

Supplement Analysis
for the
Columbia River Basin Tributary Habitat Restoration EA
(DOE/EA - 2126/SA-32)

Pine Creek Conservation Area
Aerial Vegetation Management
BPA project number 1998-022-00

Bonneville Power Administration
Department of Energy



Introduction

In December 2020, Bonneville Power Administration (BPA) and the Bureau of Reclamation completed the *Columbia River Basin Tributary Habitat Restoration Programmatic Environmental Assessment* (DOE/EA 2126) (Programmatic EA). The Programmatic EA analyzed the potential environmental impacts of implementing habitat restoration actions in the Columbia River Basin and its tributaries.

Consistent with the Programmatic EA, this supplement analysis (SA) analyzes the effects of a proposed aerial vegetation management project (Project) that would suppress invasive plant species with herbicide and revegetate the treated area with native species at the Pine Creek Conservation Area (PCCA) in Wheeler County, Oregon. Aerial herbicide applications are needed to manage larger and inaccessible plots of invasive annual grasses that cannot be practically treated by ground-based methods.

The SA analyzes the Project's site-specific impacts and determines if it is within the scope of the Programmatic EA's analysis. This SA also evaluates whether the Project presents significant new circumstances or information relevant to environmental concerns that were not addressed in the EA. The findings of this supplement analysis determine whether additional National Environmental Policy Act (NEPA) analysis is needed pursuant to 40 Code of Federal Regulations (CFR) § 1502.9 (d) and 10 CFR § 1021 *et seq.*

Proposed Action

BPA proposes to fund the Confederated Tribes of Warm Springs of Oregon (Confederated Tribes of Warm Springs) to implement an aerial vegetation management project on the PCCA. Owned by BPA and managed by the Confederated Tribes of Warm Spring, the PCCA is a 34,000-acre fish and wildlife habitat mitigation site near Fossil in Wheeler County, Oregon. The PCCA is located within the lower John Day River watershed in the Clarno Basin, bordered to the west by the John Day River and the Spring Basin Wilderness Area, which is managed by the Bureau of Land Management (BLM); to the northeast by the Clarno Unit of the Joh Day Fossil Beds National Monument, which is managed by the National Park Service (NPS); and to the east and south by primarily privately owned land. The PCCA lies within an area of generally steep and rugged topography characterized by numerous canyons and plateaus and little flat terrain. Floodplains exist along major streams and the John Day River, but occupy a small percentage of the land area. Elevations on the property range from over 4,000 feet to approximately 1,300 feet at

the mouth of Pine Creek. The terrain is comprised of grasslands, shrub steppe, woodlands, and riparian habitats. Although some native flora and fauna remain, historical agriculture practices have resulted in eroded streams and highly degraded vegetation communities with areas of invasive plant monocultures.

One of the PCCA's most prevalent invasive species is medusahead (*Taeniatherum caput-medusae*) which is one of the most substantial stressors to rangeland ecosystems in the Pacific Northwest. Medusahead not only outcompetes native species for resources, it also changes the ecosystem, resulting in decreased biodiversity, degraded wildlife habitat, and increased wildfire risk. Treatment with Imazapic has proven effective at controlling medusahead in central Oregon so that native bunchgrass communities can be established.¹ The aerial herbicide treatment would reduce competition with native vegetation, improve habitat conditions, and reduce vulnerability to fire within the PCCA, which would benefit Endangered Species Act (ESA)-listed bull trout (*Salvelinus confluentus*), Middle Columbia River steelhead (*Oncorhynchus mykiss*), and wildlife.

The Project area comprises four plots totaling about 1,200 acres that BPA selected based on their large size, degree of infestation, and limited access. BPA chose south-facing slopes displaying a monoculture of medusahead, prioritizing those that had an intact bunchgrass community on the northern side. Consistent with the Programmatic EA, the Project would involve aerial applications of herbicide and drift retardant from a helicopter traveling approximately 30 to 45 feet above the ground or 10 feet above the tree canopy and using boom-mounted nozzles for liquids. Flights would originate from and return to Madras Airport, approximately 15 minutes flight time from the Project area. In addition, an emergency landing site has been identified along the Shaniko-Fossil Highway, but would not be used except in the unlikely event that an emergency landing is necessary. Prior to aerial treatment, 22 acres would be pre-treated with harrowing and raking to reduce medusa head thatches on the surface. Pre-treatment sites would be accessed by foot and all-terrain vehicles. The duration of herbicide application by helicopter is expected to last less than four hours. Aerial treatment would occur in late fall outside of designated hunting seasons.

Additionally, vegetation management activities would adhere to the following stipulations to avoid ESA-listed species and critical habitat and to minimize the potential for damage to non-target vegetation or the movement of chemicals out of the Project area:

- A drift control agent (Liberate) would be added to herbicides at the manufacturer's recommended rate
- Herbicide would not be applied when wind speed is less than 3 mph or greater than 10 mph
- Herbicide would not be applied during humidity or surface temperature inversions
- Herbicide would not be applied to stream-adjacent slopes steeper than 25%
- Herbicide would not be applied when the air temperature exceeds 80°F
- Herbicide would not be applied within 300 feet of springs
- Herbicide would not be applied within a half mile of the John Day River or Pine Creek

Aerial herbicide application would incorporate the mitigation measures listed in the Programmatic EA.

¹ Butler, M. Brummer, F. Simmons, R. 2010. Restoring Central Oregon Rangeland from Ventenata and Medusahead to a Sustainable Bunchgrass Environment-Warm Springs and Ashwood. Central Oregon Agricultural Research Center Annual Report.

Proposed Herbicides

The Project would use a mixture of the herbicide Imazapic (Trade name Plateau, BASF Corporation; Research Park, NC) and the surfactant and drift retardant Liberate (Loveland Products; Loveland, CO). Imazapic is a selective pre-emergent herbicide that prevents germination of winter annual grasses. Imazapic is non-toxic to terrestrial and aquatic mammals, birds, and amphibians, and does not bio-accumulate in organisms. Imazapic is non-toxic to fish and rapidly degrades in water.² The herbicide would be dispersed at a rate of six ounces per acre and would not exceed the maximum application rate limits of 0.189 pounds of active ingredient per acre, as analyzed in the Programmatic EA. The adjuvant and drift retardant Liberate would be added in accordance with the manufacturer's specifications to increase herbicide uptake by the target invasive grass and to reduce the risk of non-target herbicide effects due to drift.

This project would support BPA's commitments to the Confederate Tribes of the Warm Springs Reservation under the 2020 Columbia River Fish Accord Extension agreement, while also supporting ongoing efforts to mitigate for effects of the Federal Columbia River Power System on fish and wildlife pursuant to the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act) (16 U.S.C. 839 *et seq.*).

Environmental Effects

The Project is consistent with the actions considered in the Programmatic EA, which represent well-established aquatic and terrestrial restoration techniques that have been applied throughout the Columbia River Basin and have been demonstrated to be effective in the support and restoration of aquatic and upland species and habitats. Specifically, the Project actions were considered in Section 2.1.3 (*Invasive Plant Control and Vegetation Management*).

Below is a description of potential site-specific Project effects and an assessment of whether they are consistent with those described in the Programmatic EA.

1. Fish and Aquatic Species

Effects of aerial herbicide treatments within the PCCA are consistent with the Programmatic EA's analysis in Section 3.3.1.2.2.3 (*Invasive Plant Control and Vegetation Management Effects on Aquatic Species*) and Section 3.3.1.3 (*Effects Conclusion for the Proposed Action on Fish and Aquatic Species*) which describe low impacts to fish and aquatic species after considering minimal short-term adverse effects and beneficial long-term effects.

Two ESA-listed aquatic species occur in the Project area: Mid-Columbia River steelhead and bull trout. Mid-Columbia River steelhead, listed as threatened, may be present in the John Day River and Pine Creek. Bull trout, also listed as threatened, may be present in the mainstem John Day River as occasional migrants, but there is no record of spawning, rearing, or foraging occurring near the Project area. BPA has made the determination that the Project would have No Effect to ESA-listed species and

² Tu, M., Hurd, C., & Randall, J. M. (2001). *Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas*. Wildland Invasive Species Team, the Nature Conservancy.

critical habitat. The rationale for this determination is documented in a No Effect Memorandum dated July 26, 2022.

The Project would apply herbicide mixed with Liberate (a drift retardant and surfactant containing lecithin, methyl esters of fatty acids, and alcohol ethoxylate) at label-recommended rates. Sources (ENSR and BLM, 2005) found that acute toxicity to aquatic life for surfactants and anti-foam agents ranged from 1 to 10 mg/L. At the proposed application rate, the maximum predicted concentration in surface waters would be far below the chronic toxicity value for nonionic surfactants (0.1 mg/L), and even far below the range for behavioral and physiological effects (0.002 to 40.0 mg/L; ENSR and BLM 2005).

There would be no spraying in areas with flowing streams, standing water, or springs. A half-mile buffer would be maintained between herbicide application and all surface water, including Pine Creek and the John Day River. Aerially spraying would be conducted at least 300 feet from springs. Aerial spraying would not occur within 48 hours of potential rainfall events. These conservative buffers would prevent Imazapic from entering the water at any concentrations. According to the Ecological Incident Information System (EIIIS) database run by the United States Environmental Protection Agency Office of Pesticide Programs, Imazapic has been associated with only one reported “ecological incident” involving damage or mortality to non-target flora (ENSR and BLM, 2005). In this case, Imazapic was used along with other herbicides which are not proposed for use in this action.

Study results for both cold water and warm water fish species failed to demonstrate adverse effects to Imazapic concentrations of 100 mg/L. This concentration is many orders of magnitude higher than what could occur in surface waters as a result of off-site transport from the proposed project with half-mile buffers in place. The BLM Ecological Risk Assessment for Imazapic (ENSR and BLM, 2005) predicts essentially no risks for non-target terrestrial plants, non-target aquatic plants in streams, fish, aquatic invertebrates, or piscivorous birds when Imazapic is applied at appropriate rates with buffers in place to prevent direct spraying of surface water.

Because fish and aquatic invertebrates would not be directly impacted by herbicide concentrations in the stream, steelhead and bull trout would not be indirectly affected by a reduction in prey. The buffers applied to streams and the low concentration of Imazapic and adjuvant proposed would prevent acute effects to the aquatic invertebrates and other fish constituting the prey base for steelhead and bull trout. Although non-target terrestrial and aquatic plants can be adversely affected by application of Imazapic for the control of invasive plants, adherence to defined application rates and half-mile stream buffers would eliminate potential effects on non-target riparian plants and associated indirect effects on species that depend on those plants for food, habitat, and cover.

Imazapic is non-toxic to terrestrial and aquatic mammals, birds, and amphibians. It has an average half-life of 120 days in soil and is rapidly degraded (one-to-two-day half-life) by sunlight in aqueous solution (Tu et al. 2001). Imazapic binds readily to soil particles. The project would be implemented in an arid region with low rainfall, reducing the mobility of the herbicide and the attendant risk of it being transported overland by water. The primary risk of off-site migration stems from the erosive movement of the soil to which it is bound. The proposed treatment would be exclusively applied aerially by helicopter, eliminating the risk of soil erosion that might result from ground based treatment.

Herbicide concentrations typically peak and fall over a very short period of time following application; although herbicide in surface runoff can reach stream channels rapidly, it can also be completely

removed from runoff that trickles a long distance through interception with vegetation and organic debris (NMFS 2012)³. Imazapic applied over the treatment area would have substantial time delays between application and weather events (weeks to months), long distances to cover (a half mile), and minimum overland flow (from infrequent rainfall events with large volumes of water). These factors would prevent or impede its transport to open bodies of water.

The potential for surface runoff in the Project area would also be minimized by mitigation measures that prohibit herbicide application when there is rain, snow, or fog, and that require spray buffers around water bodies and stream channels. These measures would reduce the potential for surface run-off to enter water bodies to discountable levels. The low rainfall in the area, however, is not conducive to the transport of Imazapic very far beneath the ground surface, and studies show it leaches to depths of only 18" even in sandy soils (Tu et al 2001).

The anticipated amount of activity and the level of impacts to aquatic species associated with this Project are consistent with the analysis in the Programmatic EA found at Section 3.3.2.2 and 3.3.1.2.2.3, which concluded there would be low to moderate impacts to aquatic and fish species.

2. Water Resources

There would be no effect to water quantity, as these actions make no water withdrawals.

The effects of aerial herbicide treatments within the PCCA would be consistent with the analysis in Programmatic EA found at Section 3.3.2, which describes overall low impacts to water quality after considering moderate short-term adverse effects and beneficial long-term effects.

Many factors affect herbicide mobility and the likelihood that it would impair surface or groundwater quality, including the manner, amount, frequency, and timing of application, and the chemical properties of the herbicide. As described in the Programmatic EA, these are short-term effects which would be lessened by the application of mitigation measures. Appendix C of the Programmatic EA lists mitigation measures specific to aerial herbicide applications. The Confederated Tribes of Warm Springs would adhere to measures that are more conservative than those in the EA and that would meet or exceed the requirements of the EA, including by creating no-spray buffer zones and abstaining from aerial herbicide application if wind velocities exceed 6 mph and/or during periods of adverse weather conditions such as snow, wind, and rain. The Confederated Tribes of Warm Springs would also limit aerial applications to 1,200 acres/year. Overall, this combination of application methods and mitigation measures would result in little to no herbicide entering waterbodies and would be low and less of an impact than the moderate short-term adverse effects described in the Programmatic EA.

3. Vegetation

The effects of applying herbicides aerially within the PCCA are consistent with the analysis in Section 3.2.3.2 of the Programmatic EA, which concludes that impacts to "target" and "non-target" vegetation that is directly sprayed would likely be high—since killing vegetation is the purpose of the action—but

³ National Marine Fisheries Service (NMFS) 2012. Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation. Cottonwood BLM 10-year Noxious Weed Control Program (20 1 1 -2022). NMFS Consultation Number: 20 1 1 | 0 59 59.

that application of the prescribed mitigation measures would minimize exposure of non-target species outside of any treatment area such that effects there would be low to moderate.

Upland areas of the PCCA are dominated by shrub-steppe vegetation. Past agricultural practices, extensive livestock grazing, and fires primarily influenced present habitat conditions, likely facilitating the spread of invasive species such as medusahead and other exotic annual grasses. The Project aims to control medusahead to facilitate the recovery of historically present native bunchgrass communities, which are more diverse, less fire-prone, and provide better wildlife habitat than monocultures of medusahead.

The Oregon Data Portal shows one species of Oregon state-listed threatened vascular plants—arrowleaf thelypody (*Thelypodium eucosmum*)—may be present in Wheeler County.⁴ Arrowleaf thelypody is endemic to tributaries of the John Day River and occurs with western junipers along streambanks, seasonally moist areas, seeps, and under isolated juniper trees away from obvious moisture. The half-mile buffers from proposed aerial herbicide application areas and the John Day River and its tributaries would help minimize the chances of spraying tributaries where it is likely to occur, to the extent that this species is present within the PCCA. No ESA-listed plant species are located within the action area, therefore BPA has determined that there would be No Effect to listed plant species as a result of this project.

Over the long term, the Project's effects to vegetation would be restoration, improvement, or maintenance of native plant communities, consistent with the Programmatic EA.

4. Wetlands and Floodplains

Much of the PCCA is dominated by grassland and shrub-steppe vegetation, with low annual precipitation. Wetland areas are limited to riparian areas along Pine Creek and the John Day River as well as near springs. Half-mile herbicide application buffers would be applied to the John Day River and Pine Creek and buffers of 300 feet would be applied to any springs within the treatment area. These buffers would prevent herbicide applications in wetlands and floodplain areas.

The effects of applying herbicides aerially on the PCCA are consistent with the analysis in the Section 3.3.4 of the Programmatic EA (*Wetlands and Floodplains*). Section 3.3.4.3 of the Programmatic EA states that herbicide application would have either inconsequential or non-existent short-term adverse effects but long-term beneficial effects as non-native plant species are removed and native plant species are allowed to reestablish.

5. Wildlife

The effects of using aerial herbicide treatments within the PCCA are consistent with the analysis in the Section 3.2.3.2.1 of Programmatic EA (*Herbicide Applications and Terrestrial Species*) which concludes that wildlife impacts are unlikely to be lethal despite potential herbicide exposure because application rates of the proposed herbicides would not reach known levels of toxicity. Additionally, chronic exposure is unlikely given the short, singular, annual seasons of proposed application and the naturally short lifespans of small animals likely to be directly exposed. Wildlife in the area may be disturbed by noise from helicopter use, however the proposed herbicide application by helicopter is expected to last less than 4 hours. Impacts to wildlife from noise would be brief due to the short duration of the

⁴ Retrieved from <https://data.oregon.gov/dataset/Oregon-listed-plants-by-county-map-view/>, August 2022

proposed action. No ESA-listed wildlife species are located within the action area, therefore BPA has determined that there would be No Effect to listed plant species as a result of this project.

As noted in Section 3.2.3.2.1 of the Programmatic EA, small resident mammals such as mice would likely be present during herbicide application and could receive direct contact, while medium and large-sized mammals (such as coyotes and elk or deer) would likely flee the site before that could happen. Foraging and other behaviors could be temporarily disrupted, but the disturbance would be of short duration and also infrequent, making it unlikely that the Project would result in changes in survivorship or reproductive success. Effects on wildlife would be moderate, which is consistent with expected impacts presented in the Programmatic EA.

6. Geology and Soils

The effects on the PCCA of aerial herbicide application are consistent with the analysis in Section 3.3.6 of the Programmatic EA, which states that herbicide use may adversely affect soils.

Studies generally indicate that the impacts of herbicide application on soil function are only minor and temporary. No effects to geology are anticipated. Though short-term impacts to soil are anticipated, the long-term effects of these restoration actions would ultimately improve soil quality and productivity with low overall impacts. Invasive annual grasses such as medusahead rye displace native communities of perennial bunchgrasses. Native perennial grasses have much more extensive root systems that persist longer and add more structure and organic materials to soils. Invasive annual grasses can also increase fire frequency and intensity by increasing fine fuel loads. More intense and frequent fires can damage soils and increase erosion. Herbicide would not be applied from soil disturbing vehicles such as all-terrain vehicles. The effects of the proposed project on geology and soils would be low due to the exclusive use of helicopters for herbicide application and the promotion of native bunchgrass communities and reduction of fire-prone invasive plant populations.

7. Transportation

The effects of aerial herbicide treatments would be less than those discussed in the analysis in Section 3.3.7 of the Programmatic EA, which describes low impacts to transportation.

The Project would not impact any roads, whether open closed, public, or private. No roads would be closed, temporarily blocked, or relocated. This level of impact would be less than the low impact that was described in the Programmatic EA.

8. Land Use and Recreation

The Project would have little to no effect on land use or recreation in the PCCA, neither of which would change as a result. The treatment area is used by subsistence and recreational hunters, however the Confederated Tribes of Warm Springs controls access to the PCCA and would coordinate herbicide application to avoid authorized hunting activities. Recreational opportunities would be suspended during application, however this is expected to last less than 4 hours.

This level of effect is consistent with that described in Section 3.3.8.3 of the Programmatic EA (*Effects Conclusion for the Proposed Action on Land Use and Recreation*) which states that land use practices underlying project sites would not be changed for most projects.

9. Visual Resources

The effects of aerial herbicide treatments in the PCCA are consistent with the analysis in Section 3.3.9 of the Programmatic EA (*Visual Resources*). Section 3.3.9.3 of the Programmatic EA (*Effects Conclusion for the Proposed Action on Visual Resources*) describes low impacts to visual resources.

The proposed aerial herbicide treatments in the PCCA would be administered in remote, hard-to-access areas and thus would be visible to few, if any, landowners and recreational users. As discussed above under “Vegetation,” there would be no large-scale soil disturbance (as the Programmatic EA assessed for some other projects), and changes to the visual landscape—which would thus last for only several months or a year at most as native vegetation reclaims the treatment areas—would be nearly undetectable to most viewers. This level of Project impact would be low, consistent with the Programmatic EA.

10. Air Quality, Noise and Public Health and Safety

The effects of the proposed Project are consistent with the analysis in Section 3.3.10 of the Programmatic EA (*Air Quality, Noise, and Public Health and Safety*). Section 3.3.10.3 of the Programmatic EA (*Effects Conclusion for the Proposed Action on Air Quality, Noise, and Public Health and Safety*) describes low impacts to air quality, noise, and public health and safety.

Human exposure to herbicides would be unlikely because aerial treatments would be focused on remote, inaccessible areas of the PCCA. The Confederated Tribes of Warm Springs controls access to the PCCA and would coordinate herbicide application to avoid authorized hunting activities. Half-mile buffers from surface water would prevent herbicide or adjuvant from entering Pine Creek or the John Day River. As noted in Section 3.2.3.2.3 of the Programmatic EA (*Herbicide Applications and Human Exposures*), workers likely to be exposed to the herbicides through handling and application would be protected by appropriate personal protective equipment. Mitigation measures would prevent or minimize exposure, and if it did occur, the low herbicide concentration and toxicities would have correspondingly low effects on humans.

Aircraft operations and emissions would temporarily affect air quality and noise levels, but only briefly and likely too far away from any population area to be heard or seen, and without creating any long-term emissions or noise sources. No proposed action has the potential to impact public safety infrastructure (e.g., roads, telecommunications) or burden emergency services (police, fire, ambulance, etc.). This level of Project impact would be low, consistent with the impacts discussed in the Programmatic EA.

11. Cultural Resources

BPA initiated consultation for Section 106 of the National Historic Preservation Act (NHPA) on March 22, 2023, (BPA Cultural Resources Project Number OR 2022 020) seeking comment from the consulting parties on a determination of “no adverse effect to historic properties.” The consultation letter was sent to the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes of the Umatilla Indian Reservation, and the Oregon State Historic Preservation Office (SHPO).

No response was received from the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes of the Umatilla Indian Reservation, or the Oregon SHPO.

In the unlikely event that cultural material is inadvertently encountered during the implementation of this project, BPA would require that work be halted in the vicinity of the finds until they can be inspected and assessed by BPA and in consultation with the appropriate consulting parties.

Impacts to cultural resources are consistent with the Tributary Habitat EA analysis in Section 3.3.11 (*Effects to Resources by Resource Type – Cultural Resources*). Therefore, the implementation of the proposed project would result in no adverse effect to historic properties and effects to cultural resources would be low.

12. Socioeconomics and Environmental Justice

The effects of these invasive plant treatments throughout the PCCA are consistent with the analysis in Section 3.3.10 of the Programmatic EA, which describes low impacts to socioeconomics and environmental justice.

As described in the Programmatic EA, none of the herbicide treatments would require additional permanent employees or for any individuals to leave or relocate within the local area. There would be no effect on housing available for local populations. These actions would not displace people or eliminate residential suitability from lands being restored, or from lands near restoration project sites. The treatments would generate short-term employment for those directly implementing the herbicide treatments and would provide small short-term cash inputs to local businesses for fuel, equipment, and meals. This degree of effect would be low.

There are no environmental justice populations present that could be affected, as these projects and their impacts are limited to the public lands on which they are located, and no offsite effects are anticipated that could impact such populations elsewhere. Overall, no permanent adverse effects to environmental justice populations are expected because this is tribally-managed land and although herbicide activities may exclude use in the remote areas temporarily, other areas would be accessible. The overall effects of this project would be consistent with those evaluated in the Programmatic EA.

13. Climate Change

The effects of these invasive plant treatments throughout the PCCA are consistent with the analysis in Section 3.3.14 of the Programmatic EA, which describes low impacts to climate change.

The Project would have a low level of effect on climate change consisting of short-term emissions from aircraft operations during implementation of the herbicide treatments, but these would be offset to some degree by the ameliorating effects of vegetation regrowth by native species following treatments and the increased carbon sequestration in expanded and improved native bunchgrass communities. The overall effects on climate change would be low, which is consistent with the Programmatic EA.

Findings

BPA finds that the types of actions and the potential impacts related to the proposed Pine Creek Conservation Area Aerial Vegetation Management Project are similar to those analyzed in the Columbia River Basin Tributary Habitat Restoration Programmatic Environmental Assessment (DOE/EA-2126) and Finding of No Significant Impact. There are no substantial changes in the EA's Proposed Action and no significant new circumstances or information relevant to environmental concerns bearing on the EA's

Proposed Action or its impacts within the meaning of 10 CFR § 1021.314(c) (1) and 40 CFR §1502.9(d). Therefore, no further NEPA analysis or documentation is required.

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