

ALASKA RAINFOREST DEFENDERS

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Submitted electronically at: objections-alaska-tongass@usda.gov

Reviewing Officer Stewart:

Pursuant to 36 C.F.R. Part 218, Alaska Rainforest Defenders hereby objects to the proposed Wrangell-Petersburg Invasive Plant Management project which would authorizing extensive use of herbicides, including the carcinogen glyphosate, anywhere in the project area with no annual treatment limit.

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I. Introduction: Project Description and Summary of Objection

A. Project and objecting party description

The proposed Wrangell-Petersburg Invasive Plant Management project would authorize spraying herbicides over an estimated 5,811 gross acres of designated Wilderness and non-Wilderness lands and federal and non-federal lands within a 3.7 million acre project area that include the entirety of the Tongass National Forest’s Petersburg and Wrangell Ranger Districts.¹ Defenders’ members use the Tongass National Forest, including numerous areas in the Petersburg and Wrangell Ranger Districts, for recreation, commercial fisheries, subsistence, wildlife viewing, scientific research, and other activities. Exposure of the general population occurs mainly through diet which is a significant concern in Southeast Alaska due to the significant proportion of wild food harvests by community residents. Our members would not use areas treated with glyphosate-based herbicides as proposed in this project.

The Responsible Officials are Petersburg Ranger District acting District Ranger Eric LaPrice of Wrangell Ranger District Ranger Clint Kolarich.² Defenders filed timely comments on April 3, 2021 and October 2, 2021 during public comment periods.³ For purposes of 36 C.F.R. § 218.8(d)(1), our contact information is in the signature block.

The proposed action would treat weeds⁴ by spraying herbicides around campgrounds, roads and trails, in riparian areas, estuaries, on waterbodies including anadromous fish streams, and within 1,000 feet of areas that provide public water supply, exposing the environment to glyphosate-based herbicides⁵ and glyphosate’s

¹ USDA Forest Service. 2022. Wrangell-Petersburg Invasive Plant Management Environmental Assessment, Finding of No Significant Impact and Draft Decision Notice. R10-MB-876b. Tongass National Forest, Petersburg and Wrangell Ranger Districts at 3. February 2022. *Hereinafter* EA/FONSI.

² 36 C.F.R. § 218.8(d)(4).

³ 36 C.F.R. § 218.8(b); Public letter #2744754: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](#); Public Letter # 2781038: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](#)

⁴ *Id.* at 9; *see also id.* at 3 (the use of the terms “weeds” is interchangeable with “invasive species”).

⁵ We use the term “glyphosate-based herbicides” instead of glyphosate because many of the chemical company studies claiming product safety address the chemical in isolation and most more modern research explains that the actual herbicide mixtures are critical to analyzing product health effects.

metabolite, aminomethyl phosphoric acid, which is more toxic and persists in the environment longer than the herbicides themselves. Treatments could include a combination of manual, mechanical and herbicide treatments.⁶ Herbicides include aquatic formulations of glyphosate, imazapyr and aminopyralid, applied by broadcast spray, spot spray and other methods.⁷ Spraying would occur directly over water.⁸ There would be no limits on the acreage treated.⁹ Herbicides are the main treatment and mechanical and manual methods would be exceptions.¹⁰ Areas where treatments are most likely to occur include fish habitat.¹¹ The locations of specific treatments and treatment methods are unknown and deferred to post-decisional planning.¹²

B. Statement of issues, inconsistency, and illegality¹³

This objection identifies: (1) the various ways that implementation of the project, will be inconsistent with law, regulation, and policy and, (2) how the Forest Service's decision and supporting documents must be improved to correct the infirmities.¹⁴ Each substantive section also demonstrates the connection between specific sections of Defenders' previously submitted comments and the contents of the objection.¹⁵

Defenders previously submitted comments requested that the Forest Service prepare an Environmental Impact Statement (EIS). There are substantial questions about the environmental impacts associated with glyphosate-based herbicides. In 2015, the International Agency for Research on Cancer (IARC) identified glyphosate as a human carcinogen. The IARC's monograph also identified carcinogenic impacts on animals and other adverse effects to fish. Since 2015, there have been hundreds of scientific studies identifying various types of toxic effects and other harms such as endocrine disruption and oxidative stress to insects, amphibians, fish, humans and other mammals.

The EA/FONSI asserted that glyphosate-based herbicides have no harmful effects to fish and wildlife, and dismisses the IARC's findings regarding human carcinogenicity as scientifically unreliable. In doing so, the analysis relied on flawed assumptions about the mobility and persistence of glyphosate formulations in the environment and ignores numerous recent studies demonstrating toxicity and other adverse effects at concentration levels well below assumed "safe" levels. An EIS is necessary to address the numerous ways that glyphosate formulations may poison humans, fish and wildlife and their environment.

⁶ EA/FONSI at 8.

⁷ *Id.*

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.* at 9.

¹¹ *Id.*

¹² *Id.*, Appx. B.

¹³ See generally 36 C.F.R. § 218.8(d)(5).

¹⁴ 36 C.F.R. § 218.8(d)(5)

¹⁵ 36 C.F.R. § 218.8(c).

Our objection can be summarized in the following broad categories:

- The FONSI is arbitrary because it relied on a flawed EA and failed to address substantial questions about significant adverse environmental impacts associated with glyphosate-based herbicide impacts to human health, fish and wildlife and forest and estuarine ecosystems;
- The EA violated APA, NEPA and NFMA by failing to take a hard look at impacts to humans, wildlife and wildlife habitat and aquatic habitat and fish populations or consider impacts from glyphosate metabolites and additives.
- The Draft Decision proposes project implementation through post-decisional annual treatment plans that identify locations and treatment methods without disclosing any site-specific information in the NEPA analysis, violating NEPA's requirement that environmental analyses provide sufficient specificity to insure informed decisionmaking and meaningful public participation.¹⁶
- The EA failed to include a reasonable range of alternatives and particularly alternatives that minimize or eliminate the impacts of glyphosate spraying.
- The decision will violate NEPA unless the agency prepares an EIS.

We request that you direct the Responsible Officials to withdraw the Draft Decision Notice and adopt the no-action alternative because of the significant environmental health risks associated with glyphosate-based alternatives. Additionally, the contents of this objection *just scratch the surface* in terms of reviewing the hundreds of studies of these health risks published since 2015. We request that you respond to these findings by initiating a review of these environmental risks that considers revisiting the use glyphosate-based herbicides across the Tongass National Forest.

II. The project violates the APA and NEPA by failing to take a hard look at project impacts and requires analysis in an EIS

The proposed action allows for unlimited herbicide application throughout two ranger districts and violates NEPA because of the failure to prepare an EIS. The use of an EA to analyze herbicide spraying over a large area is unusual.¹⁷ NEPA requires federal agencies to analyze the foreseeable environmental impacts, including direct, indirect, and cumulative impacts, of "major Federal actions."¹⁸ If the action *may* cause degradation of some human environmental factor, the agency must prepare an EIS.¹⁹ In other words, the threshold issue for determining whether or not to prepare

¹⁶ This approach resembles recent "Landscape Level Analysis" strategies for timber projects. Alaska District Court federal Judge Gleason rejected this approach in March 2020 in *SEACC et al. v. U.S. Forest Service* as a violation of NEPA.

¹⁷ *Northwest Coalition for Alternatives to Pesticides (NCAP) et al. v. Lyng*, 844 F.2d 588 (9th Cir. 1988); *Blue Mountains Biodiversity Project v. U.S. Forest Service*, 229 F.Supp.2d 1140 (2002).

¹⁸ 42 U.S.C. § 4332(2)(C).

¹⁹ *Idaho Sporting Congress v. Thomas*, 137 F.3d 1146, 1149 (9th Cir. 1998).

an EIS is not whether significant effects will in fact occur. Instead, the trigger is if there are substantial questions about whether a project will have a significant effect on the environment.²⁰

NEPA also requires that “public information be of ‘high quality’ because ‘[a]ccurate scientific analysis, expert agency comments, and *public scrutiny* are essential to implementing NEPA.’”²¹ Even if the Forest Service prepares an EA, the analysis must still take a hard look at impacts and “explain the differences between the Forest Service’s view of likely impacts and the view of others in the scientific community.”²² Specifically, the NEPA analysis must disclose that leading international cancer researchers and multiple independent studies conducted since 2015 disagree with the agency’s belief that glyphosate is harmless to humans, animals and fish unless directly ingested in large quantities.

Further, the EA/FONSI relies on risk assessments done over a decade ago, or more recent Forest Service analyses that rely on those assessments. As explained in our substantive discussions, the analysts for this weed management project failed to review any more recent research. NEPA imposes “a continuing duty to gather and evaluate new information” relevant to environmental impacts.²³

Finally, the analysis independently violates the Administrative Procedure Act (APA) which requires that “the agency must examine the relevant data and articulate a satisfactory explanation for its action including a ‘rational connection between the facts found and the choice made.’”²⁴ A decision is arbitrary if the agency “entirely failed to consider an important aspect of the problem” or “offered an explanation for its decision that runs counter to the evidence before the agency.”²⁵ The analysis fails to examine relevant data and ignores critical factors which include, among others, toxic effects from aminomethyl phosphoric acid and multiple adverse health impacts, such as endocrine disruption.

Foundation for N. Am. Wild Sheep v. United States Dep’t of Agric., 681 F.2d 1172, 1178-79 (9th Cir. 1982)(emphasis added); see also *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1212 (9th Cir. 1998)(the “substantial question standard does not require a showing ‘that significant effects will in fact occur’”).

²⁰ *Idaho Sporting Congress v. Thomas*, 137 F.3d 1146, 1150 (9th Cir. 1998).

²¹ *Id.* at 1151 (citation omitted; emphasis in original).

²² See, e.g. *League of Wilderness Defenders v. Forsgren*, 184 F.Supp.2d 1058, 1066 (D. Or. 2002).

²³ *Warm Springs Dam Task Force v. Gribble*, 621 F.2d 1017, 1023-24 (9th Cir. 1980) (explaining that “[w]hen new information comes to light, the agency must consider it, evaluate it and make a reasoned determination whether it is of such significance as to require implementation of formal NEPA filing requirements. Reasonableness depends on the environmental significance of the new information, the probable accuracy of the information, the degree of care with which the agency considered the information and evaluated its impact).

²⁴ *Motor Vehicle Mfrs. Ass’n of the U.S. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)).

²⁵ *Id.* at 43.

A. The use of glyphosate is controversial and presents unknown and uncertain risks to human health and safety

Defenders' comment letters explained that the Forest Service needed to prepare an EIS because glyphosate is a likely carcinogen and poses other multiple risks to human health, wildlife and the environment.²⁶ The numerous recent studies provide "strong evidence" that glyphosate and glyphosate-based herbicides harm human health.²⁷ Effects include cytotoxic²⁸ and genotoxic effects,²⁹ increased oxidative stress,³⁰ endocrine disruption,³¹ impairment of some cerebral functions, and potential carcinogenicity.³² The EA/FONSI arbitrarily dismissed the potential carcinogenicity of glyphosate-based herbicides and omitted other adverse health effects.

The determination whether an action has a significant effect on the environment triggering the need to prepare an EIS requires consideration of the NEPA "intensity" factors.³³ The FONSI concluded that there are no significant environmental impacts that warrant an EIS for the project nor any cumulative effects for any resource.³⁴ The FONSI violated NEPA by relying on flawed and arbitrary conclusions regarding four intensity factors in particular - "[t]he degree to which the proposed action affects public health or safety[.]" ... "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial[.]" "[t]he degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risk [.]" and relationship between the action and other cumulative impacts, such as those associated with glyphosate formulations or metabolites.³⁵

"Agencies must prepare environmental impact statements whenever a federal action is "controversial," meaning that there is a substantial question as to whether a project "may cause significant degradation of some human environmental factor" or there is a "substantial dispute [about] the size, nature, or effect" of the action.³⁶ "A

²⁶ Public letter #2744754 at 4-5: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](#); Public Letter # 2781038 at 4: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](#)

²⁷ Peillex, C. & M. Pelletier. 2020. The impact and toxicity of glyphosate and glyphosate-based herbicides on health and immunity. *Journal of Immunotoxicology* 17:1, 63-174.

²⁸ Cytotoxic means toxic to cells.

²⁹ Genotoxicity refers to the capacity for chemicals to damage DNA, causing mutations within cells that can lead to cancer; see <https://en.wikipedia.org/wiki/Genotoxicity>

³⁰ Oxidative stress occurs when there is an imbalance between free radical activity and antioxidant activity in the body, and can cause damage to fatty tissue, DNA and body proteins and lead to a large number of diseases over time. See [Oxidative Stress: Definition, Effects on the Body, and Prevention \(healthline.com\)](#)

³¹ Endocrine disruptors are chemicals that interfere with the body's hormones and can cause developmental, reproductive, brain and immune system problems. See <https://www.niehs.nih.gov/health/topics/agents/endocrine/index.cfm>

³² Peillex, C. & M. Pelletier. 2020.

³³ 40 C.F.R. § 1508.27.

³⁴ EA/FONSI at 41-44.

³⁵ 40 C.F.R. § 1508.27(b).

³⁶ *National Parks & Conservation Ass'n*, 241 F.3d at 736; 40 C.F.R. §1508.27(b)(4); *Bark v. U.S. Forest*

substantial dispute exists when evidence ... casts serious doubt upon the reasonableness of the agency's conclusions.”³⁷

There is a clear, substantial dispute about the effects of glyphosate-based herbicides. The conflict between the IARC's findings and chemical company claims of product safety triggered a series of independent studies launched to better understand the danger posed by glyphosate-based herbicides to humans and the environment.³⁸ Results of the studies show how massive use of the herbicide contaminated soil, surface and groundwater and food throughout the planet.³⁹ Glyphosate-based herbicides are inherently controversial because of adverse effects to human health, resulting in massive research efforts conducted by both public and private entities.⁴⁰ There are conflicting conclusions in the various studies that in many cases reflect different economic and social interests.⁴¹ Regulatory body studies declaring glyphosate-based herbicides to be safe often have a “low level of independence” because of direct involvement by chemical companies that conducted studies and defined their own conclusions.⁴²

1. Glyphosate based herbicides are controversial and entail unknown risks to human health, requiring analysis in an EIS

The assessment of risks associated with chemical interactions with humans inherently entails “a high degree of uncertainty.”⁴³ Despite numerous studies, considerable uncertainty remains regarding potentially harmful effects to humans.⁴⁴ Recent independent scientific reviews identify the need for more unbiased research on real-world exposures to glyphosate-based herbicides – particularly because the

Service, 958 F.3d 865, 870 (9th Cir. 2020)(citations omitted).

³⁷ *In Def. of Animals v. U.S. Dept. of Interior*, 751 F.3d 1054, 1064 (9th Cir. 2014).

³⁸ Torreta, V., I.A. Katsoyiannis, P. Viotti & E.C. Rada. 2018. Critical review of the effects of glyphosate exposure to the environment and humans through the food supply chain. *Sustainability* 10(4).

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ Krosse, P. 2019. Unpublished Report. North Tongass Invasive Management Project. Human Health and Herbicide Report at 7-9. USDA Forest Service, Tongass National Forest. 44p. Krosse explains that:

Risk assessments have a high degree of uncertainty in interpretation and extrapolation of data. Uncertainty may result from a study design, questions asked (and questions avoided), data collection, data interpretation, and extreme variability associated with aggregate effects of natural and synthesized chemicals on organisms, including humans, and with ecological relationships.

Any project involving herbicide use in a natural setting will contain many sources of uncertainty. The range of invasive plant species to be managed is large and compounded by the number of non-target species and diversity of ecological conditions in areas where treatment may occur. Data on herbicide toxicity and environmental fate is limited to those conditions and species tested for registration purposes and investigated by independent researchers. Available data on surfactants, inert ingredients, and dyes is even more limited. It is not possible to obtain all the data necessary to substantially reduce this information gap.

⁴⁴ Torreta, V., et al. 2018.

potential consequences of exposure are of considerable significance.⁴⁵ Reliance on previous studies and older, incomplete data is insufficient because many effects were poorly understood.⁴⁶ Many of the older studies considered glyphosate independently of its interaction with additives, requiring a need to fully evaluate glyphosate-based herbicides, rather than the chemical in isolation.⁴⁷ There is notable lack of studies with regard to various human health effects, such as on the immune system.⁴⁸ One of the major challenges in evaluating the product's carcinogenicity is the lack of open peer review, caused by the chemical companies' decision to withhold data used in regulatory processes.⁴⁹ Other factors limiting a full assessment of glyphosate-based herbicide health effects include challenges in experimenting with humans, and chemical company malfeasance, such as the 'Monsanto Papers' scandal.⁵⁰

Despite these uncertainties, apparent regulatory agency conflicts of interest and their significant consequences for human health, the EA/FONSI repeatedly and confidently characterized glyphosate as a "low risk chemical" with "low or negligible toxicity levels" that pose "minimal" health risks throughout the EA, FONSI and Draft Decision Notice.⁵¹ The analysis asserts that glyphosate "is not likely to be carcinogenic to humans" – that the worst that could happen would be accidental acute exposure accompanied by temporary eye or skin irritation or a stomachache.⁵² There is no other mention of any adverse human health effects. These conclusions rely on findings in older Forest Service analyses, an unpublished report, 2011 toxicity risk assessments from Syracuse Environmental Research Associates (SERA) and Environmental Protection Agency (EPA) findings and other regulatory agency certifications that reflect chemical company studies and/or are otherwise based on limited testing and controversial findings.⁵³ Based on these limited and outdated findings, the EA/FONSI arbitrarily concluded that "it is unlikely the risks of [glyphosate] use are highly certain or unknown."⁵⁴

The IARC is the cancer research arm of the World Health Organization, and "gold standard" in the field and its 2015 review of all published, peer-reviewed data

⁴⁵ Benbrook, C.M. 2019. How did the US EPA and IARC reach diametrically opposed conclusions on the genotoxicity of glyphosate-based herbicides. *Environ. Sci. Eur.* 31:2; Davoren, M.J. & R.H. Schiestl. 2018. Glyphosate-based herbicides and cancer risk: a post-IARC decision review of potential mechanisms, policy and avenues of research. *Carcinogenesis* Vol. 39, No. 10, 1207-1215; Torreta, V., et al.

⁴⁶ Davoren, M.J. & R.H. Schiestl. 2018.

⁴⁷ Peillex, C. & M. Pelletier. 2020.

⁴⁸ *Id.*.

⁴⁹ Davoren, M.J. & R.H. Schiestl. 2018.

⁵⁰ Peillex, C. & M. Pelletier. 2020.

⁵¹ EA/FONSI at 17 (adding that there is little risk of the public being directly or indirectly poisoned by water, fish, fruit or vegetation treated with glyphosate); 20 (glyphosate has "low" toxicity levels so that "the inherent level of public health and safety risk is minimal"), Final EA/FONSI at 41-43 (concluding that there are no highly uncertain or unknown effects and that the herbicide treatments are unlikely to be controversial because of low toxicity and minimal risks); Draft Decision Notice at 1-2.

⁵² *Id.* at 19.

⁵³ *Id.* at 12, 17, 18; Krosse, P. 2019 at 36-37.

⁵⁴ Final EA/FONSI at 43.

regarding glyphosate and identified the chemical as a probable human carcinogen with a positive association for non-Hodgkin lymphoma.⁵⁵ The study was performed by seventeen international experts who found sufficient evidence that the herbicide caused cancer in animals, and strong evidence showing genotoxicity.⁵⁶ The carcinogenic classification “marked a sea change in the scientific community’s consensus view.”⁵⁷

Because of these findings, a growing number of countries, as well as dozens of cities in the United States, restricted or banned products containing glyphosate.⁵⁸ The California Environmental Protection Agency’s Office of Health Hazard Assessment has also concluded that glyphosate is a carcinogen.⁵⁹ Thousands of Americans have contracted non-Hodgkin’s lymphoma because of exposure to glyphosate.⁶⁰ Glyphosate manufacturer Monsanto, now Bayer, has consistently lost lawsuits over its failure to warn consumers of cancer risks caused by glyphosate-based herbicides and paid out billions of dollars to cancer victims.⁶¹

The Forest Service’s *misplaced confidence* in regulatory agency registrations and chemical company conclusions caused its analysts to dismiss or ignore the numerous recent studies identifying numerous unknown risks to human health and safety, substantial disputes about the effect of glyphosate. In 2016, scientists and medical experts produced a “Statement of Concern” in response to advances in research regarding harms caused by glyphosate-based herbicides.⁶² Their analysis considered current published literature and safety standards and concluded that glyphosate-based herbicides often contaminate drinking water sources, precipitation, and air, remain present in water and soil longer than previously recognized and that regulators were using outdated science to develop exposure thresholds.⁶³

Then, in 2018 another group of expert plant pathologists and medical professionals reiterated the concerns of environmental health scientists and doctors about glyphosate:

Due to the large-scale and intensive use of glyphosate and its accumulation in the environment and edible products, several major

⁵⁵ International Agency for Research on Cancer (IARC), World Health Organization. 2017. IARC Monographs on the evaluation of carcinogenic risks to humans. Some organophosphate insecticides and herbicides Volume 112. Lyon, France. Available at: <https://publications.iarc.fr/549>

⁵⁶ Torreta, V., I.A. Katsoyiannis, P. Viotti & E.C. Rada. 2018.

⁵⁷ Davoren, M.J. & R.H. Schiestl. 2018.

⁵⁸ Carlson Law Firm. 2021. [Which Countries and U.S. States are Banning Roundup?](#)

⁵⁹ Brown, V. & E. Grossman. 2017. How Monsanto captured the EPA (and twisted science) to keep glyphosate on the market. In: InTheseTimes. November 1, 2017. Available at: https://inthesetimes.com/features/monsanto_epa_glyphosate_roundup_investigation.html

⁶⁰ Baum Hedlund Law Firm. Monsanto Roundup Lawsuit. (Downloaded Sept. 2021). <https://www.baumhedlundlaw.com/toxic-tort-law/monsanto-roundup-lawsuit/>

⁶¹ *Id.*; Nunes Rezende, E.C., F.M. Carneiro, J.B. de Moraes & I.J. Wastowski. Trends in science on glyphosate toxicity: a scientometric study. Environmental Science and Pollution Research.

⁶² Myers, J.P. et al. 2016. Concerns over use of glyphosate-based herbicides and risks associated with exposures: a consensus statement. In: *Environmental Health* volume 15, Article number: 19 (2016). Available at: <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-016-0117-0>

⁶³ *Id.*

concerns have arisen in recent years about harmful side effects of glyphosate and [for soil and water quality, and plant, animal and human health. Based on recent reports on potential chronic side effects of glyphosate ... the World Health Organization reclassified the herbicide glyphosate as probably carcinogenic to humans in 2015 Since then, many (about 1000) scientific research papers have been published on glyphosate, especially its potential side effects, in the last two years, but a comprehensive review is still missing.⁶⁴

The Forest Service ignored these numerous new concerns and limited its reference list to a very small number of outdated risk assessments and chemical company conclusions submitted to and approved by the EPA, and, with one exception, there is no indication that the Forest Service reviewed any independent scientific studies nor any material discussing glyphosate risks produced since 2011.⁶⁵

The EA/FONSI violated NEPA because the analysis failed to confront the scientific findings that conflict with the Forest Service's belief that glyphosate-based herbicides are "safe."

2. The EA fails consider flaws with the EPA and industry studies

Expert scientific opinion explains that glyphosate-based herbicides pose much more serious risks than the agency assumes, but the EA/FONSI failed to evaluate this information, violating NEPA.⁶⁶ The controversy generated under this factor alone raises "substantial questions" and requires the agency to prepare an EIS.⁶⁷ The analysis concluded that glyphosate is not likely to cause cancer based on its registration with the U.S. Environmental Protection Agency (EPA) and cursorily dismissed studies identifying its carcinogenic potential are scientifically flawed.⁶⁸ An agency cannot rely on another agency's conclusions about the safety of a herbicide, including EPA registration processes, and instead must independently research the effects in its NEPA analyses.⁶⁹

The EA failed to fairly evaluate the differences between the chemical industry studies and independent studies that reach different conclusions.⁷⁰ Many independent scientists are highly critical of chemical company claims and regulatory agency beliefs that glyphosate-based herbicides are "safe" and note that the agency's

⁶⁴ van Bruggen, A.H.C. et al. 2018. Environmental and health effects of the herbicide glyphosate at 256. *Science of the Total Environment* 616-6-7 (2018) 255-268. Available at: <https://www.global2000.at/sites/global/files/Literatur-Geissen-2.pdf>

⁶⁵ Krosse, P.C. 2019. *Supra*. See Section 5, References.

⁶⁶ *Bark*, 958 F.3d at 871-72 (explaining that the Forest Service's effects analyses "did not engage with the considerable contrary scientific and expert opinion" and instead "drew general conclusions"); see also *Blue Mountains Biodiversity Project*, 161 F.3d at 1213.

⁶⁷ *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 865 (9th Cir. 2005).

⁶⁸ Final EA/FONSI at 18-19, 43.

⁶⁹ See *Southern Oregon Citizens Against Toxic Sprays v. Clark*, 720 F.2d 1475, 1480 (9th Cir. 1993).

⁷⁰ Burtscher Schaden, H., P Clausen & C. Robinson. 2017. Glyphosate and cancer: buying science. How industry strategized (and regulators colluded) in an attempt to save the world's most widely used herbicide from a ban. Available at: [Glyphosate_buying_science-EN.pdf](https://www.glyphosate-ban.org/Glyphosate_buying_science-EN.pdf) ([pan-germany.org](https://www.glyphosate-ban.org/)).

belief ignores “substantial laboratory and some epidemiological evidence that continues to accumulate and points to the opposite conclusion.”⁷¹ For example, most industry studies assert that glyphosate is not genotoxic (damaging to DNA) while the majority of independent studies, including the IARC, reach the opposite conclusion.⁷²

The disagreement between the U.S. EPA and IARC on the toxicity of glyphosate is well known – the EPA found no evidence of carcinogenicity while the IARC identified strong evidence through at least two mechanisms.⁷³ Official reviews of regulatory and health bodies remain divided on the glyphosate’s status as a human carcinogen.⁷⁴ There are several reasons for conflicting conclusions: (1) the EPA relied on unpublished studies, mostly prepared by chemical companies that reached negative findings, while the IARC relied on peer-reviewed studies⁷⁵ of which 70 percent were positive; (2) EPA’s evaluation reflected data from studies on technical glyphosate, while IARC’s review included the actual glyphosate-based herbicide formulations and aminomethyl phosphoric acid⁷⁶ and (3) the EPA’s review focused on general population dietary exposure while IARC’s assessment encompassed a broader dataset.⁷⁷

There is a long history of various companies hiding the carcinogenic properties of their products.⁷⁸ The EPA has not commissioned or conducted any of its own studies to examine glyphosate’s potential health effects.⁷⁹ There have been a number of “questionable interactions” between Monsanto and regulators, particularly the U.S.

⁷¹ Pesticide Action Network. 2016. Monograph: Glyphosate. At 3. Available at: [Glyphosate-monograph.pdf \(pan-international.org\)](https://pan-international.org/glyphosate-monograph.pdf).

⁷² Burtscher Schaden, H., P Clausen & C. Robinson. 2017. *Supra*.

⁷³ Benbrook, C.M. 2019. How did the US EPA and IARC reach diametrically opposed conclusions on the genotoxicity of glyphosate-based herbicides. *Environ. Sci. Eur.* 31:2.

⁷⁴ Davoren, M.J. & R.H. Schiestl. 2018. Glyphosate-based herbicides and cancer risk: a post-IARC decision review of potential mechanisms, policy and avenues of research. *Carcinogenesis* Vol. 39, No. 10, 1207-1215.

⁷⁵ See also Gillam, Carey. 2021. Corporate studies asserting herbicide safety show many flaws, new analysis finds. *The Guardian*, 2 July 2021. Available at: [Corporate studies asserting herbicide safety show many flaws, new analysis finds | Monsanto | The Guardian](https://www.theguardian.com/environment/2021/jul/02/corporate-studies-asserting-herbicide-safety-show-many-flaws-new-analysis-finds-monsanto-the-guardian) (explaining the main difference between the IARC and EPA findings is that the IARC reviewed a larger body of peer-reviewed research).

⁷⁶ Aminomethyl phosphoric acid (frequently referenced by its acronym, AMPA), is a metabolite of glyphosate that remains in water and independently has potential genotoxic and other toxic effects at low concentrations. See Medalie, L., Baker, N.T., Shoda, M.E., Stone, W.W., Meyer, M.T., Stets, E.G. and Wilson, M., 2020. Influence of land use and region on glyphosate and aminomethylphosphonic acid in streams in the USA. *Science of The Total Environment*, 707, p.136008.

⁷⁷ Benbrook, C.M. 2019. How did the US EPA and IARC reach diametrically opposed conclusions on the genotoxicity of glyphosate-based herbicides. *Environ. Sci. Eur.* 31:2; see also Brown, V. & E. Grossman. 2017. *Supra*; Burtscher Schaden, H., P. Clausen & C. Robinson. 2017. *Supra*. (explaining that the EPA registration process relies on industry studies withheld from the public and scientific community to support assumptions about product safety).

⁷⁸ [1] CBS News. 2011. [Big tobacco kept cancer risk in cigarettes secret: Study - CBS News](https://www.cbsnews.com/news/big-tobacco-kept-cancer-risk-in-cigarettes-secret-study/);

[2] Wikipedia. (Downloaded Sept. 2021). [Erin Brockovich \(film\) - Wikipedia](https://en.wikipedia.org/wiki/Erin_Brockovich) (regulators concealed the use of a carcinogen that causes Hodgkins lymphoma, hexavalent chromium, when other forms were available).

⁷⁹ Brown, V. & E. Grossman. 2017. *Supra*.

EPA.⁸⁰ The reliability of EPA's findings is questionable in part because of the 2017 "Monsanto Papers" scandal where Monsanto allegedly interfered with publication of information on glyphosate toxicity and ghost-wrote papers asserting product safety.⁸¹ Surveys of EPA employees verify persistent chemical company interference with scientific findings that altered regulatory outcomes, including stifling agency employees who recognized glyphosate's carcinogenicity.⁸² There are also questions about whether the EPA ignored proper scientific guidelines for how to assess research about glyphosate health impacts.⁸³ The EA fails to disclose these major criticisms of the "methodology" used to support its conclusions that the herbicide is harmless to humans.

Researchers from the Institute of Cancer Research in Austria conducted one of the first reviews the underlying studies that assert that glyphosate-based herbicides are safe. Their analysis indicates that most of the studies relied on by the EPA are of poor quality and unreliable for assessing cancer risks.⁸⁴ In particular, Monsanto's genotoxicity studies failed to use modern methods for detecting carcinogens, meaning that their tests detect only fifty to sixty percent of the carcinogens.⁸⁵

In sum, the Forest Service cannot rely on Monsanto or EPA findings to avoid preparing an EIS because glyphosate-based herbicides are controversial and pose unknown risks to human health. The failure to disclose criticisms of EPA's regulatory findings also violates NEPA. As explained by Natural Resources Defense Council senior scientist Jennifer Sass in comments submitted to the FIFRA Scientific Advisory Panel on Nov. 3, 2016:

The EPA's regulatory record on glyphosate is compromised by missing, incomplete, hidden, redacted, lost and otherwise faulty information. The EPA relies on data, most of which is unpublished, that is supplied by the manufacturer, interpreted by the industry and not publicly available. Consequently, a decisive and transparent assessment of glyphosate's toxicity is impossible. The EPA has never wavered from its decision to dismiss and minimize the 1983 mouse study, which appears to be valid. The agency has never attempted to replicate the study in order to clarify its results—perhaps because it feared that such evidence would demonstrate that glyphosate was indeed a carcinogen. Furthermore, it's a pattern the agency continues to follow, discounting later studies using similar arguments and research supplied by industry that have not undergone independent analysis.⁸⁶

⁸⁰ Gillam, Carey. 2021. *Supra.*

⁸¹ Peillex, C. & M. Pelletier. 2020. The impact and toxicity of glyphosate and glyphosate-based herbicides on health and immunity. *Journal of Immunotoxicology* 17:1, 63-174.

⁸² Burtcher Schaden, H., P Clausing & C. Robinson. 2017. *Supra.*

⁸³ Gillam, Carey. 2021. *Supra.*

⁸⁴ *Id.*; See also Myers, J.P. et al. 2016. *Supra.*

⁸⁵ Gillam, Carey. 2021. *Supra.*

⁸⁶ NRDC. 2016. Comments on EPA-HQ-OPP-2016-0385. Nov. 2016. Available at: [NRDC: letter-glyphosate-sap-20161103.pdf](#). The 1983 mouse study referred to in the NRDC letter led the EPA to classify glyphosate as a carcinogen in 1985. The EPA changed its mind based on reinterpretations of the study developed by Monsanto.

3. The assumption that glyphosate is safe ignored the need to consider actual herbicide formulations and their effects on the public

Glyphosate-based herbicides include additives that have not been tested or subject to registration requirements, and the additives lead to cumulative impacts beyond the technical chemical itself.⁸⁷ There is no information about the toxicity and effects of these additive chemicals in the older risk assessment materials relied on to inform the analysis in the EA.⁸⁸ Many of the ingredients that chemical companies combine with glyphosate to make herbicides are proprietary and unknown.⁸⁹ The EA considered only direct and indirect effects from pure glyphosate and arbitrarily excluded any impacts caused by adjuvants, surfactants or other additives from the analysis.⁹⁰ The Final EA/FONSI described the effects of these additives as “low risk,” non-toxic or “practically non-toxic.”⁹¹

The failure to evaluate additive-specific risks in terms of actual formulations is a major oversight - some additives may be five times as toxic as glyphosate itself.⁹² There are a number of studies showing that “[e]ven where acute toxic effects of glyphosate on fish and mammals are low, the formulated products often are more toxic than glyphosate itself, and concerns have emerged about chronic effects of the formulated products on human and animal diseases, in particular various forms of cancer and mental disorders (Fortes et al., 2016, Mesnage et al., 2015a, 2015b; Swanson et al. 2014).⁹³ Many of the added chemicals are known to be harmful, but are chemical company trade secrets so it is uncertain how much the substances contribute to adverse health and environmental effects.⁹⁴ The EA failed to consider responsible scientific opinion contrary to the conclusions on effects that the EA reached.

4. The EA failed to consider how much is too much and consider non-linear responses

The EA relied extensively on the belief that small and dispersed herbicide treatments in accordance with application recommendations will reduce risks to human health and other resource values. However, research conducted in 2015, 2016 and 2017 has shown significant intake of glyphosate by humans and animals, including the general public, even when daily exposures are lower than the tolerable doses established by regulatory agencies.⁹⁵ The expanded human exposure data is causing scientists to challenge previously established tolerance levels and safety standards.⁹⁶ These findings indicate human health risks, controversy and highly uncertain effects under the NEPA intensity factors because many studies indicate

⁸⁷ Krosse, P.C. 2019. *Supra*, at 18.

⁸⁸ *Id.* at 8.

⁸⁹ Final EA/FONSI at 20.

⁹⁰ Final EA/FONSI at 17.

⁹¹ Final EA/FONSI at 19-20. (20: health risk is “low” due to the regulatory certifications in WA state).

⁹² Pesticide Action Network. 2016. *Supra*, at 3.

⁹³ Van Bruggen, A.H.C. et al. 2018. *Supra*, at 256.

⁹⁴ Pesticide Action Network. 2016. *Supra*, at 3.

⁹⁵ van Bruggen, A.H.C. et al. 2018. *Supra*, at 260.

⁹⁶ *Id.*

more severe and various adverse health effects occurring at glyphosate concentrations perceived as low and deemed safe by the Forest Service. Van Bruggen et al.'s 2018 review of recent findings explains that:

Due to the almost exponential increase in glyphosate use and the slow decomposition of glyphosate and its breakdown product AMPA [(aminomethyl phosphoric acid)] in soil, water and sediment, the accumulation of glyphosate in the environment, plant products and animal organs has become quite worrisome (Myers et al 2015; Shehata et al., 2014). In particular, the high proportion of people and farm animals with glyphosate in their urine is concerning, even though the concentrations are still low (Niemann et al. 2015). Although conclusions regarding possible carcinogenicity and other health effects of glyphosate remain controversial, we feel that sufficient additional data has accumulated regarding the chronic toxic effects of the formulated products on aquatic and terrestrial animals and humans to warrant reconsideration of the tolerable residue levels of glyphosate and AMPA in plant and animal products and the environments. The recent reclassification of glyphosate as probably carcinogenic by the International Agency for Research on Cancer (IARC) of the World Health Organization (WHO) was based primarily on research with the main formulated product Roundup (IARC, 2015; Seralini et al. 2014). Additional research is needed to come to a definitive conclusion on the chronic health effects of the various formulated products containing glyphosate.⁹⁷

The EA failed disclose uncertainties about this apparent reliance on the linear dose-response, which “assumes that the greater the dose of a toxic substance, the greater the effects, and vice versa, often phrased as ‘the dose makes the poison.’”⁹⁸ Reliance on the linear dose response approach is outdated. Researchers now generally accept that “non-linear dose-responses—responses in which low levels of exposure may produce more significant effects than high levels and responses in which effects at high doses sometimes plateau or tail off—often occur.”⁹⁹ None of the EPA or other regulatory studies of glyphosate considered the possibility of non-linear dose-responses.¹⁰⁰

The potential exposure for chemically sensitive individuals is a significant concern. The Forest Service’s own resource report hints at the possibility that herbicides may be more poisonous to some individuals than others in recognizing that “[h]uman susceptibility to toxic substances can vary substantially” and that “some individuals may be unusually sensitive so individual susceptibility to the herbicides proposed in this EA cannot be predicted specifically.”¹⁰¹ The number of individuals who are more susceptible to lower levels of glyphosate may be very large -

⁹⁷ *Id.*

⁹⁸ Brown, V. & E. Grossman. 2017. *Supra.*

⁹⁹ *Id.*

¹⁰⁰ *Id.*

¹⁰¹ Krosse, P.C. 2019. *Supra.*

thousands of Americans have contracted non-Hodgkin's lymphoma because of exposure to glyphosate.¹⁰²

5. The EA failed to consider other unknown risks and adverse human health effects

Glyphosate-based herbicides have long-term toxicity and interfere with mammalian organs in numerous ways, including genotoxicity and endocrine disruption.¹⁰³ Even at low concentrations, glyphosate damages liver, kidney and skin cells.¹⁰⁴ The EA considers risks to other human health systems as “low” and claims that “to date” there are no known risks to reproductive, neurologic, immunologic or endocrine systems.¹⁰⁵ This statement in part reflects highly limited, short-term tests on glyphosate alone without ever testing the actual formulations used by the Forest Service through which human, fish and wildlife and the environment would experience actual exposure.¹⁰⁶ Further, although the EA does not explicitly say so, the “low” risk assertion in part reflects the Forest Service's failure to seek out readily available studies measuring effects to these health systems.¹⁰⁷

A number of studies have found significant and more pronounced endocrine disruption effects when testing actual herbicide formulations rather than glyphosate in isolation.¹⁰⁸ Many of these studies also found endocrine disruption at doses substantially lower than those used in agriculture.¹⁰⁹ Exposure, even at lower levels than those deemed safe by regulators, may result in reproductive problems, including miscarriages, birth defects and cancerous tumors.¹¹⁰

Endocrine disrupting chemicals remain in the environment for long periods of time, increasing risks to humans.¹¹¹ Exposure to endocrine disrupting chemicals, even at low levels, can alter sensitive systems and cause health problems.¹¹² There is limited scientific information on these potential risks, in part because people are typically exposed to multiple endocrine disruptors, challenging the ability to evaluate public health.¹¹³ Low doses of endocrine disrupting chemicals may be unsafe because normal endocrine functioning involves very small changes in hormone levels and small changes can cause significant developmental and biological effects.¹¹⁴

¹⁰² Baum Hedlund webpage. *Supra*.

¹⁰³ Pesticide Action Network. 2016. *Supra*, at 3.

¹⁰⁴ *Id.*

¹⁰⁵ EA/FONSI at 18-19.

¹⁰⁶ Pesticide Action Network. 2016. *Supra*, at 3..

¹⁰⁷ Krosse, P.C. 2019. *Supra*, at 11.

¹⁰⁸ Pesticide Action Network. 2016. *Supra*, at 3.

¹⁰⁹ *Id.*

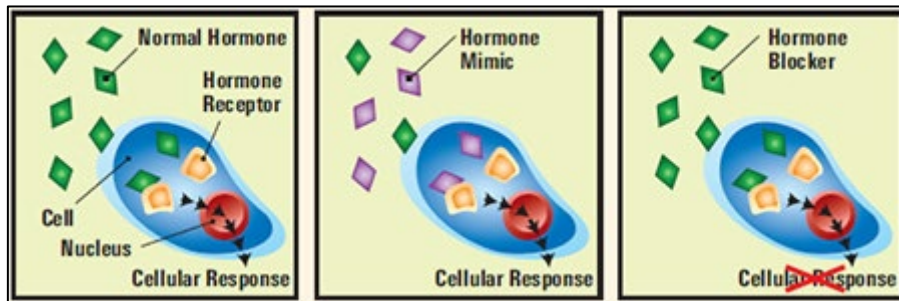
¹¹⁰ Pesticide Action Network. 2016. *Supra*, at 3.

¹¹¹ See National Institute of Environmental Health Sciences, Endocrine Disruptors. Available at: <https://www.niehs.nih.gov/health/topics/agents/endocrine/index.cfm>

¹¹² *Id.*

¹¹³ *Id.*

¹¹⁴ *Id.*



An endocrine disruptor can decrease or increase normal hormone levels (left), mimic the body's natural hormones (middle), or alter the natural production of hormones (right).¹¹⁵

6. Conclusion and suggested resolution

The EA/FONSI violated the APA and NEPA because the analysis neither considered human health factors relevant to the decision nor confronted numerous scientific findings that conflict with the Forest Service's belief that glyphosate-based herbicides are "safe." The Reviewing Officer should direct the Responsible Officials to either rescind the Draft Decision Notice and adopt the no-action alternative, or — in and EIS — evaluate: additional adverse impacts to human health and safety; controversial disputes about the effect of the herbicides; and additional risks and uncertainties such as endocrine disruptions and non-linear effects.

B. Glyphosate-based herbicides entails controversial and unknown risks to fish and wildlife, necessitating preparation of an EIS

Defenders, in our previously submitted comments, identified substantial questions about impacts to fish and wildlife triggering the need to prepare an EIS.¹¹⁶ The EA/FONSI's conclusions about impacts to wildlife reflect a narrow set of studies on small subsets of species and do not address many of the same issues implicated in the previous discussion: for example, how much poison is too much; non-linear effects; and uncertainties and unknown risks associated with exposure at juvenile life stages and effects of endocrine disruptors. The analysis of the NEPA intensity factors with regard to controversy, uncertainties and unknown risks and cumulative impacts to fish and wildlife in the EA/FONSI was similarly flawed. Importantly, glyphosate and residues such as aminomethyl phosphoric acid are more mobile and persist in the environment for longer than assumed by the Forest Service, meaning that the entire analysis of the intensity factors, as evaluated for fish and wildlife in the EA, is *wrong*.¹¹⁷ The analysis of impacts to fish and wildlife also violated the APA and the agency's substantive obligations under NFMA which requires the Forest Service to "provide for the diversity of plants and animals."¹¹⁸

¹¹⁵ Graphic: National Institute of Environmental Health Sciences, Endocrine Disruptors. Available at: <https://www.niehs.nih.gov/health/topics/agents/endocrine/index.cfm>

¹¹⁶ Public letter #2744754: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](#); Public Letter # 2781038: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](#)

¹¹⁷ Kissane, Z. and Shephard, J.M. 2017. The rise of glyphosate and new opportunities for biosentinel early-warning studies. Conservation Biology 31(6) 1293-1300. Available at: [biosentinel-early-warning-studies.pdf \(murdoch.edu.au\)](#)

¹¹⁸ 16 U.S.C. § 1604(g)(3)(B).

The EA/FONSI arbitrarily relies on outdated (2011 and older) risk assessments in assuming that herbicides will have negligible to minor localized adverse effects on fish and wildlife and the aquatic environment based on beliefs that herbicides have limited mobility in the environment, “minimal toxicity” to fish and wildlife, and that rapid dissipation and biodegradation of herbicides reduce water contamination risks to minimal levels.¹¹⁹ The analysis identifies negligible effects to aquatic organisms and at worst, unmeasurable but minimal or negligible effects to wildlife caused by disturbance or displacement by workers spraying chemicals.¹²⁰

There has been considerable research over the past few years that “provides strong evidence of the impact of glyphosate and [glyphosate-based herbicides] on fish and mammals” including cytotoxic and genotoxic effects, oxidative stress, endocrine disruption, cerebral impairment, some cancers, and compromised immune systems.¹²¹ One of the main problems with relying on outdated risk assessments for fish and wildlife is because of the significant effects of additives to glyphosate-based herbicides - in the absence of known concentrations of glyphosate and other ingredients, “it is difficult to determine the toxicity of the formulated herbicide on a taxon of wildlife let alone a single species.”¹²² In other words, as with impacts to humans, additives cause significant “multiplier effects.”¹²³ Given these impacts, the consideration of the significance of uncertainties and risks needs to reflect analysis of local impacts, and triggers the need for an EIS.¹²⁴

1. Glyphosate-based herbicides pose significant cumulative, controversial and unknown risks to aquatic organisms

Glyphosate produces aminomethyl phosphoric acid, its main metabolite, which is prevalent throughout the environment and particularly in water, contaminating aquatic organisms throughout the food web.¹²⁵ Published data show that aminomethyl phosphoric acid is highly toxic on aquatic organisms.¹²⁶ Recent research identifies cumulative toxic effects from glyphosate and aminomethyl phosphoric acid on aquatic organisms that influence growth, juvenile development, cause oxidative stress and cause histopathological damage (damage to tissues caused

¹¹⁹ EA/FONSI at 20-27.

¹²⁰ *Id.*.

¹²¹ Peillex, C. & M. Pelletier. 2020

¹²² Durkin, P.R. 2011. Glyphosate-Human Health and Ecological Risk Assessment. Final Report. Syracuse Environmental Research Associates, Inc., Manlius, New York. Prepared for U.S. Forest Service, Southern Region, Atlanta. USDA Forest Service Contract: AG-3187-C-06-0010

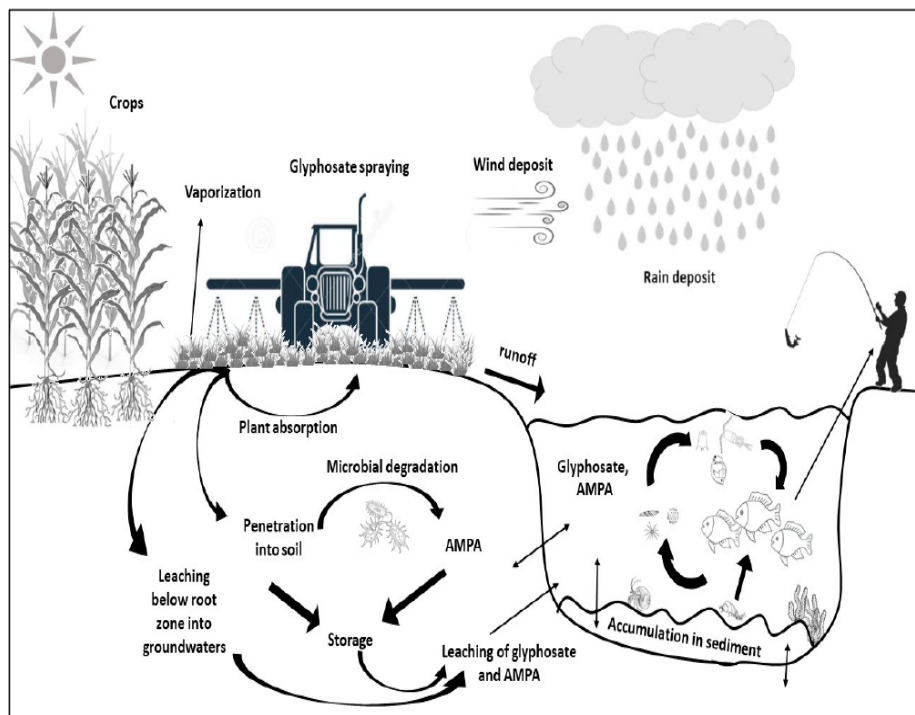
¹²³ Kissane, Z. and Shephard, J.M. 2017. *Supra*.

¹²⁴ See *Anderson v. Evans*, 371 F.3d 475, 490 (9th Cir. 2004); see also *Fund for Animals v. Norton*, 281 F.Supp.2d 209, 234 (D.D.C. 2003)(holding that “uncertainty as to the impact of a proposed action on a local population of a species, even where all parties acknowledge that the action will have little or no effect on broader populations, is ‘a basis for a finding that there will be a significant impact’ and setting aside a FONSI”).

¹²⁵ Tresnakova, N., A. Stara & J. Velisek. 2021. Effects of glyphosate and its metabolite AMPN on aquatic organisms. *Appl. Sci.* 11, 9004.

¹²⁶ *Id.*

by disease), genotoxicity, immunotoxicity, and cardiotoxicity (heart damage).¹²⁷ It degrades slowly in soil and freshwater and is three to six times more toxic and persistent than glyphosate alone, persisting for nearly 8 months and prevalent in significant quantities throughout freshwater systems.¹²⁸ There is a deficit of analyses of chronic exposure on nontarget organisms, meaning considerable uncertainty remains about toxic and other effects.¹²⁹ Other recent studies have found that “[g]lyphosate and the surfactants ... can have negative impacts on the health of



variety of animals in the aquatic food web, including protozoa, mussels, crustaceans, frogs and fish.”¹³⁰ These impacts include the aquatic food web and occur even at low levels of glyphosate concentrations.¹³¹

Tresnakova, N., A. Stara & J. Velisek. 2021. Figure 1. Distribution and transport of glyphosate and its major metabolite AMPA into the aquatic environment.¹³²

Recent research has also identified other multiple glyphosate-based herbicide toxic effects to fish –

immunotoxicity, hepatotoxicity (liver damage), genotoxicity, neurotoxicity and cardiotoxicity.¹³³ Fish exposed at even low concentrations also show significant impairment of exploratory and other behaviors that are critical to their habitat use,

¹²⁷ *Id.*

¹²⁸ *Id.*; Medalie et al. 2020.

¹²⁹ Tresnakova, N., A. Stara & J. Velisek. 2021.

¹³⁰ van Bruggen, A.H.C. et al. 2018. *Supra*, at 260.

¹³¹ *Id.*

¹³² Tresnakova, N., A. Stara & J. Velisek. 2021.

¹³³ Rezende, E.C.N., Carneiro, F.M., de Moraes, J.B. and Wastowski, I.J., 2021. Trends in science on glyphosate toxicity: a scientometric study. *Environmental Science and Pollution Research*, 28(40), pp.56432-56448. Faria, M., Bedrossiantz, J., Ramirez, J.R.R., Mayol, M., Garcia, G.H., Bellot, M., Prats, E., Garcia-Reyero, N., Gómez-Canela, C., Gómez-Oliván, L.M. and Raldúa, D., 2021. Glyphosate targets fish monoaminergic systems leading to oxidative stress and anxiety. *Environment International*, 146, p.106253; Pelleix & Pelletier 2020; neurotoxicity means alterations to the nervous system that can disrupt or kill neurons that transmit and process signals to the brain and cause a variety of physical and behavioral problems – see National Institute of Neurotoxicological Disorders and Stroke, Neurotoxicity Information Page. Available at: [Neurotoxicity Information Page | National Institute of Neurological Disorders and Stroke \(nih.gov\)](https://www.nndb.org/neurotoxicity).

and that they experience oxidative stress.¹³⁴ Most of the research used in glyphosate risk assessments are highly outdated, and more recent research suggests current safety standards are inadequate to protect aquatic ecosystems.¹³⁵ There is limited information regarding the effects of glyphosate on the marine environment but research also identifies severe effects to crustaceans.¹³⁶ Research also illustrates tissue, reproductive and developmental harms to invertebrates.¹³⁷ There is considerable uncertainty about risks to aquatic systems at environmentally relevant levels.¹³⁸

2. Effects to terrestrial mammals

Glyphosate-based herbicides have caused toxic effects on almost all animals.¹³⁹ Scientific research conducted after 2015 identifies adverse physiological effects to mammals, birds, reptiles and amphibians.¹⁴⁰ Effects include morphological alterations, mortality, genotoxicity, alterations in embryonic development, and hepatotoxicity (liver damage, or hepatitis) in amphibians.¹⁴¹ Endocrine disrupting chemicals also cause adverse effects in animals generally.¹⁴² Aminomethyl phosphoric acid may cause developmental delay and survival of amphibians.¹⁴³ There is a need for further evaluation of the long-term exposure at real environmental concentrations.¹⁴⁴

Glyphosate persists in the environment for long periods of time, including in non-target plants that provide forage for multiple wildlife species. Some glyphosate residues may translocate into shoots and fruit in some plants, and there is significant uncertainty about residue persistence, the effect on forage quality, and the

¹³⁴ Faria, M., et al. 2021.

¹³⁵ *Id.*

¹³⁶ Parlapiano, I., Biandolino, F., Grattagliano, A., Ruscito, A., Libralato, G. and Prato, E., 2021. Effects of commercial formulations of glyphosate on marine crustaceans and implications for risk assessment under temperature changes. *Ecotoxicology and Environmental Safety*, 213, p.112068.

¹³⁷ Tresnakova, N., A. Stara & J. Velisek. 2021.

¹³⁸ Rezende, E.C.N., Carneiro, F.M., de Moraes, J.B. and Wastowski, I.J., 2021.

¹³⁹ Gill, J.P.K., Sethi, N., Mohan, A., Datta, S. and Girdhar, M., 2018. Glyphosate toxicity for animals. *Environmental Chemistry Letters*, 16(2), pp.401-426.

¹⁴⁰ Other relevant studies include: [1] Landrigan, P.J. & F. Belppoggi. 2018. The need for independent research on the health effects of glyphosate based herbicides. *Environmental Health* (2018) 17:51. <http://doi.org/10.1186/s12940-018-0392-z>; [2] Leveroni, F.A., J.D. Caffetti & M.C. Pastori. 2017. Genotoxic response of blood, gill and liver cells of *Piaractus mesopotamicus* after an acute exposure to a glyphosate based herbicide. *Caryologia, International Journal of Cytology, Cytosystematics, and Cytogenetics* 70(1):21-28; [3] Myers, J.P., et al. 2016. (*Supra.*); and [4] Tarazona et al. 2017. Glyphosate toxicity and carcinogenicity: a review of the scientific basis of the European Union assessment and its differences with IARC. *Arch Toxicol* (2017) 91:2723-2743. DOI 10.1007/s00204-017-1962-5.

¹⁴¹ Rezende, E.C.N., Carneiro, F.M., de Moraes, J.B. and Wastowski, I.J., 2021.

¹⁴² <https://www.niehs.nih.gov/health/topics/agents/endocrine/index.cfm>

¹⁴³ Tresnakova, N., A. Stara & J. Velisek. 2021.

¹⁴⁴ *Id.*

impact of chronic low-level exposure on herbivorous and omnivorous wildlife species which are subject to substantial contamination through the food chain.¹⁴⁵

As with human exposure, there are substantial questions about the effects of chronic sub-lethal exposure to wildlife, even at levels lower than those deemed safe by regulatory agencies.¹⁴⁶ Because of impacts to non-target plants, glyphosate treatments have reduced forage availability and potentially forage quality for ungulates accompanied by displacement effects and possibly population declines.¹⁴⁷ Herbicides reduce the biomass and diversity of vegetation preferred by foraging deer for years, affecting both nutritional quality and nutrient intake and reducing energy needed for growth, survival and reproduction.¹⁴⁸

3. Duration and effectiveness of effects: the NEPA analysis needed to revisit the discussion of how long glyphosate poisons the environment

The EA assumed short-term effects to fish, wildlife and plants based on rapid dissipation and biodegradation of herbicides.¹⁴⁹ It never defines the temporal extent of contamination but merely states that the herbicides do not remain in the environment for long periods of time.¹⁵⁰ The NEPA analysis failed to provide region-specific analysis regarding chronic risks of herbicides relative to degradation rates, which can vary substantially. Recent studies show that glyphosate is “quite resistant to degradation,” and when broken down in dead plant material and soil it leaves behind decomposition products such as aminomethyl phosphoric acid.¹⁵¹ Multiple studies published in 2015 and 2016 showed that glyphosate and aminomethyl phosphoric acid may persist for over a year in some soils, accompanied by higher risks of groundwater and surface water contamination than assumed in studies prepared by chemical companies used to inform EPA’s findings.¹⁵² The elimination of glyphosate through physical processes is limited – residues can endure for three months in water and total concentration in ground can last up to half a year, meaning it can potentially contaminate groundwater.¹⁵³ In water, aminomethyl

¹⁴⁵ Torreta, V., I.A. Katsoyiannis, P. Viotti & E.C. Rada. 2018. Critical review of the effects of glyphosate exposure to the environment and humans through the food supply chain. *Sustainability* 10(4); Wood, J.L. 2019. The present of glyphosate in forest plants with different life strategies one year after application. *Canadian Journal of Forest Research* 49(6) 586-594; [2] Mesnage, R., Defarge, N., Spirois de Vendomois, J., & Seraline, G.E. 2015. Potential toxic effects of glyphosate and its commercial formulations below regulatory limits. *Food and chemical toxicology*, an international journal published for the British Industrial Biological Research Association. 84 133-53. Available at: [Mesnage et al. FCT Review revised final accepted.pdf](#) (kcl.ac.uk); [3] Kissane, Z. and Shephard, J.M. 2017. *Supra*.

¹⁴⁶ *Id.*

¹⁴⁷ Hunt, J. & P. Matute. 2019. Review of glyphosate use in British Columbia. Available at: [TR2019N21.PDF](#) (fpinnovations.ca).

¹⁴⁸ Ulappa, A.C., Shipley, L.A., Cook, R.C., Cook, J.G. and Swanson, M.E., 2020. Silvicultural herbicides and forest succession influence understory vegetation and nutritional ecology of black-tailed deer in managed forests. *Forest Ecology and Management*, 470, p.118216.

¹⁴⁹ EA/FONSI at 20-27.

¹⁵⁰ EA/FONSI at 39.

¹⁵¹ van Bruggen, A.H.C. et al. 2018.

¹⁵² *Id.*

¹⁵³ Torreta, V., I.A. Katsoyiannis, P. Viotti & E.C. Rada. 2018.

phosphoric acid maintains its toxic characteristics which can last for over half a year.¹⁵⁴

Furthermore, there are potential effects on non-target plants when non-target species are interspersed with target invasive species.¹⁵⁵ The prevalent use of glyphosate also raises substantial questions about environmental effects because of its non-selective nature and danger of suppressing non-target native plants. The non-selectivity in turn creates the possibility that non-native plants will quickly recolonize a treated area due to a competitive advantage over native plants killed by glyphosate. Glyphosate effectiveness studies have focused on its effects on the target species over a short period of time, rather than long-term impacts on native plants. New research indicates that plants that survive glyphosate can show adverse effects for long periods of time as “glyphosate has been found to persist in low levels in some surviving perennial forest plants for at least 1 year.”¹⁵⁶

4. Conclusion and suggested resolution

The FONSI is arbitrary because it relied on an analysis that failed to take a hard look at glyphosate-based herbicide impacts to fish and wildlife or recognize controversial and unknown risks that require preparation of an EIS. The omission of aminomethyl phosphoric acid impacts to aquatic organisms, for example, was a major oversight. The Reviewing Officer should direct the Responsible Officials either to rescind the draft Decision Notice and adopt the no-action alternative or to evaluate substantial questions about fish and wildlife impacts in an EIS through a review of recent literature that disagrees with agency conclusions about the mobility, toxicity and duration of glyphosate and glyphosate-based herbicide effects on fish and wildlife.

III. The environmental analysis must provide site-specific information

Defenders’ previously submitted comments explained that the project’s approach to herbicide spraying across a large area without disclosing locations or specific treatments is troubling and violates NEPA.¹⁵⁷ This approach resembles recent “Landscape Level Analysis” strategies for timber projects. Alaska District Court federal Judge Gleason rejected this approach in March 2020 in *SEACC et al. v. U.S. Forest Service* as a violation of NEPA. Any further analysis should provide greater detail about when and where the public could face exposure to herbicides – and how much.

¹⁵⁴ *Id.*

¹⁵⁵ Wagner, V., P.M. Antunes, M. Irvine & C.R. Nelson. 2017. Herbicide usage for invasive non-native plant management in wildland areas of North America. *Journal of Applied Ecology* 54, 198-204. Available at: <https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.12711> (“[g]iven the paucity of published information and regular use of non-selective herbicides, there is a critical need for land management agencies to assess non-target effects of the herbicide treatments they are implementing”)

¹⁵⁶ Wood, J.L. 2019. The present of glyphosate in forest plants with different life strategies one year after application. *Canadian Journal of Forest Research* 49(6) 586-594.

¹⁵⁷ Public letter #2744754: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](#); Public Letter # 2781038: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](#)

The strategy for this project would defer site-specific determinations about herbicide applications or other treatments for future implementation plans. The draft decision proposes project implementation through a Weed Treatment Plan providing a resource review format for each specific treatment.¹⁵⁸ The analysis for this project must include some type of determination or estimate of where and when these activities will occur rather than reserving siting decisions for the future.¹⁵⁹ NEPA's requirement that environmental analyses provide sufficient specificity to insure informed decisionmaking and meaningful public participation requires more detail than a large-scale map or a blank card provided in an appendix to an EA.¹⁶⁰

The broad-scale map suggests treatments could occur in the vicinity of community use areas, in watersheds or in areas used for subsistence purposes, including gathering berries or other activities that involve contact with plants. The site-specific information is necessary to assess both ecological and human safety impacts. Without this information, the public will also be unable to review the project as it relates to other impacts such as timber sales that are the likely current and future cause of many infestations.

The 2013 Wrangell-Petersburg Weed Management Project EA explained that “[d]efining an acreage ‘cap’ allows the analysis in the EA to proceed within maximum, well-defined parameters” and provided useful information about the potential extent of proposed treatments.¹⁶¹ The 2013 project also targeted invasive weeds on 441 acres that the agency determined posed a threat to the ecological integrity of occupied areas and it limited application methods to reduce airborne drift and other effects.¹⁶² But the approach taken here neither provides “useful information” about proposed treatments nor allows for public review of site-specific actions. Instead, the Forest Service would develop an annual implementation plan that theoretically authorizes herbicide spraying anywhere on an estimated 5,811 acres. This approach violates NEPA.

To correct this error, the Reviewing Officer should either direct the Responsible Officials to withdraw the Draft Decision Notice or include site-specific information about proposed treatment plans in an EIS.

IV. The Forest Service needs to expand the Range of Alternatives

Defenders first set of scoping comments requested the Responsible Officials develop alternatives aimed at weed prevention and a non-herbicide alternative.¹⁶³ Our second set of comments suggested development of additional alternatives that in particular would at a minimum reduce use of glyphosate-based herbicides as proposed in the only action alternative by prohibiting broadcast spraying and use in

¹⁵⁸ Draft Decision Notice at 1; EA/FONSI Appx. B.

¹⁵⁹ See, e.g. *SEACC et al. v. U.S. Forest Service*. Case No. 1:19-cv-00006-SLG. (D. Alaska 2020).

¹⁶⁰ *SEACC et al. v. U.S. Forest Service*. Case No. 1:19-cv-00006-SLG. (D. Alaska 2020).

¹⁶¹ Forest Service. 2013. Environmental Assessment, Decision Notice and Finding of No Significant Impact, Wrangell-Petersburg Weed Management Project at 14. R10-MB-758. July 2013.

¹⁶² *Id.* at 1-3.

¹⁶³ Public letter #2744754 at 7-9: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](https://www.usda.gov/forestservice/nepa-project-public-reading-room/view-letter)

sensitive ecological areas such as wilderness and riparian areas.¹⁶⁴ Scientific studies that find considerable uncertainty remaining about potentially harmful effects to humans identify a need to reduce its use.¹⁶⁵ The Responsible Officials refused to consider any means of weed control other than the action alternative that allowed for unlimited broadcast spraying of glyphosate-based herbicides.¹⁶⁶

In general, the project's purpose is to maintain a natural range of habitat conditions in the area and reduce weed infestations and risks to native or desired non-native species caused by weeds.¹⁶⁷ The applicable standard and guideline directs the agency to treat priority species infestations and reduce population sizes and/or limit the spread of priority invasive species.¹⁶⁸

The two alternatives – the proposed action and status quo under the 2013 Wrangell-Petersburg Weed Management Project – provide for only two ways to achieve these goals. The proposed action would authorize unlimited broadcast spraying of glyphosate-based herbicides¹⁶⁹ and the no-action alternative maintains those treatments but at lower levels and through less dangerous application methods.¹⁷⁰ The proposed action is a new and different activity – it more than doubles the estimated acreage available for herbicide treatments, changes the application methods and exposes more sensitive areas to intensive herbicide treatments. It also differs from the 2013 Weed Management Project in that the available science at the time had not identified the numerous additional carcinogenic and other health effects studied over the past few years.

The failure to consider alternative and less poisonous ways to reduce the infestations violates NEPA. NEPA imposes an obligation to “[r]igorously explore and objectively evaluate all reasonable alternatives.”¹⁷¹ An agency must “consider such alternatives to the proposed action as may partially or completely meet the proposal’s goal,” meaning that it is reasonable to consider alternatives that meet other

¹⁶⁴ Public Letter # 2781038 at 17-19: [US Forest Service NEPA Project Public Reading Room - View Letter \(usda.gov\)](https://www.usda.gov/forestservice/nepea-project/public-reading-room/view-letter)

¹⁶⁵ Torreta, V., I.A. Katsoyiannis, P. Viotti & E.C. Rada. 2018. Critical review of the effects of glyphosate exposure to the environment and humans through the food supply chain. *Sustainability* 10(4).

¹⁶⁶ Final EA/FONSI at 11.

¹⁶⁷ *Id.* at 7.

¹⁶⁸ *Id.* at 8

¹⁶⁹ The agency’s own analyses indicate that the proposed action is excessive. On one hand, the EA/FONSI seeks to artificially minimize effects by claiming that the treatments will be limited, yet on the other hand, the proposed action provides no limits. See EA/FONSI at 39 (claiming that “the amount of herbicide used is not expected to increase markedly because capacity is unlikely to change”); Forest Service. 2013. Environmental Assessment, Decision Notice and Finding of No Significant Impact, Wrangell-Petersburg Weed Management Project at 14 (“[i]t is expected that acres treated annually would be substantially less than 200 acres, considering limited budgets and recent treatment history”).

¹⁷⁰ EA/FONSI at 11.

¹⁷¹ 40 C.F.R. § 1502.14(a); see also *Barnes v. U.S. Dep’t. of Transp.*, 655 F.3d 1124, 1131 (9th Cir. 2011)(“Congress created NEPA to protect the environment by requiring that federal agencies carefully weigh environmental considerations and consider potential alternatives to the proposed action before the government launches any major federal action”).

objectives.¹⁷² The Forest Service could, for example, like the U.S. Air Force, contemplate 21st century technologies and consider ways to obviate “the need to spend millions of dollars on toxic chemicals” by using a distributed array machine or even a “NatureZap”¹⁷³ (*photo at right*). Weed zappers, increasingly used by farmers, can treat more acreage more rapidly than herbicides.¹⁷⁴

A “reasonable” range of alternatives includes alternatives “that are practical or feasible” and not just those alternatives preferred by the agency.¹⁷⁵ The key criterion for determining whether a range of alternatives is reasonable is whether the “selection and discussion of alternatives fosters informed decisionmaking and informed public participation.”¹⁷⁶ The exploration of alternatives to an agency’s preferred course of action is critical, because “[w]ithout substantive, comparative environmental impact information regarding other possible courses of action, the ability of an EIS to inform agency deliberation and facilitate public involvement would be greatly degraded.”¹⁷⁷ The need to consider non-chemical treatments in weed treatment projects has been a NEPA requirement for years based on the agency’s own recognition that herbicide treatments “may have greater potential to pose risks to human health and the environment than other alternatives.”¹⁷⁸



The Forest Service developed two alternatives for the 2013 Weed Management Project EA that addressed concerns with herbicides *even before the IARC had established glyphosate’s carcinogenic potential*.¹⁷⁹ The No-Action Alternative responded to public concerns about herbicides because the Forest Service could still allow manual and mechanical treatments approved through Categorical Exclusions.¹⁸⁰ The Forest Service also developed what it described as a “reasonable

¹⁷² *City of New York v. U.S. Dep’t of Transp.*, 715 F.2d 732, 742-742 (2nd Cir. 1981).

¹⁷³ USAF. 2018. Directed Energy For Widespread Vegetation Control A Step Closer To Reality. *Avail. At:* <https://media.defense.gov/2018/Mar/06/2001886655/-1/-1/1/G-CEQ-40Questions.pdf>
<https://www.energy.gov/sites/prod/files/2018/06/f53/G-CEQ-40Questions.pdf>
[GLOBALNEIGHBOR_AF121-207%20\(CONCEPT\).PDF](https://www.energy.gov/sites/prod/files/2018/06/f53/G-CEQ-40Questions.pdf)

¹⁷⁴ [Testimonials – The Weed Zapper](#)

¹⁷⁵ Council on Environmental Quality (CEQ), Forty Most Asked Questions, Questions 2A and 2B; 40 C.F.R. §§ 1502.14, 1506.2(d); *available at* <https://www.energy.gov/sites/prod/files/2018/06/f53/G-CEQ-40Questions.pdf>.

¹⁷⁶ *Westlands Water Dist. V. U.S. Dep’t of Interior*, 376 F.3d 853, 872 (9th Cir. 2004)(citations omitted).

¹⁷⁷ *New Mexico ex rel. Richardson*, 565 F.3d 683, 708 (10th Cir. 2009)(citations omitted).

¹⁷⁸ *Blue Mountains Biodiversity Project v. U.S. Forest Service*, 229 F.Supp.2d 1140 (2002).

¹⁷⁹ Forest Service. 2013. Environmental Assessment, Decision Notice and Finding of No Significant Impact, Wrangell-Petersburg Weed Management Project at 11, 14. R10-MB-758. July 2013.

¹⁸⁰ *Id.*

alternative” - Alternative 3 - to address public concerns about herbicide use by relying primarily on manual and mechanical treatments.¹⁸¹

The Responsible Officials refused to develop a chemical-free alternative or any other alternatives which could reduce the risks associated with glyphosate-based herbicides by excluding broadcast spray and/or restricting the use of one or all three proposed herbicides to non-Wilderness, non-riparian and other sensitive areas such as wildlife foraging habitat. The EA does not even contain an alternative requiring selective application of herbicides. Broadcast spraying covers large areas, affecting more non-target plants and increasing risks associated with drift while spot spraying and hand treatments reduce impacts to soil and non-target organisms.¹⁸²

To correct this error, the Reviewing Officer should direct the Responsible Officials to withdraw the Draft Decision Notice and adopt the no-action alternative, or develop a broader range of alternatives in an EIS that include no-herbicide treatments and/or alternatives that reduce the use of glyphosate-based herbicides.

V. Chemical spraying in Wilderness with no limit requires an EIS

The Wilderness Act provides that:

Except as otherwise provided in this chapter, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this chapter, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.¹⁸³

The project area includes five designated wilderness areas encompassing 705,787 acres which the Forest Service says are “naturally functioning” with “no significant impairments or noted concern with any of the qualities of wilderness character.”¹⁸⁴ The proposed action authorizes use of herbicide application methods and formulations that can remain in Wilderness waters and soils for extended periods of time and kill native plants accompanied by numerous potential toxic and other adverse health effects to fish and wildlife described in Section II.B. of this objection letter, impairing Wilderness character. As explained throughout these comments, the Forest Service’s beliefs about the safety and short-term localized effects of glyphosate ignores multiple findings about the persistence, mobility and impacts of glyphosate formulations and the analysis vastly understates potential impacts to wilderness character. The FONSI wrongly characterizes effects as temporary and localized and concludes that they will not entail significant adverse environmental effects to any unique characteristics of project area Wilderness character.¹⁸⁵

¹⁸¹ *Id.*

¹⁸² Krosse, P.C. 2019. *Supra*, at 11-12.

¹⁸³ 16 U.S.C. § 1133(b).

¹⁸⁴ EA/FONSI at 35-37.

¹⁸⁵ EA/FONSI at 42.

The Reviewing Officer should direct the Responsible Officials to rescind the draft Decision Notice and adopt the no-action alternative, or analyze the effects to Wilderness character in an EIS that includes an alternative that restricts herbicide treatments to non-Wilderness areas.

VI. Conclusion: Prepare an EIS

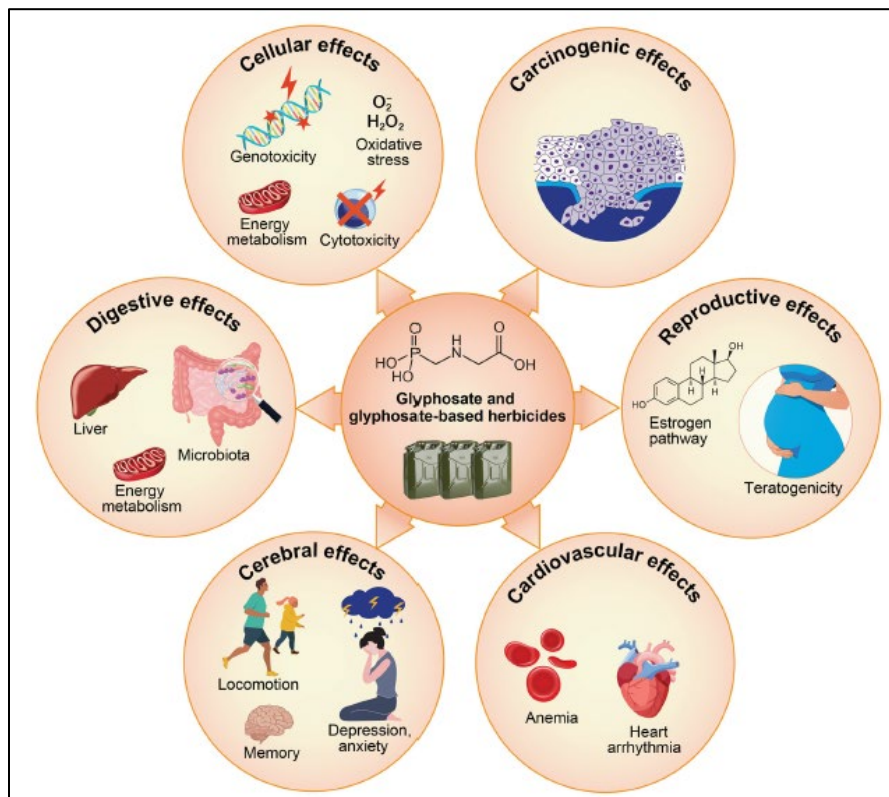


Figure 2. Impacts of glyphosate and glyphosate-based herbicides on animal health. Individual circles summarize the reported cellular, carcinogenic, reproductive, cardiovascular, cerebral and digestive effects of glyphosate and glyphosate-based herbicides on fish and mammal health.¹⁸⁶

In sum, considerable research over the past few years identifies a strong likelihood of cardiotoxic, cytotoxic, genotoxic, hepatotoxic, immunotoxic and neurotoxic effects to fish, wildlife and humans caused by glyphosate-based herbicides and their metabolite, aminomethyl phosphoric acid, in addition to oxidative stress, endocrine disruption, cerebral impairment and some cancers. There is a clear need to prioritize “the protection of citizens and the environment from exposure to a substance whose side effects are not yet known.”¹⁸⁷

The EA/FONSI failed to fairly analyze or in most cases disclose these potential significant environmental risks, violating the APA, NEPA and NFMA. Defenders’ requests that the Reviewing Officer direct the Responsible Officials to rescind the Draft Decision Notice and adopt the no-action alternative. The Reviewing Officer should then initiate a process such as a Supplemental EIS that responds to evolving

¹⁸⁶ Peillex, C. & M. Pelletier. 2020.

¹⁸⁷ Torreta, V., I.A. Katsoyiannis, P. Viotti & E.C. Rada. 2018. Critical review of the effects of glyphosate exposure to the environment and humans through the food supply chain. Sustainability 10(4).

and recent science on the effects of glyphosate-based herbicides and revisits weed treatment methods through the Tongass National Forest for the safety and well-being of Southeast Alaska residents and Tongass National Forest fish, wildlife and other resources. If you decide to proceed with the proposed action in some form, direction to the Responsible Officials should include (1) preparation of an EIS analyzing the impacts of glyphosate formulations and metabolites on human health and safety, fish and wildlife and ecosystems; (2) site-specific analysis and (3) an expanded range of alternatives.

A handwritten signature in black ink, appearing to read "Larry Edwards". The signature is fluid and cursive, with the first name "Larry" written in a stylized, looped manner and the last name "Edwards" in a more straightforward cursive script.

Larry Edwards, president (907-752-7557)
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Appendix 1: Reference List/documentation being submitted with this objection

The following cited documents are (or have already been) provided in PDF format. Copies of the ten documents displayed below in a blue sans-serif font are being provided with this Objection; document displayed below in black serif font were provided with our earlier comments on this project.

Baum Hedlund Law Firm. (Website). Accessed Sept. **2021**.

Benbrook, C.M. **2019**. How did the US EPA and IARC reach diametrically opposed conclusions on the genotoxicity of glyphosate-based herbicides. *Environ. Sci. Eur.* 31:2.

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Burtscher Schaden, H., P Clausen & C. Robinson. **2017**. Glyphosate and cancer: buying science. How industry strategized (and regulators colluded) in an attempt to save the world's most widely used herbicide from a ban.

Carlson Law Firm. (Webpage, **Accessed Sept. 2021**). Which Countries and U.S. States are Banning Roundup?

CBS News. **2011**. Big tobacco kept cancer risk in cigarettes secret: Study. 30 Sept. 2011.

CEQ_Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations.pdf

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- Myers, J.P., et al. **2016**. Concerns over use of glyphosate-based herbicide and risks associated with exposures: a consensus statement. *Environmental Health* (2016) 15:10. DOI 10.1186/s12940-016-0117-0
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