

Attachment D: Mitigation Measures to Minimize Environmental Harm

Mount Rainier National Park

Lahar Detection System Environmental Assessment

The following practices will be implemented under the selected alternative.

Geology and Soils

- U.S. Geological Survey (USGS) staff will travel on existing maintained and way trails when possible.
- USGS staff will travel cross-country over nonwoody plants using minimum impact/diffuse travel techniques and will walk on rock to the degree possible to avoid creating a new trail or widening impact areas in places where trails do not already exist or where they have been decommissioned (restored).
- Sites have been designed to be the minimum necessary size to enable installation of a functioning station.
- Helicopter landings will be the minimum number needed to safely insert personnel and equipment (as determined appropriate per site location).
- Helicopters will land on bare rock or snow wherever possible.
- Burying of seismometers will include naturalization of the surface to minimize the appearance of disturbance and potential added soil erosion.
- If trenching will occur on a slope, installation will include erosion control measures (e.g., soil bars, down woody debris, etc.) in consultation with the park geologist and/or vegetation specialist on site in order to reduce potential for soil loss and to support passive revegetation.
- Seismic stations will be located on barren areas where possible.
- Walking on the site and temporary storage of supplies will be on rock or barren ground rather than on plants or soil.
- Excavated rock and soil will be scattered to blend with the site.

Vegetation

- Site selection will avoid areas of intact vegetation with continuous cover.

- Where intact vegetation must be disturbed by digging, it will be carefully dug up and immediately replanted in a nearby barren area of similar habitat and thoroughly watered or replaced as the excavated area was filled in and thoroughly watered (if transplanting, the vegetation will cause no additional impacts on vegetation and soil).
- Equipment used for digging will be cleaned prior to entry into the Mount Rainier National Park (park) and before being used at other sites in the park to avoid the potential introduction of nonnative plants or pathogens or the transfer of soil organisms between sites. Example cleaning protocols include the Clean Equipment Protocol developed by Ontario Ministry of Natural Resources and Forestry (2016) and the U.S. Forest Service's Vehicle Cleaning guidelines (U.S. Forest Service 2005).
- Staff will clean all personal equipment and personal gear (e.g., boots, pack, and pant cuffs) following a park-approved protocol before entering the park and before moving between sites.
- Access trails to sites that are near areas of heavy existing seasonal visitor use will be camouflaged to discourage visitors from approaching the sites.
- If access to the sites requires travel through a recently revegetated area, then trampling of plants that have been planted will be avoided. Instead, access will avoid formerly existing user-defined (social) trails and will instead be cross-country over nonwoody, un-revegetated areas using minimum impact/diffuse travel techniques.
- On sites where surface rocks will be disturbed, rocks will be replaced in their original orientation after installation to retain lichen and nonvascular plant habitat with the least amount of disturbance.
- When working in a vegetated area, park vegetation specialists will be advised as sites are delineated to provide input on salvage and recovery from plant disturbance.
- Trenching will avoid the critical root zones of trees, as possible. Critical root zones can be estimated as 1 foot for every 1 inch of tree basal diameter (approximately 10 centimeters (cm) for every 1 cm of tree diameter). When avoiding critical root zones is not possible, impacting less than 25 percent of the critical root circumference will minimize impacts.
- No trenching will occur in the critical root zones of whitebark pine. This is defined as 1.5 feet for every 1 inch of tree diameter.
- Vegetation staff will be provided with a detailed map of the extent of site ground disturbances to follow up on treatments for any potential weed introductions in those areas.

Wildlife

- To the extent possible, installation and maintenance activities will be timed to avoid sensitive periods, such as nesting seasons.

- Aircraft will attempt to avoid disturbance to wildlife. If animals are observed within 500 feet of a station (this is the usual distance for elk surveys), the team will evaluate postponement of the site visit and measures to ensure the safety of staff and wildlife.
- To avoid the potential for disturbance, USGS staff will generally hike in for repairs to the lahar monitoring sites, except for rare occasions when emergency repairs may be necessary.
- In addition to meeting all Federal Aviation Administration and National Park Service (NPS) helicopter policy and aircraft requirements, mitigation common to all alternatives for both fixed-wing and helicopter flight paths will include maintaining a 2,000-foot vertical or horizontal clearance whenever feasible and no hovering, circling, harassing, or pursuing wildlife in any way.
- If an active wolf den or rendezvous site becomes established, no ground-disturbing work or helicopter landings will occur within 0.25 mile, as needed, until wolves are no longer using the area.

Special Status Species

- Helicopter transport of equipment, materials, and personnel to the sites will occur after Labor Day, at the end of the nesting season for both marbled murrelets and northern spotted owls and after most juveniles have fledged.
- For sites below 3,800 feet in elevation (Mount Wow and Tahoma Vista Overlook) and for helicopter flights from the Kautz Helipad, project activities will begin 2 hours after official sunrise and cease 2 hours before official sunset to avoid potential disruption to marbled murrelets during peak activity periods for feeding and incubation exchanges. This restriction will apply to the marbled murrelet nesting period from April 1 through September 23.
- Helicopter flights will avoid the Carbon, Puyallup, and Mowich River valleys by flying at 2,000 feet and will begin flying after Labor Day to avoid impacts on both visitors and reduce the potential for impacts on nesting marbled murrelets and northern spotted owls.
- Sites below 4,800 feet in elevation (Mount Wow, Tahoma Bridge, and Tahoma Vista Overlook/Tahoma Vista Ridge) will be installed after September 23 to minimize impacts on nesting spotted owls and marbled murrelets.
- Helicopter flights will occur a minimum of 2,000 feet above ground level except during takeoff, approach, and landing in accordance with park recommendations for avoiding impacts.
- After sites are installed, routine and other maintenance will occur either by foot or, in the event of equipment malfunction at a site, by helicopter, with helicopter-based maintenance occurring only after Labor Day.
- Construction personnel will be informed of the occurrence and status of special status species (including federally listed species) and will be advised of the potential impacts on the species and potential penalties for taking or harming a special status species.

- Feeding or approaching wildlife will be prohibited.
- To the extent possible, current year spotted owl surveys will be performed and preliminary results completed in early June of that year. Active owl territories will be based on the most recent information available and may change during a season as new information is gained. If surveys reveal activity centers have shifted, then construction limitations will be adjusted accordingly.

Archeological Resources

- Archeological monitoring will occur during installation of equipment where prior archeological investigations indicate this need (i.e., Copper Mountain, Ararat South, Tahoma Vista, and Emerald Ridge).
- Should unknown archeological resources be uncovered during construction, work will be halted in the discovery area, the park archeologist contacted, the site secured, and the park will be consulted according to 36 Code of Federal Regulations 800.11 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990. In compliance with this act, the NPS will also notify and consult concerned tribal representatives for the proper treatment of human remains, funerary objects, and sacred objects should these be discovered during the course of the project.

Historic Structures / Cultural Landscapes

- Equipment will be placed to minimize visibility in or into the Mount Rainier National Historic Landmark District (NHLHD) to the extent practicable.
- Where possible, the antenna on the seismic stations will be installed in such a way as to not protrude beyond the silhouette/horizon of the ridge.
- Antennas and equipment boxes will be painted with appropriate colors to blend in with each environment in consultation with the park historical landscape architect.
- The equipment boxes will be painted a neutral color (as selected by the park historical landscape architect) to blend into most landscapes including a variety of steep, rocky, and alpine settings.
- Because the project may affect historic structures that contribute to the NHLHD, the NPS must consider the effects of the undertaking on historic properties and afford the State Historic Preservation Office (SHPO) an opportunity to comment on the potential effects of the project on the NHLHD and contributing structures. If consultation results in a determination of adverse effect, the NPS, in consultation with the SHPO and other consulting parties, will work to minimize or mitigate the effects of the undertaking on historic properties.

Visitor Use and Experience

- Helicopter installation flights will occur after Labor Day and will be a minimum of 2,000 feet above ground level in accordance with park recommendations for avoiding impacts.

- An approved Helicopter Use Plan and Aviation Safety Plan will be completed by the USGS at least 2 weeks prior to any helicopter flights.
- As appropriate, flight path suggestions or requirements will be made by the park to minimize impacts on wildlife and visitors.
- Monitoring stations will be located or concealed away from primary visitor use areas to the extent possible.
- USGS-contracted flights will be under USGS helibase management but will be supported by NPS communications center operations and staffing (crews) as appropriate.
- Signs will be posted on the station equipment explaining its purpose and listing a person to contact if visitors to the site have any questions.
- As appropriate, areas exposed on the surface will be covered with rocks gathered from the vicinity of the station, or with excavated rocks.
- A USGS flight manager will be on-site during all flight operations, and all personnel involved in helicopter operations will be fully trained to USGS and Department of the Interior (DOI) standards. The helicopter and pilot will be DOI Office of Aviation Services certified for working in mountainous terrain, snow landings, working with external loads, and other aspects specific to working at Mount Rainier.
- See also measures listed under *Wilderness* below.

Wilderness

- The USGS will submit an Aviation Safety Plan and Operations Plan to the park for approval as part of this project, specifying the number of landings and hours of flight time over wilderness.
- Guidelines set forth by the Aviation Safety Plan and Operations Plan will be followed.
- Flights will only be authorized consistent with an approved wilderness Minimum Requirements Analysis (MRA) and decision.
- Access to sites will be by foot unless specific hazards exist that prevent safe access (e.g., considerable or higher avalanche danger or exposure to steep icy slopes or crevasses). Physical fitness will not be a primary consideration for authorizing crew transport by aircraft.
- In planning flight paths, all feasible measures will be undertaken to avoid and minimize impacts on wilderness visitors, including no flights on weekends and restricting planned flights to fall after Labor Day. However, the USGS estimates up to two helicopter flights may be needed annually for emergency maintenance, based on their experience with other installations.
- Observation flights (i.e., site orientation; project showcasing) not directly in support of installation or maintenance are not authorized by the Environmental Assessment (EA) and must be authorized through a separate MRA.

- A park liaison role will be used to ensure coordination between the USGS and NPS.
- Researchers will use the principles of Leave No Trace impact minimization techniques in installing the sites.
- No rock shelters or other evidence of camping at the monitoring stations will be added or used.
- Travel and camping will be on snow-hardened or nonvegetated surfaces to the extent possible.
- Annual reviews of helicopter operations will be conducted jointly by the NPS and USGS.

References

- Ontario Ministry of Natural Resources and Forestry. 2016. Clean Equipment Protocol. Inspecting and cleaning equipment for the purposes of invasive species prevention. Best Management Practices in Ontario. http://www.ontarioinvasiveplants.ca.php56-30.ord1-1.websitetestlink.com/wp-content/uploads/2016/07/2016-Clean-Equipment-Protocol_Feb-17-2016.compressed.pdf. Last accessed December 16, 2020.
- U.S. Forest Service. 2005. Vehicle Cleaning Technology for Controlling the Spread of Noxious Weeds and Invasive Species. United States Department of Agriculture Forest Service Technology & Development Program. <https://www.fs.fed.us/eng/pubs/pdf/05511203.pdf>. Last accessed December 16, 2020. October.