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Organization: Washington State University

Title:

Comments: January 16, 2020

I am writing to comment on the Notice of Proposed Action. My comments are based on my 30 years of experience conducting ecological research at the site of the proposed actions, first as a PhD student at University of Washington, and for the last 21 years as Professor of Biology at Washington State University. For 20 of those years I have also been engaged in promoting educational and stewardship activities in the project area through my leadership role as a board member of the Mount St. Helens Institute as well as leading numerous field trips there for a range of audiences. Ecologically, the Pumice Plain, and especially the portion transected by the Truman Trail, is the beating heart of the National Volcanic Monument. In my view, the proposed projects are a dagger to this heart. They will permanently change the course of life in the core of the Monument and thereby jeopardize its ability to fulfill the purpose it was created for. These actions will so alter the landscape and ecological processes that I think the ecological research enterprise in that area, the most intensively studied primary succession landscape in history, worldwide, will likely sputter out. They will destroy a unique landscape and unique communities that have captivated the public and diminish the value of the Monument.

Regarding specific objections to the NOPA I would like to hereby incorporate all comments on the NOPA made in the letter submitted in the record by Dr. Carri Leroy (appended), by the Cascade Forest Conservancy (appended), and by the Washington Native Plant Society, and adopt them as my own.

I acknowledge the need to manage the water level of Spirit Lake in order to minimize the risk of a catastrophic outbreak flood. However, the USFS and USACE have proceeded as if such an outbreak is imminent and an emergency, but there is no evidence of that. Their rush threatens to unnecessarily damage the unique characteristics of the Pumice Plain by failing to fully consider the impact of the activities and ways that they may be avoided or mitigated.

Moreover, it is still unclear whether the proposed core drilling work is essential, as the results of less invasive approaches recommended in earlier reports, for example ground penetrating radar and geological mapping have not been published or presented.

Importance of long-term ecological research.

One of the unique and most valuable aspects of research at Mount St. Helens is the long-term nature of many research projects. Sampling in many cases began in the early 1980s and in some cases has continued through the present time (c.f. descriptions in books by Dale et al. 2005, Crisafulli et al. 2018). As many of the early researchers are retiring, younger researchers are taking over their sampling sites in an effort to extend the data sets through another generation. This includes sites on the Pumice Plain within 30 meters of the proposed road, such as the plots established by Roger del Moral in the 1980s which are now being studied by Dr. Cynthia Chang (University of Washington). My own work, supported by National Science Foundation Long Term Research in Environmental Biology grants for the last 11 years, includes sites that have been sampled yearly for 20 summers or more that will be directly impacted by the road. These sites have formed the basis for many peer-reviewed papers, some of which have won prestigious awards¹, and many forthcoming papers. Some of our results have been surprising, for example prior to our work, it was not recognized that insect herbivores were capable of dramatically changing successional processes². One of our focal species, now known as *Filatima loowita*, was previously unknown to science³ and a number of other arthropod species discovered by us and Charlie Crisafulli remain undescribed. The geographic distributions of all of these newly discovered species are unknown. In fact no one has investigated where else these new species occur, raising the issue of whether they are unique to Mount St. Helens and hence requiring of protection. Many of our papers describe the surprising role of nutrient limitation in mediating the interactions of plants and insects and of invasive and native species⁴.

Some of the research plots for this work, which expect to re-sample in the near future, are within 20 meters of the Truman Trail and would undoubtedly be impacted by the proposed action. However, sites that are much further from the road would also become useless because the ecological processes such as availability and dispersal of propagules, patterns of erosion, and more would be irrevocably altered within at least 100m of the road. The research described here from my lab is only a small component of a larger body of research from Mount St. Helens that has impacted not only the field of ecology, but a large body of public as indicated its inclusion in numerous textbooks, college and k-12 courses, the many thousands of people each year who visit the Monument to see the recolonization process first hand, and the numerous invitations Mount St. Helens researchers receive to provide public lectures and media interviews.

The decision by researchers to conduct extremely long term ecological research on the Pumice Plain, and the decision by agencies to invest in research with a long-term payoff, was based on the absolutely unique opportunities afforded not only by the eruption itself, but also grounded strongly in the assurance that these sites would not be seriously disturbed by future management actions. Since the mid-1980s the Pumice Plain has been managed with research as the number one priority. In addition, as a Class 1 Research Area under the Comprehensive Management Plan it has had highly restricted use, e.g. no motorized use, bikes, or pack animals, as well as no off-trail travel or camping without administrative use permits. In many respects this is far more restrictive than designated Wilderness. The proposed activities mark a major deviation from 34 years of prior management and are likely deter future researchers from engaging in long term research here. The NOPA does not appear to give serious consideration to research as an important value.

Requirement for an Environmental Impact Statement instead of Environmental Assessment. As outlined in the adopted letters by Cascade Forest Conservancy and the Washington Native Plant Society, the proposed action warrants an EIS. The proposed action is in the heart of a National Volcanic Monument that was established precisely because its landscape was so unique that Congress designated its study a primary objective of establishing the Monument, and that the Comprehensive Management Plan identifies the Pumice Plain as a Class I Research Area because [ldquo]it is the most scientifically important and sensitive area in the monument[rdquo]. Large portions of the Monument, including the Pumice Plain, have been managed as defacto roadless and wilderness areas. MSHNVM is unusual in that a) it is a USFS managed National Monument.

1. the NVM was established so that [ldquo][hellip] geologic forces and ecological succession [hellip]continue substantially unimpeded.[rdquo] Since then it has become apparent that the Pumice Plain is ecologically unique in North America and my lab as well as others demonstrates that there unique and diverse native plant and animal communities that will be disrupted by these actions. The letter by Dr. LeRoy describes how the project would disrupt a unique set of newly formed watersheds that form the basis of her NSF-funded project. The unique Congressional mandate for the NVM, the fact that ecological succession and research forms a core purpose of the monument, that ecologically unique biological communities are now present and that the Spirit Lake Basin has been managed largely as if it were wilderness, all indicate that project area possesses [ldquo]Unique characteristics, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas,[rdquo] a key criteria for triggering an EIS.

Potential violation of the Endangered Species Act

In its preparation of this NOPA and the earlier EAs, the USFS appears not to have considered the origin of the rainbow trout in Spirit Lake. It is possible that these are wild steelhead that naturally colonized up the North Fork of the Toutle River. Steelhead were documented as spawning in the upper North Fork Toutle River as early as 1981. These steelhead are part of the Lower Columbia River distinct population segment, which is listed as threatened under the Endangered Species Act⁵. A soon to be published report documents numerous stream avulsions in the upper part of the North Fork system during the 1980^s⁶. At times these avulsions united the N. Fork Toutle with Loowit Creek which at the time was flowing into Spirit Lake. It is more than plausible that wild steelhead colonized the lake by this route. In fact, the trout in Spirit Lake were first detected within a year two of one such period of connectivity in the late 1980^s. Moreover, WA state fish biologists have commented on the resemblance of the Spirit Lake rainbow trout to wild steelhead. Before any actions proposed in this NOPA

can go forward, genetic testing of the Spirit Lake rainbow/steelhead trout must occur to establish their provenance, as the proposed activities are likely to have many unanticipated effects on these fish and require the USFS to consult with the National Marine Fisheries Service.

Wetland

The NOPA7 states that Alternative B does not cross any wetlands. This is an astounding and absolutely incorrect statement and suggests that whoever wrote this hasn't visited the site.

Botany The survey area does contain *Montia diffusa*, a sensitive species, which my lab detected in 2016. The location is extremely close to the Duck Bay route. It likely occurs elsewhere than where we detected it, since we sample such a small portion of the landscape.

Sincerely,

Footnotes

1 E.g. Fagan, W.F., M. Lewis, M. Neubert, C. Aumann, J.L. Apple, and Bishop, J.G. 2005. When can herbivores reverse the spread of an invading plant? A test case from Mount St. Helens. *American Naturalist* 166: 669-685. Awarded 2006 American Society of Naturalists President's Award for Best Paper in *The American Naturalist* in 2005
2 Yang, S et al. 2011. The Effect of Consumers and Mutualists of *Vaccinium membranaceum* at Mount St. Helens: Dependence on Successional Context. *PLoS One* 6: e26094; Fagan et al. 2005.

3 Adamski, et al. 2009. A new *Filatima* Busck (Lepidoptera: Gelechiidae) associated with lupine during early herbivore colonization on Mount St Helens. *Proceedings of the Entomological Society of Washington*.

4 Bishop, J.G., et al. 2010. Addition of phosphorus increases primary production and orthopteran abundance during primary succession at Mount St. Helens. *PLOS One*: 5(10): e13598; Apple, J.L., et al. 2009. Successional Change in Phosphorus Stoichiometry Explains The Inverse Relationship Between Herbivory and Lupin Density on Mount St. Helens. *PLoS One*: 4: e7807.; Marleau, J.N., et al. 2011. A Stoichiometric Model of Early Plant Primary Succession. *American Naturalist* 177: 233-245.; Schoenfelder, A.C et al. 2010. Resource use efficiency and community effects of invasive *Hypochaeris radicata* (Asteraceae) during primary succession. *American Journal of Botany* 97: 1772-1779. Lambers, H., et al. 2012. Invited Review for special issue on root biology: Phosphorus- mobilization ecosystem engineering: the roles of cluster roots and carboxylate exudation in young P-limited ecosystems. *Annals of Botany*. 110: 329-348

5 See https://fortress.wa.gov/dfw/score/score/species/population_details.jsp?stockId=6714 accessed 16 Jan. 2020.

6 Major, J.J., Grant, G.E., Sweeney, K., and A.R. Mosbrucker. 2019 (Draft). A multi-decade analysis of fluvial geomorphic evolution of the Spirit Lake blockage. U.S. Geological Survey. Open-File Report 2019-XXXX.

7 NOPA page 12

Letter from Cascade Forest Conservancy
January 15, 2020

Gifford Pinchot National Forest Supervisor 987 McClellan Road

Vancouver, WA 98661

RE: Comments on Notice of Proposed Action and Scoping for Spirit Lake Intake Gate Replacement and Geotechnical Drilling

Dear Forest Supervisor,

Thank you for the opportunity to comment on the Spirit Lake Intake Gate Replacement and Geotechnical Drilling Notice of Proposed Action (NOPA). The Cascade Forest Conservancy's (CFC) mission is to protect and sustain forests, streams, wildlife, and communities in the heart of the Cascades through conservation, education, and advocacy. We represent over 10,000 members and supporters who share our vision of a forest where wild places existing, allowing wildlife to thrive.

CFC acknowledges the need to protect public health and safety through the replacement of the Spirit Lake tunnel intake gate. We support the Forest Service's efforts to protect downstream communities; however, the Forest Service should consider the unique geology and ecology of the area as well as the ongoing need to replace the tunnel intake gate. Additionally, while we believe the drilling for core samples could provide valuable data and insight, combining the drilling project with the intake gate replacement projects prevents the consideration of viable alternatives.

The Pumice Plain is a unique ecological anomaly and our members and partners care deeply about the preservation and protection of this special place. The two preferred alternatives do not adequately protect the Monument's ecological and scientific values, and they cause environmental harms that are extremely concerning to a variety of stakeholders. The current analysis for the Spirit Lake proposed action is inadequate, incomplete, and will have irreparable consequences.

We request that the Forest Service consider an alternative that mitigates both ecological harm and impacts to research and conducts adequate environmental review in the form an Environmental Impact Statement. Additionally, given the time constraints of this comment period and the lack of available information and analysis, we request the Forest Service open a public comment period after the final EA is posted.

CFC's specific concerns with this project and suggested alternatives are explained in further detail as follows.

NEPA requires the consideration of an adequate range of alternatives.

We are concerned that the Forest Service has failed to consider, or dismissed without adequate analysis, a range of alternatives that protect the Monument values.

The Forest Service has suggested two alternatives for the gate replacement and drilling, both of which require a paved motorized access route across the Pumice Plain, which will be harmful to the unique ecology, geology, and recreational values of the Monument. Initial scoping meetings and prior projects proposed a UTV trail for a motorized accessed route. A paved motorized access route will leave a permanent scar on the landscape, impair the visual quality of the Monument, and invite unwanted motorized access to the Pumice Plain. The Forest Service should explore an alternative that does not require a permanent paved road.

An alternative that uses the Duck Bay access route should be adequately explored. The Duck Bay access route alternative (Gate Replacement 3)⁸ would transport equipment in and out of Spirit Lake seasonally by helicopter to Duck Bay and by barge to the gate structure. Work crews would travel daily by utility terrain vehicle and boat to the intake structure. This alternative would mitigate both environmental impacts and harm to research plots. We have requested the project file to gain a better understanding of the dismissed alternatives; that request was turned down.⁹

The need for core sample drilling is premature and the Forest Service should explore an alternative that does not include the drilling project. The National Academies of Science report¹⁰ highlighted a need to fill a data gap, not an urgent need for core samples to prevent an imminent catastrophic event. We are concerned there is not a legitimate need for drilling additional cores, and by combining the gate replacement and drilling projects, adequate alternatives have been dismissed. The perceived need for drilling is driving the project west of Spirit Lake and across the Pumice Plain. Exploring an alternative that does not incorporate the drilling would mitigate environmental impacts and harm to research plots.

Inadequate analysis at the planning stage can result in irreparable environmental harm to the Pumice Plain and Spirit Lake. Alternative access routes not analyzed in the NOPA should be analyzed in further detail and compared not just with regard to economics, but also with a consideration of how well it protects the Monument values. We suggest the Forest Service revisit the prematurely dismissed alternatives and consider an alternative that results in fewer ecological harms and impacts to research.

The proposed action requires the preparation of an Environmental Impact Statement. Under NEPA, an agency must prepare an EIS if a proposed federal action could [ldquo]significantly affect the quality of the human environment." The significant effect need not actually occur; it is sufficient to trigger the preparation of an EIS if a substantial question is raised "whether a project may have a significant effect on the environment." Council on Environmental Quality Regulations define significant effect by reference to both the context and intensity of the action. There are a number of factors the agency must consider in assessing the intensity of the action, including:

1.

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
2. The degree to which the proposed action affects public health or safety.
3. Unique characteristics, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
4. The degree to which the effects are likely to be highly controversial.
5. The degree to which the possible effects are highly uncertain or involve unique or unknown risks.
6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it into small component parts.
8. The degree to which the action may adversely affect [sites/structures] listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

40. C.F.R. [sect] 1508.27(b).

The environmental impacts of the proposed alternatives are both controversial and significant. The proposed road would cross five permanent streams and ten seasonal streams, risking soil erosion and sediment delivery into the streams, the Toutle River System, and Spirit Lake. These channels make up five separate watersheds that were created following the eruption of Mount St. Helens[mdash]a set of newborn watersheds globally unique to this landscape. The road would receive 1,980 passenger vehicle passes, 84 tractor-trailer passes, 464 single-unit truck passes, and 6-10 drill rigs passes per season.¹¹ The impacts of sediment disturbances will cause significant harm to aquatic insects and fish, and may downstream migration, increasing turbidity and damage to benthic habitat. Additionally, a portion of these stream crossings are likely wash out every year, requiring additional construction and causing additional harms to the ecology of the landscapes[mdash]impacts that have not been discussed.

The proposed duration of the project is up to five years[mdash]three years longer than initially proposed in scoping meetings. The sounds from drilling will be heard throughout the region, affecting both the area[rsquo]s

tranquility and nearby animal populations. Mountain goats, a sensitive species, as well as deer and elk, may avoid their current habitats in the area and potentially disappear off the landscape for an extended period of time given the proposed timeline of the project.

The human impacts on the landscape during the proposed project timeline are unmitigated. Specifically, there will be unintended consequences due to the density of workers for a prolonged period of time. The construction of a road will cause a permanent scar on the landscape due to its structure alone. The Forest Service's classification of the road has not been discussed and could require long-term maintenance and result in additional significant ecological harms. We are concerned about the limited analysis, which fails to adequately explore the wide-ranging impacts to the quality of the environment. We believe the Forest Service is obligated to prepare an EIS to address these concerns.

The proposed Comprehensive Management Plan amendment requires the preparation of an Environmental Impact Statement.

We have concerns that a project-specific amendment to the Comprehensive Management Plan¹² (CMP) is being proposed without adequate environmental review. Plans themselves may not directly cause environmental impacts, but in this case, the proposed site-specific amendment is for the sole purpose of facilitating this project. The Forest Service is obligated to prepare an Environmental Impact Statement for an amendment that causes significant impacts and is a major federal action.¹³ The proposal to amend the visual quality objective from retention to partial retention will have significant impacts on the character and landscape of the monument and is a major federal action. The retention objective currently required in the CMP is "[t]he most restrictive visual quality objective" and "[m]anagement activities are not evident to the casual forest visitor."¹⁴ This visual quality objective is in place to preserve aesthetic values of the Monument and maintain a landscape that has negligible visible human influence. Deviation from this objective will have significant effects on recreation, opportunities and access, and the scenic character of the Monument. Additionally, this amendment may establish a precedent for future actions with significant effects.¹⁵ We do not support the proposed amendment and urge the Forest Service to do the necessary environmental analysis and prepare an EIS. The impacts to research are controversial and significant.

When Congress designated Mt. St. Helens as a National Monument, it identified research as a priority. The Pumice Plain, specifically, was designated as a Class 1 Research Area; the two proposed alternatives could have irreversible impacts to this natural laboratory and its ongoing research. In fact, there are few places on earth that boast six square miles with almost no human influence, and researchers have spent 40 years observing nature recover from total destruction to a flourishing ecosystem of streams, soils, plants, and animals. It is an epicenter for learning and knowledge. We are concerned that any activity as invasive as the proposed action would have damaging consequences for global research. Both alternatives directly cause the loss of research plots and transects,¹⁶ destroying research, impacting funding, and potentially permanently altering the ecological conditions for all research on the Pumice Plain. Additionally, a Class 1 Research Area is a unique characteristic that requires the preparation of an EIS under 40 C.F.R. [sect] 1508.27(b)(3), the list is not exhaustive, they are suggestions, and a Class 1 Research Area is exactly the kind of characteristic the legislators were striving to protect.

The public is not being given an adequate opportunity to provide meaningful comments. In an attempt to circumvent opposition to a highly controversial project, the Forest Service is rushing this project through without adequate consideration of public input. The notice of

proposed action was posted on December 17, allowing for a limited public comment window across the vacation period while agency staff are unavailable to answer public concerns and supply additional information. CFC sent a letter requesting a comment extension on December 19,¹⁷ to which the Forest Service did not respond until January 3—two weeks later—when agency staff were back in the office. We are deeply concerned the Forest Service is failing to entertain an adequate public comment period following the final Environmental Assessment. It is challenging, if not impossible, to provide meaningful comment and preserve standing on issues for which we have not been supplied adequate documentation. Additionally, the EA is likely to include substantial

changes from the NOPA[mdash]especially if the Forest Service takes on board public comment[mdash]which requires a public comment period.¹⁸ We request the Forest Service open up an additional public comment after review of these comments to allow CFC time to receive documents from our FOIA request and further understand the intricacies of this project.

The Presence of Endangered Species requires consultation under the Endangered Species Act.

The Notice of proposed action fails to acknowledge the population of Lower Columbia River Steelhead inhabiting Spirit Lake. Under the Endangered Species Act (ESA), any federal action that may affect threatened or endangered species or its habitat, the agency contemplating an action must consult with the consulting agency.¹⁹ For anadromous species, the consulting agency is the National Marine Fisheries Service (NMFS or NOAA Fisheries).²⁰ Local biologists and researchers are fairly certain there is a population of steelhead²¹ in Spirit Lake.²² The North Fork Toutle River avulsed at least ten times from 1980 through 2017, which would have allowed the population of steelhead to connect with Spirit Lake. Anadromous steelhead is listed as Threatened under the ESA, and if the proposed activity is likely to adversely affect the listed species,²³ the Forest Service is required to consult with NMFS and request the issuance of a Biological Opinion.²⁴ We are concerned that the effects of the debris block drilling, gate replacement, and road construction are certain to harm the habitat and survival of the steelhead. Given the project may adversely affect the threatened steelhead and their habitat, we believe the Forest Service is obligated to prepare an EIS.²⁵

The threat of invasive species has not been adequately considered.

The Forest Service has failed to account for the impacts and introduction of invasive species into this unique landscape. CFC is concerned about the potential introduction of invasive species because of the introduction of barges, machinery for drilling equipment, and materials for road construction. Specifically, the NOPA proposes a road constructed out of gravel and asphalt²⁶ without any mention of where these materials will be sourced from and methods to prevent the introduction of invasive species. Additionally, the New Zealand mudsnail, a known invasive species, has already been introduced to the Spirit Lake system.²⁷ We are concerned that this project, as proposed, could allow for further introduction and more dispersal downstream into the Toutle River system, posing a potential ecological disaster. We suggest the Forest Service strongly consider taking a hard look at the environmental impacts of the project and conduct further analysis in the form of the preparation of an EIS.

The harms to recreation will be long-term and permanent.

We are concerned the proposed project will have long-term, permanent impacts on recreation. The project will impact hiking, birding, biking, hunting, and scenic views. The disturbance from the proposed project will be seen from a vast array of locations including Harry[rsquo]s Ridge, Windy Ridge, Johnston Ridge, and the Mount Margaret Backcountry. The thumping sound associated with drilling and the construction of the gate will displace the quiet and tranquil nature of the landscape. Additionally, the proposal identifies Windy Ridge as a staging zone, which will lead to the closure of the ridge and any associated trails for the duration of the project. This closure also includes the popular mountain biking and hiking trail, the Plains of Abraham, that would be rendered inoperable for the foreseeable future. The Truman Trail will be most significantly affected by the project; both alternatives propose the trail will be closed for five years and turned into a gravel road[mdash]no longer resembling a hiking trail. The impacts to recreation are significant and do not consider the values of the Monument. We request the Forest Service consider an alternative that mitigates any impacts to recreation.

Conclusion

Based on the alternatives presented in the NOPA, and the absence of an EIS, we request that the Forest Service choose Alternative A, the no-action alternative, to protect the scientific and ecological value of the Monument. Without the release of the project file and the preparation of an EIS, CFC does not feel comfortable supporting an action alternative. However, with the above documentation and appropriate environmental review we could be amenable to supporting a proposed or modified alternative.

The Cascade Forest Conservancy appreciates your consideration of our comments.

Footnotes:

⁸ NOPA at 10.

9 CFC requested the project file on 12/19/19, the Forest Service declined the request and recommend CFC make an official FOIA request for the documents. CFC submitted a FOIA request on 01/03/20.

10 See

11 NOPA at 7.

16 Alternative B causes the destruction of five research plots; Alternative C cause the destruction of three research plots.

17 CFC comment extension request letter submitted as official comment.

18 36 C.F.R.[hellip]

19 Karuk Tribe of California v. U.S. Forest Service, 681 F.3d 1006, 1020 (9th Cir. 2012).

20 See 50 C.F.R. [sect] 402.01.

21 See 50 C.F.R. [sect]223, [sect]224.

22 Major, J.J., Grant, G.E., Sweeney, K., and A.R. Mosbrucker. 2019 (Draft). A multi-decade analysis of fluvial geomorphic evolution of the Spirit Lake blockage. U.S. Geological Survey. Open-File Report 2019-XXXX.

23 50 C.F.R. [sect]402.13(a), [sect]402.14(a)-(b).

24 50 C.F.R. [sect] 402.14(g),(h).

25 40 C.F.R. [sect] 1508.27(b)(9).

26 NOPA at 10.

27 NOPA at 11.

Letter from Dr. Carri LeRoy

January 13, 2020

Gifford Pinchot Forest Supervisor 987 McClellan Road

Vancouver, WA 98661

Subject: Spirit Lake Tunnel Intake Gate Replacement and Geotechnical Drilling Project Notice of Proposed Action

Dear Gifford Pinchot Forest Supervisor and Monument Ranger Hoffman:

I am writing to submit a substantive formal comment opposing all proposed actions for the Spirit Lake Tunnel Intake Gate Replacement and Geotechnical Drilling Project.

I am a stream ecologist and have been conducting research on terrestrial-aquatic interactions since 2001. I have published over 50 scientific articles, mainly on the influence of terrestrial and forest processes on stream ecosystems. I have been collaborating with USFS scientists to study the watersheds on the Pumice Plain of Mount St. Helens since 2015. I have an active \$225,000 National Science Foundation grant to do research at MSHNVM through 2021. The proposed road-building actions will negatively impact my ability to do this research and will significantly alter the course of successional development for the watersheds on the Pumice Plain.

It may seem like the streams on the Pumice Plain are just a few small channels that will not be negatively impacted by road-building and use; however, this is blatantly wrong. The streams on the Pumice Plain comprise some of the youngest watersheds on Earth. Five entire watersheds were formed following the eruption of 1980, and each consists of several tributaries. The entire watersheds are contained within the sensitive area of MSHNVM on the Pumice Plain.

The creation of watersheds de novo on the landscape is a very rare occurrence. On the Pumice Plain, we not only have watersheds that are very young (less than 40 years old), but there are replicate watersheds = 5 watersheds carving through the same unconsolidated pyroclastic and pumice material, flowing from springs that start on the mountainside and flow into Spirit Lake. There is not another location on Earth with this experimental set-up, and this is the reason the National Science Foundation as invested in this research [ndash] for its unique nature and the information we can gather at this specific site.

Although rivers may jump channels during floods and new stream reaches may be formed at other volcanoes, the lateral blast at Mount St. Helens created a unique landscape that allowed for the development of five entire watersheds. Building a road across the Pumice Plain would irreparably harm the development of these watersheds and negatively impact our research and our ability to explore in-stream primary succession.

Our preliminary research shows that these five watersheds are developing in different ways and we are just now figuring out why. The repeated disturbances created by road-building, vehicular traffic, and increased sedimentation would be a man-made influence on these systems that would significantly alter their evolutionary trajectories. The proposed Truman road route would cross multiple tributaries at their headwaters, effectively influencing all downstream communities. The removal of fragile riparian vegetation at road-crossings would significantly alter algal productivity and macroinvertebrate communities at these locations. Our research has shown that riparian canopy cover is one of the strongest predictors of in-stream algal, macroinvertebrate, and riparian vegetation communities across the Pumice Plain.

The research community involved in ongoing research at Mount St. Helens is in the midst of a major transition. Scientists involved immediately following the eruption have made their careers out of studying this unique lateral blast. New scientists are being encouraged to design studies and take over legacy research projects (New Yorker, August 5, 2015), and this proposed action will negatively impact the research of several new researchers just receiving funding and conducting new studies. This decision puts the legacy of research at Mount St. Helens in the crosshairs and could deal a fatal blow to new research programs just getting off the ground.

I have written previous letters in both 2017 and 2018 to oppose similar actions. I am disappointed that Monument Managers and Monument Rangers have not heeded the collective advice of the scientists that know this ecosystem and continue to push for short-sighted, ecologically damaging solutions to this problem. I have attended multiple meetings and wish for a more collaborative approach to solving this problem. There has still been not substantive involvement of the scientists conducting research in this process, despite promises that we would be involved.

The decision to use tracked vehicles for the drilling operations will have significant impacts on riparian and wetland plant communities, soil compaction, and landscape scarring. Tracked vehicular traffic will have negative

impacts on sensitive wetlands, increase invasive species spread, and result in significant riparian vegetation removal. Tracks left from tank transport on military lands take tens to hundreds of years to recover (Wilson 1988, Althoff et al. 2010). The drilling area is much more sensitive to this compaction and tracked vehicle movement than is represented in the decision.

The Truman Trail is so diminished in most places, that the new road to be built on top of it will need extensive earthwork. There are areas that will need to be blasted in the headwaters of Red Rock Spring, and the decision outlines some of the work that will need to be done to excavate each stream crossing. Each of these stream crossings will wash out every year and need to be re-excavated and re-built. The expense and numbers of construction hours will likely be greater than anticipated. The new UTV road to Duck Bay (built 8-29-18) had already washed out by 10-28-18 following a relatively small fall storm (8 cm of precipitation), and continued to wash out in 2019 despite being regraded. The decision does not outline a temporary road (as outlined in Decision #1, 2017), but instead a road across the Pumice Plain that will be maintained into perpetuity, impacting these stream systems continuously from construction onward. The proposed road building is not a limited pulse disturbance, but a continuous press disturbance in a fragile ecosystem.

Any time a vehicle or ATV drives across a stream it sends a plume of sediment, debris, and transplanted materials (abiotic and biotic) downstream. Depending on the water flow, sediment plumes from road crossings may take hours to days to dissipate and afterwards the aquatic system would be impacted for up to several months. Sediment disturbances can directly impact aquatic insects and fish, indirectly cause them to move downstream, increase turbidity, damage benthic habitat, and reduce hyporheic water exchange. The most recent NOPA discusses over 3500 vehicular trips on this new road! This is a very significant impact! The hydrology of these streams is not characterized well enough to be able to predict the influences of road building and sediment inputs throughout the year.

I talked with Erica Marbet, hydrologist for the Squaxin Island Tribe. She confirmed that summertime access roads will still affect the localized environment and downstream reaches all year round.

Compaction of the road surface will cause runoff and redirect the water over exposed rock and soil into to the most likely downstream locations. The result will be accelerated sediment transport and modified hydrology, even for a seasonal road. The parent material at Mount Saint Helens is unconsolidated and highly mobile. Streams below the road would most certainly be modified.

Building roads will increase the likelihood of spreading invasive plants across the Pumice Plain. Roads are known corridors for invasive plants in particular and waterways are one of the most susceptible environments to invasive organisms because of their relatively hospitable environment and downstream transport. New Zealand Mudsnailes (NZ mudsnails) are classified as prohibited species in the state of Washington. According to WA DFW, after moving into a lake or stream, these mudsnails are nearly impossible to remove without damaging other aspects of the habitat. [rdquo] (<https://wdfw.wa.gov/species-habitats/invasive/potamopyrgus-antipodarum>). Moving crews in and out of the area by vehicle increases the risk of spreading NZ mudsnails to all other watersheds on the Pumice Plain and throughout the region. Moving crews in and out by helicopter would significantly decrease this risk and quarantine procedures could be followed at the helicopter landing pad to disinfect all personnel. (strategies to prevent the spread of NZ mudsnails can be found: <https://wdfw.wa.gov/species-habitats/invasive/prevention>). Based on 5 years of research at Mount St Helens, we know that NZ mudsnails are only found in one of the five watersheds on the Pumice Plain. We have been very careful about our movements on the landscape and have kept them from spreading beyond their natural abilities to proliferate. The proposed actions will absolutely increase the spread of NZ mudsnails to currently unaffected watersheds. Based on their size, their ability to reproduce asexually, and the location of the drilling operations, there would be no way to avoid spreading their eggs.

The proposed drilling work will require the use of local water sources, which will dewater fragile stream

ecosystems, contribute to invasive species spread and could cause water contamination. Based on the maps provided, the proposed drilling locations overlap with the known distribution of the invasive New Zealand Mud Snail (discovered by our team in Camp Creek in 2016). The intake screen of 3/32 inch mesh would not exclude the eggs nor small adults of the New Zealand Mud Snail which is known to reside both in Spirit Lake and in the Camp Creek tributary closest to the drilling sites. Millions of these asexually reproductive snails are found in Spirit Lake itself, so water should not be taken from the lake, nor the streams closest to the drilling site or this invasive species will spread. This proposed drilling would most likely spread an invasive snail to nearby streams and the North Fork Toutle River.

This proposed action would negatively influence irreplaceable research and negatively influence both stream ecosystems and the Spirit Lake ecosystem. The road will be visible from Johnson Ridge Observatory and an eyesore that will cause controversy with the public. The new road will alter the hiking experience along the Truman Trail [ndash] the only current access to the Pumice Plain. Hiking access by the public would be limited for up to 5 years and over 3 miles of a popular trail, and one that is used consistently by the Mount St. Helens Institute and all of their educational programs. Based on poor communication with researchers in the past, it is also possible that researcher access to the Pumice Plain would be limited or curtailed during these five years, putting many research projects at risk.

Please make a decision to protect the natural landscape of the Pumice Plain, ongoing ecological research, and native ecological communities against the spread of non-natives.

According to Appendix A, the Drilling 2 alternative, [ldquo]It would be less feasible and illogical to develop two separate motorized routes. In addition, two separate routes would greatly increase the impact to the natural environment.[rdquo] In effect, this is what the Forest Service is proposing! Since it already built one motorized route to access Duck Bay from Windy Ridge, any further development of other motorized routes (along the Truman Trail or Boundary Trail) would [ldquo]greatly increase the impact to the natural environment,[rdquo] according to your own document.

Also according to Appendix A, building a road in a stream channel to access the Duck Bay route goes against a variety of federal and state regulations. [ldquo]The alternative component would be inconsistent with Aquatic Conservation Strategy guidance on Objective 2 (maintain and restore spatial and temporal connectivity within and between watersheds), Objective 3 (maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations), and Objective 5 (maintain and restore the sediment regime under which aquatic ecosystems evolved).[rdquo] All of these objectives would also not be met for the five watersheds across the Pumice Plain if the Forest Service moves forward with building a road along the Truman Trail.

(p.17) [ldquo]In the Mount St. Helens comprehensive management plan, the project area is not designated as an ecological critical area.[rdquo] I disagree. The MSH CMP was created in 1985. Today this area of MSH is clearly an ecologically critical area in terms of its unique setting (relatively recent eruption resetting the ecological stage), its global research significance (see publications, workshops, trainings, field trips by American and international scientists, etc.), and societal importance (public fascination with the eruption of MSH and its natural recovery). The determination of significant effects often requires professional judgment regarding the issue. In this case, the Pumice Plain has been very well-studied by many professional scientists who have already commented about the area being ecologically critical. I, myself, am a professional ecologist who has conducted work on the Pumice Plain since 2014 and I can attest that the area should be designated as an ecologically critical area and these proposed actions will result in significant impacts.

(p.15) Research issues: The proposed road will destroy a number of research plots directly due to the construction of the road. However, you are ignoring the much more pervasive indirect impact to all freshwater study areas in the Pumice Plain. Whether due to downstream flow, sediment transport, dust, seed dispersal,

wildlife displacement, noise, invasives, etc., there will be a large number of significant indirect impacts to the environment, and thus research areas, caused by building a road through the middle of the Pumice Plain. Currently the Pumice Plain has seen little man-made disturbance since 1982. The monument was established in part to allow the area to recover passively, and to be studied for research. Building a road to be used for up to 5 years will end this natural experiment. Once the road is built, the science that follows will never be able to differentiate between natural recovery and indirect effects from the road, thus effectively ending all natural succession-related research on the Pumice Plain.

Alternatives considered:

Drilling 2: Ground-based Johnston's Ridge Observatory Route

The reason for eliminating this alternative was that it was deemed not feasible for the gate replacement. [Idquo]in order to meet the need of the entire project an additional temporary road would need to be built for the gate operations. It would be less feasible and illogical to develop two separate motorized routes.[rdquo] Comment [ndash] You have already built a very large UTV road down the far eastern side of the Pumice Plain and this Duck Bay route can be used for gate replacement. It is now already disturbed so it will have less of an impact if you enlarge it for equipment. Also, that route avoids most of the unique and sensitive environment currently part of long-term monitoring or other research studies.

Drilling 3: Helicopter

Comment [ndash] This alternative [Idquo]meets the project need, reduces environmental effects, and is feasible[rdquo] according to your own analysis (page 5). The Monument should attempt this plan during the first summer of work prior to any construction. I understand that there is concern about weather limiting flight times, but that is unknown. Give it a try. If it fails, then go back to the other alternative.

Gate Replacement 1: Historic Route to Pump Station

[Idquo]Almost all activities would remain in the footprint of activities in the early 1980s.[rdquo]

Comment [ndash] This statement is misleading. The environmental and ecological state of the Pumice Plain today, compared to 38 years ago, is drastically different. This location is much more different than in other, non-eruption impacted environments because the Pumice Plain was reset (i.e., like a moonscape) at the time of eruption and the dynamic recovery of plants and animals changes every year. You are blatantly ignoring the expert opinion of a dozen professional landscape ecologists.

Gate Replacement 3: Duck Bay Utility-Terrain Vehicle Access Route

Comment [ndash]The rationales listed here for reasons against this route demonstrate very little actual knowledge of this ecosystem. These statements show your extreme lack of knowledge of the channels and their flow characteristics. The creek discussed here is not Forsyth Creek (that is farther west of this route). This route goes down a dry channel that was formed during the 1980 debris avalanche. The route has minor interaction with Red Rock creek that is a short seasonally flowing creek (i.e., very little water runs down this creek during the summer).

Finally, once again, the timing of this comment period highlights an attempt to push this decision through with as few public comments as possible. You sent out the NOPA on December 17th, with a 30- day comment period that included several major holidays. This is the third attempt to push through the same decision to build a road in one of the most fragile and unique habitats in Washington State and the contiguous USA.

Thank you,

Washington Native Plant Society