasive success of a nonindigenous forest herb. Ecological Applications 11: 1336-1348.

Rauschert, E.S.J., D.A. Mortensen, and S.M. Bloser. 2017. Human-mediated dispersal via rural road maintenance can move invasive propagules. Biological Invasions 19: 2047-2058. https://doi.org/10.1007/s10530-017- 1416-2

Redwood, M., G. Matlack, and C. Huebner, C. 2018. Seed longevity and dormancy state suggest management strategies for garlic mustard (*Alliaria petiolata*) and Japanese stiltgrass (*Microstegium vimineum*) in deciduous forest sites. Weed Science 66: 190-198. doi:10.1017/wsc.2017.74

Schulz, B.K. and A.N. Gray. 2013. The new flora of the northeastern USA: quantifying introduced plant species occupancy in forest ecosystems. Environmental Monitoring and Assessment 185: 3931-3957. https://doi.org/10.1007/s10661-012-2841-4

Vilà, M. , Espinar, J. L., Hejda, M. , Hulme, P. E., Jarošík, V. , Maron, J. L., Pergl, J. , Schaffner, U. , Sun, Y. and Pyšek, P. 2011. Ecological impacts of invasive alien plants: a meta-analysis of their effects on species, communities and ecosystems. Ecology Letters 14: 702-708. doi:10.1111/j.1461-0248.2011.01628.x

1b. Potential for overuse of herbicides for NNIS control

Issue

Are chemical herbicides, fungicides, and pesticides the best way to control NNIS? Biocides often have far reaching effects on non-target organisms and the residence time of pesticide residues in the environment can be long. A growing body of scientific literature suggests that the use of biocides in the environment by land managers should be minimized to the extent practical and reserved as a last-ditch effort to achieve specific conservation objectives where there is overwhelming evidence to suggest success.

Best Available Science

There is a very recent change in attitude among scientists and land managers as to when and how to control NNIS. Likewise, there is increased recognition that we are overusing chemical herbicides, fungicides, and pesticides—and this is coming with environmental consequences.

A good example is glyphosate (Round-Up™). This is generally considered by most land managers to be relatively benign. Historical data support this notion and the herbicide is used widely in agriculture for food production. However, there is a now growing list of not previously envisioned issues with glyphosate. Herbicide resistant weeds are increasing dramatically. More disturbingly, a study appeared relatively recently (Relyea 2012) that implicated glyphosate use as the cause of morphological and behavioral changes in vertebrates (salamanders and frogs)—even when applied at sub-agricultural dosage levels. Amphibians are widely seen as indicator species due to their sensitivity to environmental change. This literature is burgeoning in the last five years and is way beyond the scope of review here. Collectively, these discoveries suggest that the world's most widely applied herbicide may have much further-reaching effects than previously anticipated.

The study by Relyea (2102) set off a cascade of subsequent studies in the industrial and academic environment that is ongoing today and quite contentious (the legal, socio-political, economic, and ecological consequences are profound). Sviridov et al. (2014) provide a relatively recent, but now somewhat dated review, of the environmental risks associated with glyphosate. Their review cited a number of studies showing significant negative impacts of glyphosate-based herbicides on human embryonic development. They indicate that there is notable amount of data suggesting that glyphosate can accumulate in the arable soil layer, and through the roots it can get into leaves, berries, and fruit and finally to mammals via food chains (Sviridov et al. 2014).

Despite its relatively benign reputation, Roundup was among the most toxic herbicides and insecticides tested in a recent study (Mesnage et al. 2014). They found 8 formulations out of 9 were up to one thousand times more toxic than their active principles alone (the part that is usually tested). Their results fundamentally challenge the relevance of the acceptable daily intake for pesticides because this norm is calculated from the toxicity of the active principle *only*. Chronic tests on pesticides may not reflect relevant environmental exposures if only one ingredient of these mixtures is tested in isolation. Despite advances in control methods and native species establishment techniques, rates of successful transition from an invaded system to a native community can be extremely low. In short, one is fighting a losing battle. Research links restoration failure following invasive plant control to prolonged invader persistence and reinvasion, extremely dry conditions, and native propagule limitation (Kettenring and Adams 2011).

To be clear, the issues surrounding herbicide application presented here are not about Roundup per se (this was just used as an example). *Regardless of which herbicide is used, what transfer agent is employed, how the herbicide was dosed (at or below label recommendations), or how applied (i.e., foliar, basal barking, or even direct injection—Lewis and McCarthy 2008)—the peer-reviewed scientific literature is crystal clear—there is no loop hole for environmental integrity*. These chemicals do not exist naturally in the environment, they are easily transferred into the food chain, and many have long residence times in the environment.

General Remedy

Because restoration success is so low, because current best practices advocate the use of a strong triage approach, and because there is a rapidly increasing body of data to suggest health concerns (for all vertebrates, including humans) related to herbicide usage, USFS should begin a rapid de-escalation of the use of all herbicides, pesticides, and fungicides on the WNF. There may be no need to fight a losing battle—we need to envision a new "normal" as it pertains to vegetation in the landscape. Inevitably, some biocides will be needed for specific projects, but they should really be reserved for the small number of situations of conservation projects that are deemed both imperative and that have a high probability of success (e.g., saving a threatened or endangered species population).

Supporting Literature

Green, J.M. 2014. Current state of herbicides in herbicide-resistant crops. Pest Management Science 70: 1351-1357. https://doi.org/10.1002/ps.3727

Kettenring, K. M. and Adams, C. R. (2011), Lessons learned from invasive plant control experiments: a systematic review and meta-analysis. Journal of Applied Ecology, 48: 970-979. doi:10.1111/j.1365-2664.2011.01979.x

Lewis, K. and B.C. McCarthy. 2008. Nontarget tree mortality after tree-of-heaven (*Ailanthus altissima*) injection with Imazapyr. Northern Journal of Applied Forestry 25(2): 66-72.

Mesnage, R. N. Defarge, J. Spiroux de Vendômois, and G-E Séralini. 2014. Major pesticides are more toxic to human cells than their declared active principles. BioMed Research International Vol. 2014, Article ID 179691, 8 pages. https://doi.org/10.1155/2014/179691.

Relyea, R. A. (2012), New effects of Roundup on amphibians: Predators reduce herbicide mortality; herbicides induce antipredator morphology. Ecological Applications, 22: 634-647. doi:10.1890/11-0189.1

Sviridov A.V., T.V. Shushkova, I.T. Ermakova, E.V. Ivanova and A.A.Leontievsky. 2014. Glyphosate: Safety Risks, Biodegradation, and Bioremediation. In: Cao G., Orrù R. (eds) Current Environmental Issues and Challenges. Springer, Dordrecht.

Original comments, as submitted 3-29-26 Letter # 66326-6884-4.

I write as an educated concerned citizen of Athens County to challenge the appropriateness, veracity, intent, and logic of the EA on NNIS control in the Wayne National Forest.

It is unacceptable for the USFS to declare that it can make future decisions on pesticide use for pesticides not yet registered with USEPA or presented to the public for comment and objections. This would give USFS a carte blanche to use whatever toxic pesticide it chooses without public scrutiny. Pesticides registered by USEPA are toxic by definition - they are intended to kill living things. There is no such thing as a safe registered pesticide. And “approved” for a particular use has nothing to do with “safety” of the pesticide.

Furthermore, the discretion given to individual managers is inadequate given that there are no guidelines for decision making or appropriate use and given that the materials to be used are all known toxins with *known* impacts on wildlife, off-target vegetation, and humans. It is absurd that the level of protection for off-target species is based on this vague instruction with no decision-making criteria specified: "*Consult a wildlife biologist to determine the need for surveys for certain wildlife species or habitats that have limited local habitat distribution when treatments are planned near known occupied areas, or when the treatment has the potential to cause direct effects."* It is also noteworthy that the EA refers to "direct effects" but **does not consider low-dose longterm impacts, including from breakdown products.**

Also, the EA’s use of "non-target species," is often not specified to mean ***all** non-target species* rather than just vegetation. And where non-vegetative off-target impacts are referenced (for example, “The proposed action is not likely to jeopardize the monarch butterfly. For northern metalmark and Appalachian grizzled skipper, the proposed action may adversely impact individuals, but is not likely to result in a loss of viability in the Planning Area, nor cause a trend toward federal listing”), there is no basis given for the claim that the population *won’t* be impacted though it states that individuals will!

Re the veracity of claims made in the EA:
While the EA states that the pesticides proposed for use have “low toxicities,” nowhere is there a definition of what “low” means. The following statement (p. 19) appears to be false based on the listed pesticides with which I am familiar, discussed below. "*Overall, the herbicides selected are characterized by low human and environmental toxicity, short environmental persistence, and limited mobility*." ***Where is there a definition of what "low" means? And how can the following evidence of toxicity and harm be reconciled with your statement of “low human and environmental toxicity”?***

A cursory search for off-target impacts revealed the following examples, a few of presumably many pieces of data on the harmful impacts of these pesticides, given that most of them have been in use for decades:

From references at beyondpesticides.org (beyondpesticides.org/dailynewsblog/2020/08/28-pesticides-linked-to-mammary-gland-cancer-inadequately-reviewed-by-epa/) on **trichlypyr:**
"Rodents developed **mammary gland tumors** after being exposed to **triclopyr,** yet for some reason regulators dismissed the information in their decision not to treat it as a carcinogen.”

Another recent example is EPA's spring 2020 registration of a demonstrably carcinogenic herbicide, **isoxaflutole** — a compound listed by EPA as "**likely to be carcinogenic" to humans**. (also at beyondpesticides.org/dailynewsblog/2020/08/28-pesticides-linked-to-mammary-gland-cancer-inadequately-reviewed-by-epa/)

On impacts of two pesticides listed on the EA: Students Poisoned by Pesticides Sprayed on Playing Field Outside of Classroom (Beyond Pesticides, October 27, 2011) Forty-seven students from Edgewood Middle School in St. Clair Township, Ohio, reportedly fell ill after the school's hired pest control company sprayed the herbicide Momentum, which contains the toxic ingredients **2,4-D, triclopyr and clopyralid,** on nearby playing fields to treat for clover and other weeds. The incident and others like it demonstrate the need for a comprehensive national policy to protect children from harmful and unnecessary exposure to toxic chemicals. Six students were taken to nearby hospitals and twenty-one students total were treated for symptoms, including headaches, breathing difficulties, nausea and dizziness. Children are especially sensitive and vulnerable to pesticides because of their rapid development and behavior patterns. *Adverse health effects, such as nausea, dizziness, respiratory problems, headaches, rashes, and mental disorientation, may appear even if a pesticide is applied according to label directions,* which may have been the case in this situation. Pesticide exposure can have long-term adverse effects, including damage to a child's neurological, respiratory, immune, and endocrine system and increased asthma symptoms. Studies show that children living in households where pesticides are used suffer elevated rates of leukemia, brain cancer, and soft tissue sarcoma.

And another entry on **clopyralid** (beyondpesticides.org/dailynewsblog/category/chemicals/clopyralid/): "Tell EPA to Ban the Persistent Toxic Herbicide Clopyralid that Contaminates Compost: (Beyond Pesticides, July 6, 2020) EPA's proposed interim decision (PID) on the weed killer clopyralid is inadequate to protect human health, property, nontarget plants, and pollinators from damage. *Clopyralid poses unreasonable adverse effects that cannot be remedied by EPA's proposed fixes*. *It should be banned*. Clopyralid is a **toxic persistent herbicide** used to control broadleaf weeds on lawns and turf, range, pastures, right-of ways, and on several crops. Approximately 1.6 million pounds of clopyralid is used on 20 million acres per year in the U.S. on agricultural land, but it is also commonly used to kill dandelions, clover, and thistles. Lawn care operators applied over a million pounds of clopyralid in 2013. **Clopyralid is notorious for causing damage to nontarget plants.** The registration was modified in 2002 to delete residential turf uses from the clopyralid product label. Additionally, under the amended label professional applicators are required to notify property managers not to compost clippings from treated grass. EPA proposes to expand the prohibition to include school turf, but clopyralid products will continue to be used on golf courses…"

Some references to **Glyphosate's off-target faunal species impacts**:

Glyphosate has been found to be associated with a variety of negative effects on fauna, including being **highly toxic to bumblebees**[1], having **low-dose effects in rodents**[2], causing **oxidative stress and anxiety in fish**[3], and effects in numerous other species.

[1] https://biologicaldiversity.org/w/news/press-releases/new-study-undisclosed-inert-ingredients-in-some-popular-roundup-products-found-to-be-highly-toxic-to-bumblebees-2021-04-16/

[2] "Lifelong Exposure to a Low-Dose of the Glyphosate-Based Herbicide RoundUp® Causes Intestinal Damage, Gut Dysbiosis, and Behavioral Changes in Mice.". Castilo et al. International Journal of Molecular Science. May 17, 2022. https://pubmed.ncbi.nlm.nih.gov/35628394/
[3] "Glyphosate targets fish monoaminergic systems leading to oxidative stress and anxiety". Faria et al. Environment InternationalVolume 146, January 2021, 106253. https://www.sciencedirect.com/science/article/pii/S016041202032208X

Other research findings on glyphosate and glyphosate formulations:
Surfactant Toxicity (POEA): Studies show that the surfactant POEA is often 10–40 times more toxic to aquatic organisms than glyphosate itself, and up to 1000 times more toxic to human cells. POEA increases mortality in tadpoles, with some studies showing survival reduction by 74%.

Aquatic Impact: GBHs are highly toxic to aquatic environments (fish, invertebrates, amphibians). While some studies find toxicity, others show it is primarily at doses higher than standard application rates, except in cases of direct overspray into water bodies

Amphibians: Amphibians are particularly sensitive, showing high mortality rates from POEA-containing formulations due to their permeable skin and aquatic-terrestrial life stages.

References for the above: J Appl Toxicol, 2014 May;34(5):458-79. doi: 10.1002/jat.2997. Epub 2014 Feb 25., *Impact of glyphosate and glyphosate-based herbicides on the freshwater environment,* Robert Annett et al.

Soil and Terrestrial Microorganisms: Glyphosate applications can negatively affect beneficial soil fungi and microbes, disrupting soil health.

Int J Environ Res Public Health. 2020 Oct 15;17(20):7519. doi: 10.3390/ijerph17207519, Herbicide Glyphosate: Toxicity and Microbial Degradation
Simranjeet Singh et al.

Non-Target Plants: Beyond animals, spray drift and runoff can severely impact non-target plant species (up to 10% of applied rate), damaging growth and harming beneficial pollinator-plant interactions.

Glyphosate and environmental toxicity with "One Health" approach, a review, Margherita Ferrante et al, Environmental Research, Vol 235, 10-15-2023,

'Furthermore, the common surfactant in glysophate formulations is up to 1000x more toxic than glyphosate alone: Studies indicated that polyethoxylated tallow amine (POEA), a common surfactant in glyphosate-based herbicides, is 10–40times more toxic to aquatic organisms and up to 1000 times more toxic to human cells than glyphosate alone. Defarge N., et al.. *Co-formulants in Glyphosate-based herbicides disrupt aromatase activity in human cells below toxic levels*. Int. J. Environ. Res. Public. Health. 2016;13 doi: 10.3390/ijerph13030264. [DOI] [PMC free article] Cited in *Genotoxic activity of glyphosate and co-formulants in glyphosate-based herbicides assessed by the micronucleus test in human mononuclear white blood cells,* Khadija Ramadhan Makame et al. Toxicol Rep. 2025 Jun 3;14:102063. doi: 10.1016/j.toxrep.2025.102063, which concluded "Glyphosate-based herbicides (GBHs) are widely used and contribute to soil, water, and air contamination. Despite differing assessments of its carcinogenic potential, glyphosate toxicity may be enhanced by the co-formulants (adjuvants) used to improve its effectiveness." And "co-formulants in glysophate-based herbicides [GBHs] can induce genotoxic effects at low concentrations and short exposure times. This indicated that some surfactants in GBHs may be more toxic than glyphosate."

Glyphosate and human health impacts:

"The Center for Biological Diversity has also charged that EPA pesticide risk assessment relies *far too heavily on industry-produced (and funded) studies to inform its conclusions, and sometimes ignores its own guidelines, never mind scientific evidence, for assessing pesticide risks*. A recent example of EPA's contravention of scientific evidence was its 2019 decision to issue an interim re-registration of **glyphosate**, which has been repeatedly **linked to the development of non-Hodgkin Lymphoma** **(and other cancers).** It did so in the face of *widespread consensus among scientists, including findings, by its own Department of Health and Human Services' Agency for Toxic Substances and Disease Registry, supporting the* ***carcinogenicity*** *of glyphosate*.

Glyphosate exposure in early pregnancy and reduced fetal growth: a prospective observational study of high-risk pregnancies

Exposure to glyphosate in the United States: Data from the 2013-2014 National Health and Nutrition Examination Survey

Urinary Glyphosate, 2,4-D and DEET Biomarkers in Relation to Neurobehavioral Performance in Ecuadorian Adolescents in the ESPINA Cohort

Glyphosate presence in human sperm: First report and positive correlation with oxidative stress in an infertile French population

The EA is also flawed because it ignores that invasives are a problem *largely because of USFS management - logging, thinning, 'prescribed' burns, ORV (allowed widely in the Wayne), logging and fracking access roads, lack of deer population controls, etc. etc*. The Wayne does not assess the true costs of these practices, which if taken into account would indicate that the Wayne should instead of wantonly proposing more foliar toxic pesticide use, rein in the practices that promote invasives as well as threatening biodiversity, carbon sequestration, and climate calming impacts of a healthy forest. Therefore the intent of this proposal is suspect, since the proposed pesticide use would be damaging to the ecosystem and would be much less needed if the Wayne stopped fragmenting the forest, stopped the unnecessary and dangerous burning of our forests that desiccates soil and boosts conditions that enable invasives to take hold, stopped the road building and ORV use that bring in the invasives, and let our forests heal. Money saved in preventing further harm to our forests could be put to the more labor-intensive *safer* methods of eradication: mechanical pulling and cutting with targeted stump/bark applications of painted-on herbicide to prevent resprouting.

The following review indicates some of the not-so-hidden costs of current Wayne practices, which should be considered before wantonly approving further toxic pesticide use. Saving costs by avoiding these practices would go a long way toward protecting our native forest and having funds to do safe eradication of the most problematic invasives:

From *Ecological trade-offs of mechanical thinning in temperate forests,* David Lindenmayer et al, **Biological Conservation,** Vol 316, April 2026, 111748 doi.org/10.1016/j.biocon.2026.111748: "Thinning operations typically employ heavy machinery that can compact soils (Cambi et al., 2015), damage sensitive reproductive organs on plants such as those of tree-ferns (Bowd et al., 2024), and remove other understorey and ground cover components of forests. The extent of soil compaction problems resulting from forestry operations can vary in response to soil types, nutrient levels, soil texture, erodibility and other factors (Cambi et al., 2015). For instance, in south-eastern Australia, up to 30% of wood production areas suffer from soil compaction (Rab, 1998). Thinning-related soil compaction effects may persist for prolonged periods, as shown in a LiDAR analysis of forests in south-eastern Australia that contains evidence of mechanical thinning operations several decades earlier (see Fig. 3). **Mechanical thinning may promote the invasion of exotic plant species. Increased light availability, mineral soil exposure, and altered microclimate conditions following canopy opening can provide a competitive advantage for invasive plants species over native flora (Liu et al., 2019). Roads constructed and maintained for thinning operations also act as dispersal corridors and points of establishment for many exotic and invasive plants (Wace, 1977). Once established, invasive plants can proliferate, outcompete native vegetation, and alter fire regimes by changing understorey fuels (Fusco et al., 2019). These cascading effects can simplify forest structure, reduce biodiversity, and potentially undermine the ecological resilience that thinning is often intended to enhance"** USFS could instead "avoid financial outlays, like the construction and maintenance of road networks required to transport machinery and logs, together with the running costs of that machinery. There are also significant ecological impacts associated with extensive road networks needed to support thinning operations that themselves require significant funds to maintain. Costs include soil compaction (Rab, 1998), habitat fragmentation (Laurance and Arrea, 2017), **spread of invasive plants (Wace, 1977)**, unwanted ignitions (Balch et al., 2017), and wildlife mortality (Ibisch et al., 2016)."

Additionally, the following statement ignores that "inert" ingredients and breakdown products cause harm long after a pesticide has been applied. This"guidance" cannot actually protect off-target vegetation, let alone animal or fungal species: "...When a large area must be sprayed, and when practical, apply herbicide when most adjacent native plants are dormant (early spring or late fall)." Whether or not native plants are dormant, pesticides persist and will affect plants when they do emerge. Amphibians, reptiles, mammals, and fungi are also unprotected by "dormant season" application of toxic pesticides. Re "When herbicide is applied during the growing season, a selective herbicide should be used, if available, to reduce effects to non-target vegetation. Otherwise, a selective method of herbicide application should be considered for use during the growing season to minimize effects to non-target species." *What about non-vegetative species?? The examples listed earlier indicate these are not protected by use of a "selective" herbicide.*

Furthermore, if a not-yet-registered herbicide is to be later registered and considered, the EA states that "A risk comparison is conducted to compare the human health and ecological risks of the active ingredient with the risks of those considered in the environmental assessment for this project." *BUT USEPA and USFS don't actually consider human health and ecological risks of already registered pesticides. For example glyphosate is in their list of chemicals to use as are other pesticides with known toxicity to vertebrates and humans - This "risk comparison" is meaningless.*

Finally, I quote from a botanical expert's assessment of the EA: "I am a plant taxonomist, retired after 30 years in Ohio University's Dept. of Environmental and Plant Biology. For more than 20 years, I have also worked on a volunteer basis with Athens Conservancy, a conservation land trust I helped found, which now owns and manages over 4,700 acres. One of my roles in the organization is preserve stewardship, including invasive plant control.

"I understand biodiversity conservation to be part of the stated mission of the USFS, with emphasis on protection of state- or federally listed endangered species. However, conserving biodiversity requires more than just protecting the rarest species. Species that are uncommon should be protected as well, to avoid their slipping into rarity. I understand this is the function of designating Regional Forester Sensitive Species (RFSS), but very few RFSSs have been designated in Wayne National Forest. For example, Guyandotte beauty (*Synandra hispidula*) occurs in the Eels Run area of WNF and is very uncommon in the state as a whole but is not included on the Regional Forester Sensitive Species list for the Wayne (RFSS_2023_24_Official_Final_list_508.pdf).

"For the most part, Athens Conservancy controls invasive plants in its preserves through a combination of manual removal of non-native herbs and low shrubs, and direct application of triclopyr to the bark of tree trunks (*Ailanthus* and *Paulownia*) and cut stems of taller shrubs (e.g., *Euonymus alatus* and *Lonicera maackii*) and vines (*Celastrus orbiculatus* and *Euonymus fortunei*). We avoid foliar spray because damage to nontarget native plants is inevitable. In the only exception to date, we are using foliar spray on a small, isolated patch of a highly invasive herb, lesser celandine (*Ficaria verna*), which was discovered in one of our preserves in 2024 by a retired USFS forester. After attempting unsuccessfully to dig it out completely last spring, we determined that the only way to eradicate it is with a foliar herbicide application. In this situation, we decided that the damage to nearby native herbs, none of which are uncommon, is justified in order to prevent far greater damage to the herb layer if lesser celandine is allowed to spread in that preserve.

"I urge the USFS to apply similar caution in Wayne National Forest. In my view, the Non-Native Invasive Plant Control EA does not give sufficient consideration to protecting uncommon non-target plants from damage due to foliar spraying. *Specifically, I urge WNF to explicitly limit the use of foliar spray to the eradication of isolated colonies of seriously invasive species such as lesser celandine that will definitely harm biodiversity if ignored, and which can't be eradicated either manually or through direct application of herbicide to trunks or cut stems*.

"The EA should state this restriction explicitly in order to avoid the temptation to use foliar spray unnecessarily, just because it takes less time than basal bark application or manual removal."

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