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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R1–ES–2024–0121; FXES1111090FEDR–267–FF09E21000]

RIN 1018–BH31

Endangered and Threatened Wildlife and Plants; Threatened Species Status with Section 4(d) Rule for the Cascade and Columbia Torrent Salamanders

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list the Cascade torrent salamander (*Rhyacotriton cascadae*), a species endemic to the western slope of the Cascade Range in Washington and Oregon, and the Columbia torrent salamander (*Rhyacotriton kezeri*), a species endemic to the Coast Range in Washington and Oregon, as threatened species under the Endangered Species Act of 1973, as amended (Act). This determination also serves as our 12-month finding on a petition to list the Cascade torrent salamander and the Columbia torrent salamander. After a review of the best scientific and commercial data available, we find that listing these species is warranted. Accordingly, we propose to list the Cascade torrent salamander and Columbia torrent salamander as threatened species with a rule issued under section 4(d) of the Act ("4(d) rule"). If finalized as proposed, this rulemaking action would add these species to the List of Endangered and Threatened Wildlife and extend the Act's protections to the two species. We find that designating critical habitat for this species is not determinable at this time.

DATES: Comments will be accepted on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. Comments submitted

electronically using the Federal eRulemaking Portal (see **ADDRESSES**, below) must be received by 11:59 p.m. eastern time on the closing date. We must receive requests for a public hearing, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

To ensure your comment is received and considered, you must submit it using one of the methods identified in the **ADDRESSES** section of this document. Comments submitted through any method not authorized in this document, or sent to an address not listed here, will not be considered.

ADDRESSES: *Comment submission:* All submissions must include the docket number (FWS–R1–ES–2024–0121) for this document. You must submit comments using one of the following methods:

(1) *Electronic submission*: Federal eRulemaking Portal at: https://www.regulations.gov. In the Search box, enter FWS–R1–ES–2024–0121, which is the docket number for this rulemaking. Then, click on the Search button. On the resulting page, you may submit a comment by clicking on "Comment." Please ensure that you have found the correct document before submitting your comments.

(2) *U.S. mail*: Public Comments Processing, Attn: Docket No. FWS–R1–ES–2024–0121, Policy and Regulations Branch, U.S. Fish and Wildlife Service, MS: PRB (JAO/3W), 5275 Leesburg Pike, Falls Church, VA 22041–3803.

Comments submitted through any method not authorized in this document, or sent to an address not listed here, will not be considered. We will not accept comments via email, fax, or hand delivery. We are not required to consider comments that are submitted after the comment period ends or that are submitted via a method outside of these instructions. Comments containing profanity, vulgarity, threats, or other inappropriate content will not be considered.

We will post all comments on https://www.regulations.gov. This generally means that we will post any personal information you provide us (see **Information Requested**, below, for more information).

Availability of supporting materials: Supporting materials, such as the species status assessment report, are available on the Service's website at https://ecos.fws.gov/ecp/species/1375 (Cascade torrent salamander) or https://ecos.fws.gov/ecp/species/3376 (Columbia torrent salamander), at https://www.regulations.gov at Docket No. FWS–R1–ES–2024–0121, or both.

FOR FURTHER INFORMATION CONTACT: Brad Thompson, Washington State Supervisor, U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, 360–753–9440, brad_thompson@fws.gov or Kessina Lee, Oregon State Supervisor, 503–447–6935, kessina_lee@fws.gov. Individuals in the United States who are deaf, deafblind, hard of hearing, or have a speech disability may dial 711 (TTY, TDD, or TeleBraille) to access telecommunications relay services. Individuals outside the United States should use the relay services offered within their country to make international calls to the point-of-contact in the United States. Please see Docket No. FWS–R1–ES–2024–0121 on https://www.regulations.gov for a document that summarizes this proposed rule.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species warrants listing if it meets the definition of an endangered species (in danger of extinction throughout all or a significant portion of its range) or a threatened species (likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range). If we determine that a species warrants listing, we must list the species promptly and designate the species' critical habitat to the maximum extent prudent and determinable. We have determined that the Cascade torrent salamander and Columbia

torrent salamander both meet the definition of a threatened species; therefore, we are proposing to list them as such. Listing a species as a threatened species can be completed only by issuing a rule through the Administrative Procedure Act rulemaking process (5 U.S.C. 551 et seq.).

What this document does. We propose to add the Cascade torrent salamander and the Columbia torrent salamander as threatened species under the Act with a rule issued under section 4(d) of the Act.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of any of five factors: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that the Cascade torrent salamander and Columbia torrent salamander each meet the definition of a threatened species due to the following threats: drought, severe heat, and wildfire (Factor E) and the loss or degradation of habitat due to roads, culverts, and timber harvest (Factor A).

Section 4(a)(3) of the Act requires that the Secretary of the Interior (Secretary), to the maximum extent prudent and determinable, concurrently with listing a species designate critical habitat for the species. Section 3(5)(A) of the Act defines critical habitat as (i) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protections; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such areas are essential for the conservation of the species. Section 4(b)(2) of the Act

states that the Secretary must make the designation on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts of specifying any particular area as critical habitat.

We have determined that designating critical habitat for the Cascade torrent salamander and Columbia torrent salamander is prudent but not determinable at this time. We will coordinate with partners to obtain data sufficient to perform the required analysis of the impacts to inform our critical habitat designations. When critical habitat is not determinable, the Act allows the Service an additional year to publish a critical habitat designation (16 U.S.C. 1533(b)(6)(C)(ii)).

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from other governmental agencies, Native American Tribes, the scientific community, industry, or any other interested parties concerning this proposed rule. We particularly seek comments concerning:

(1) The species' biology, range, and population trends, including:

(a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics and taxonomy;

(c) Historical and current range, including distribution patterns and the locations of any additional populations of these species;

(d) Historical and current population levels, and current and projected trends; and

(e) Past and ongoing conservation measures for the species, their habitats, or both.

(2) Threats and conservation actions affecting the species, including:

(a) Factors that may be affecting the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors;

(b) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to these species; and

(c) Existing regulations or conservation actions that may be addressing threats to these species.

(3) Additional information concerning the historical and current status of these species.

(4) Information to assist with issuing protective regulations under section 4(d) of the Act ("4(d) rule") that may be necessary and advisable to provide for the conservation of the Cascade and Columbia torrent salamanders. In particular, information concerning:

(a) The extent to which we should include any of the section 9 prohibitions in the 4(d) rule;

(b) Whether we should consider any additional exceptions from the prohibitions in the 4(d) rule;

(c) Impacts (conservation and economic) associated with implementing the 4(d) rule,

(d) The frequency and geographical locations of ongoing activities we propose to regulate under the 4(d) rule (e.g., "take");

(e) Whether there are other laws currently in place beyond what we describe in the economic considerations document that regulate the activities or "take" prohibited in the proposed 4(d) rule;

(f) Entities likely to request section 10(a)(1)(A) permits for conducting activities that would involve "take" that we propose to continue to prohibit such as capture or handling of the Cascade and Columbia torrent salamanders;

(g) Data available on the time and economic costs of obtaining section 10(a)(1)(A) permits in accordance with title 50 of the Code of Federal Regulations (CFR) part 17.32;

(h) Entities likely to develop habitat conservation plans and request section 10(a)(1)(B) permits for conducting activities that would involve incidental "take" of the Cascade and Columbia torrent salamanders that we propose to prohibit;

(i) Data available on the time and economic costs of obtaining section 10(a)(1)(B) permits in accordance with 50 CFR 17.32;

(j) Any other entities not addressed in this proposed rule that may be affected by the 4(d) rule; and

(k) Comments and suggestions regarding additional guidance and methods that we could provide or use, respectively, to streamline the implementation of this proposed 4(d) rule.

(5) Information regarding the habitat suitability model used to assess the current and future conditions of these species, including how Thurman et al. 2025 (entire) may be used to inform the model used in the 2023 SSA report.

(6) Information regarding the population structure of Cascade torrent salamanders, including how Cousins et al. 2026 (entire) may be used to inform the Cascade torrent salamander analysis units in the 2023 SSA report.

Please include any supplemental information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for, or opposition to, the action under consideration without providing supporting information, although noted, do not provide substantial information necessary to support a determination. Section 4(b)(1)(A) of the Act directs that determinations as to whether any species is an

endangered or a threatened species must be made solely on the basis of the best scientific and commercial data available, and section 4(b)(2) of the Act directs that the Secretary shall designate critical habitat on the basis of the best scientific data available.

You must submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**.

If you submit information via https://www.regulations.gov, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on https://www.regulations.gov.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on https://www.regulations.gov.

Our final determination may differ from this proposal because we will consider all comments we receive during the comment period as well as any information that may become available after this proposal. Based on the new information we receive, we may conclude that the species are endangered instead of threatened, or we may conclude that the species do not warrant listing as either endangered species or threatened species. In addition, we may change the parameters of the prohibitions or the exceptions to those prohibitions in the protective regulations issued under section 4(d) of the Act if we conclude it is appropriate in light of comments and new information received. For example, we may expand the prohibitions if we conclude that the protective regulations as a whole, including those additional prohibitions, are necessary and advisable to provide for the conservation of the species. Conversely, we may establish additional or different exceptions to the prohibitions in the final rule if we conclude that the activities

would facilitate or are compatible with the conservation and recovery of the species. In our final rule, we will clearly explain our rationale and the basis for our final decision, including why we made changes, if any, that differ from this proposal.

Public Hearing

Section 4(b)(5) of the Act provides for a public hearing on this proposal, if requested. Requests must be received by the date specified in **DATES**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule a public hearing on this proposal, if requested, and announce the date, time, and place of the hearing, as well as how to obtain reasonable accommodations, in the *Federal Register* and local newspapers at least 15 days before the hearing. We may hold the public hearing in person or virtually via webinar. We will announce any public hearing on our website, in addition to the *Federal Register*. The use of virtual public hearings is consistent with our regulations at 50 CFR 424.16(c)(3).

Previous Federal Actions

On July 11, 2012, we received a petition from the Center for Biological Diversity, requesting that 53 species of reptiles and amphibians, including the Cascade torrent salamander and Columbia torrent salamander, be listed as endangered or threatened species and that their critical habitat be designated under the Act of 1973, as amended (16 U.S.C. 1531 et seq.). On September 18, 2015, we published a 90-day finding stating that the petition presented substantial scientific or commercial information indicating that listing both the Cascade and Columbia torrent salamander may be warranted (80 FR 56423) and initiated a status review. This document constitutes our 12-month finding on the July 11, 2012, petition to list the Cascade and Columbia torrent salamanders under the Act.

Peer Review

A species status assessment (SSA) team prepared an SSA report for the Cascade

torrent salamander and Columbia torrent salamander. The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species.

In accordance with our joint policy with the National Marine Fisheries Services (NMFS) on peer review that published in the *Federal Register* on July 1, 1994 (59 FR 34270), and our August 22, 2016, memorandum updating and clarifying the role of peer review in listing and recovery actions under the Act (https://www.fws.gov/sites/default/files/documents/peer-review-policy-directors-memo-2016-08-22.pdf), we solicited independent scientific review of the information contained in the Cascade torrent salamander and Columbia torrent salamander SSA report. We sent the SSA report to five independent peer reviewers, and two individuals responded. Results of this structured peer review process can be found at https://www.regulations.gov. In preparing this proposed rule, we incorporated the results of these reviews, as appropriate, into the SSA report, which is the foundation for this proposed rule.

Summary of Peer Reviewer Comments

As discussed in Peer Review above, we received comments from two peer reviewers on the draft SSA report. We reviewed all comments we received from the peer reviewers for substantive issues and new information regarding the contents of the SSA report.

The peer reviewers generally concurred with our overall analytical approach and conclusions. They provided additional information and clarifications, including updates to Cascade torrent salamander genetic diversity based on preliminary results from Oregon State University, additional information and citations, suggested clarifications to our

methodology and uncertainties, and other editorial suggestions. However, the commenters were concerned with our methodology analyzing the threat of timber harvest on resiliency. Timber harvest is a key population level threat; however, in the SSA's quantitative resiliency model, timber harvest did not factor as heavily as other assessed threats (Service 2023, pp. 62, 65). In response, we bolstered our rationale for how we quantitatively captured threats in our analysis. We also added a robust qualitative analysis to more accurately evaluate the magnitude of timber harvest as a threat to both species. The qualitative analysis uses Wilson et al. (2014) timber harvest projections, along with other sources, to identify potential harvest rates under the current and future condition scenarios for both species. The revised timber harvest analysis is supplemental to the quantitative results of the resiliency analysis.

Peer reviewers also noted the 5-year time horizon for the current condition analysis seemed short given the generation time of these species. We chose 5 years to account for the current generation of torrent salamanders whose contribution to future generations may occur in approximately 5 years and to incorporate the time required between the onset of the analysis and development of the final SSA report. However, the 5-year time horizon for the current condition analysis is an approximation and is generally shorter than one generation for either species. The Cascade torrent salamander takes a minimum of 6 years to reach sexual maturity, and the Columbia torrent salamander takes a minimum of 5.5 years to reach sexual maturity; however, it can take both species up to 7.5 years to reach sexual maturity. Peer reviewer comments are addressed, as appropriate, in version 1.1 of the SSA report.

I. Proposed Listing Determination

Background

A thorough review of the taxonomy, life history, and ecology of the Cascade torrent salamander and Columbia torrent salamander is presented in the SSA report

(Service 2023, pp. 17–35).

Torrent salamanders (genus *Rhyacotriton*), a genus of four species, are endemic to the Pacific Northwest and include the Cascade (*R. cascade*) and Columbia (*R. kezeri*) torrent salamanders. Cascade and Columbia torrent salamanders are endemic to Washington and Oregon (Jones et al. 2005, pp. 58–65). The Cascade torrent salamander occurs across the western slope of the Cascade range in southwestern Washington and northwestern Oregon, and the Columbia torrent salamander occurs in the coast ranges of northwestern Oregon and southwestern Washington (see figure 1, below).

Torrent salamanders are a semi-aquatic genus of small salamanders that are typically found in and around small perennial and intermittent streams, seeps, waterfalls, and splash zones (i.e., where falling water meets the stream and surrounding habitat) or stream banks beneath rocks, moss, or wood in humid coniferous forests (Jones et al. 2005, p. 61). Torrent salamanders are adapted for a semi-aquatic existence in cool, highly oxygenated mountain streams, and are thought to be among the most desiccation-intolerant and thermally sensitive of North American salamanders (Ray 1958, pp. 77–81). These salamanders are highly susceptible to drying out (desiccation) and overheating. Thus, Cascade torrent salamanders are not found in dry stream reaches (Olson and Weaver 2007, p. 350), and relative abundance of Cascade, Columbia, and (the closely related) Olympic torrent salamander was lower in areas where the proportion of dry headwater stream channels was highest (Ojala-Barbour et al. 2024, pp. 7–8).

Torrent salamanders undergo metamorphosis (from an immature form to an adult form) by transformation (complete change in appearance or form) as part of their life cycle, which includes fully aquatic egg and larval life stages, as well as semi-aquatic post-metamorphic subadult (sexually immature) and adult (sexually mature) life stages. It takes approximately 5 to 8 years for these salamanders to reach sexual maturity (Jones et al. 2005, p. 61; Nussbaum et al. 1983, p. 72).

Torrent salamanders show high genetic diversity among populations (Wagner et al. 2006, pp. 67–68). High genetic diversity among populations suggests a long history of isolation in headwater refugia and a high susceptibility to restricted gene flow (Welsh and Hodgson 2008, p. 1473). Torrent salamanders disperse primarily via stream networks, which facilitates gene flow along moist riparian corridors within watersheds, but they also disperse up and over ridgelines, which facilitates gene flow among discrete watersheds (Emel et al. 2019, p. 812). Adults will disperse over land into riparian and upland forests during periods of rain (Jones et al. 2005, p. 65). Forest fragmentation is associated with lower genetic diversity (i.e., inbreeding) (Emel et al. 2019, p. 812).

Columbia torrent salamander is composed of two genetic populations, with the northern population having reduced genetic diversity relative to the southern population (Emel et al. 2019, pp. 806–807). Columbia torrent salamander has lower observed heterozygosity than the closely related, more widely distributed southern torrent salamander, indicating genetic isolation and an increase in homozygosity (Emel et al. 2019, p. 812). When the SSA was completed (Service 2023, entire), limited population-level genetic information existed for the Cascade torrent salamander, beyond Good et al. 1987 (entire), but was available for Columbia torrent salamanders. A recent range-wide genetic study of the Cascade torrent salamander found six demographically independent populations, with gene flow largely constrained within populations (Cousins et al. 2026, pp. 7–9). Due to low dispersal capacity, habitat fragmentation within populations is expected to increase isolation, reducing genetic diversity and evolutionary fitness (Cousins et al. 2026, p. 10). The most genetically divergent population of Cascade torrent salamander is in the northwestern part of the range, where it largely occupies privately owned timberland; this population has the lowest genetic diversity of the six populations (Cousins et al. 2026, pp. 8–10).

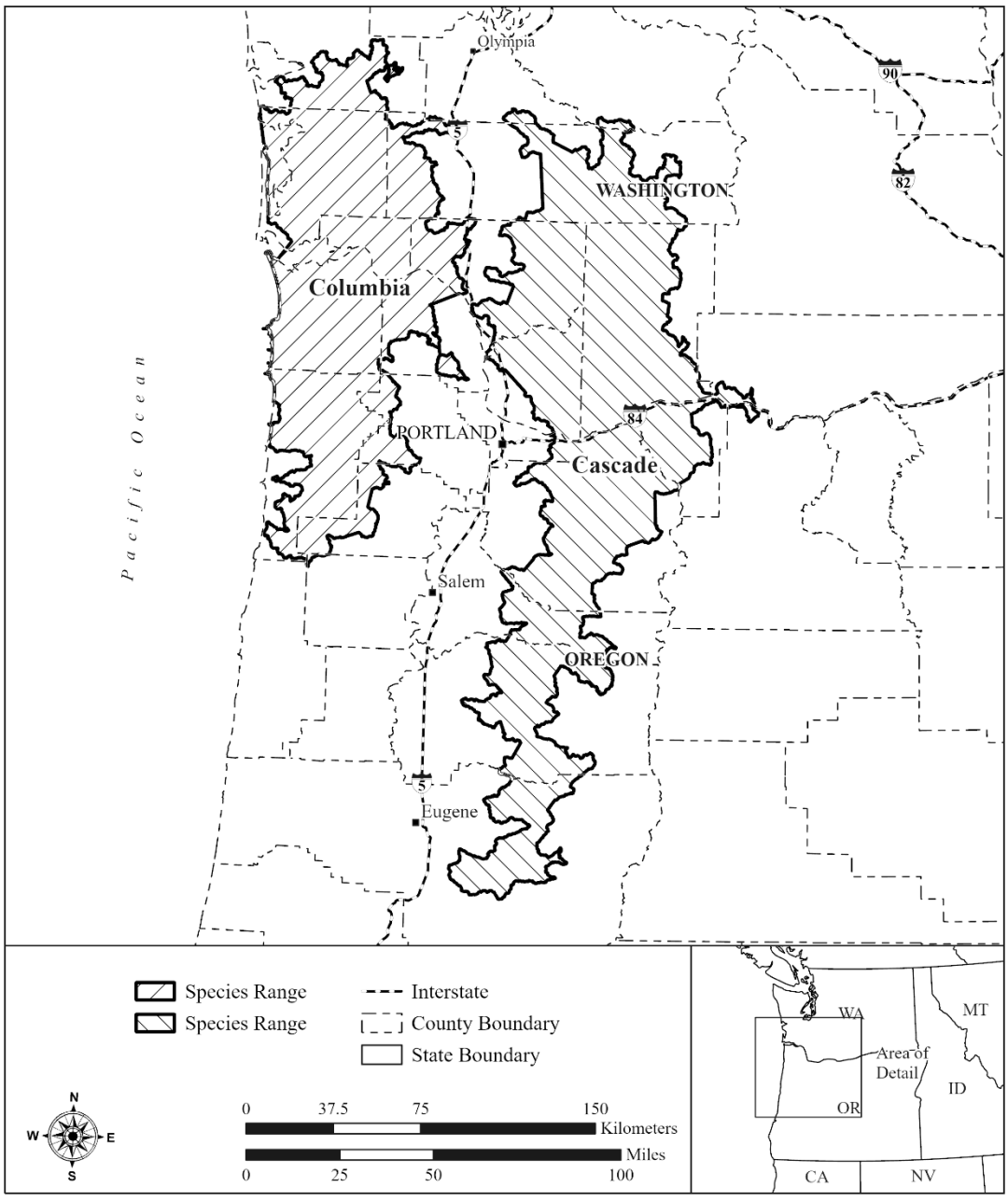


Figure 1—Current estimated range of the Cascade and Columbia torrent salamanders.

Regulatory and Analytical Framework

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and the implementing regulations in title 50 of the CFR set forth the procedures for determining whether a species is an endangered

species or a threatened species, issuing protective regulations for threatened species, and designating critical habitat for endangered and threatened species.

The Act defines an "endangered species" as a species that is in danger of extinction throughout all or a significant portion of its range, and a "threatened species" as a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether any species is an endangered species or a threatened species because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term "threat" to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term "threat" includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term "threat" may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an "endangered species" or a "threatened species." In determining whether a species meets either definition, we must evaluate all identified threats by considering the species' expected response and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an "endangered species" or a "threatened species" only after conducting this cumulative analysis and describing the expected effect on the species.

The Act does not define the term "foreseeable future," which appears in the statutory definition of "threatened species." Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis, which is further described in the 2009 Memorandum Opinion on the foreseeable future from the Department of the Interior (DOI), Office of the Solicitor (M–37021, January 16, 2009; "M-Opinion," available online at https://www.doi.gov/sites/doi.opengov.ibmcloud.com/files/uploads/M-37021.pdf). The foreseeable future extends as far into the future as the Service can make reasonably reliable predictions about the threats to the species and the species' responses to those threats. We need not identify the foreseeable future in terms of a specific period of time. We will describe the foreseeable future on a case-by-case basis, using the best scientific and commercial data available and taking into account considerations such as the species' life-history characteristics, threat-projection timeframes, and environmental variability. In other words, the foreseeable future is the period of time over which we can make

reasonably reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction, in light of the conservation purposes of the Act.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent our decision on whether the species should be proposed for listing as an endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies.

To assess Cascade torrent salamander and Columbia torrent salamander viability, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency is the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years); redundancy is the ability of the species to withstand catastrophic events (for example, droughts, large pollution events); and representation is the ability of the species to adapt to both near-term and long-term changes in its physical and biological environment (for example, climate conditions, pathogens). In general, species viability will increase with increases in resiliency, redundancy, and representation (Smith et al. 2018, p. 306). Using these principles, we identified the species’ ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species’ viability.

The SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual species’ life-history needs. The next stage involved an assessment of the historical and current condition of the species’ demographics and

habitat characteristics, including an explanation of how the species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best scientific and commercial data available to characterize viability as the ability of a species to sustain populations in the wild over time, which we then used to inform our regulatory decision.

The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket FWS–R1–ES–2024–0121 on https://www.regulations.gov.

Summary of Biological Status and Threats

In this discussion, we review the biological condition of the species and their resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability.

Individual, Population, and Species Needs

A thorough review of the Cascade and Columbia torrent salamanders' resource needs is presented in chapter 3 of the SSA report (Service 2023, pp. 32–35).

Ecological needs for the species are described at the individual, population, and species level. To complete their life cycle, all life stages require the presence of water. Individual Cascade and Columbia torrent salamanders require cool, well-aerated streams and springs that contain low-velocity water, steep gradients, coarse organic and inorganic substrates, and minimal fine sediments (Nussbaum et al. 1983, p. 69; Good and Wake 1992, p. 20; Diller and Wallace 1996, p. 189).

Cascade and Columbia torrent salamanders are extremely desiccation intolerant, requiring near-constant access to water for survival (Ray 1958, p. 81). Cascade torrent salamanders are generally absent from streams with temperatures of 14 degrees Celsius (°C) (57.2 degrees Fahrenheit (°F)) or higher for more than 35 consecutive hours (Pollett

et al. 2010, p. 1086). Cool spring-fed water can serve as a refuge from hot air temperatures (Thompson et al. 2018, p. 204). Thermal requirements for torrent salamander egg development range from 8.3 to 12.5 °C (46.9 to 54.5 °F) (Thompson et al. 2018, table 2).

Coarse inorganic and organic substrates are used by torrent salamanders for shelter and egg deposition sites (Diller and Wallace 1996, p. 186; Jones et al. 2005, p. 65; Karraker et al. 2005, p. 34; Thompson et al. 2018, p. 199). Too much sediment can smother eggs, make it difficult for larvae and post-metamorphic individuals to breathe, reduce the abundance of the salamander's aquatic invertebrate food source, and bury the cobbles and gravel that salamanders use for cover (Pogue 2008, pp. 43–44).

Slow-moving, low-velocity water is important for torrent salamander egg deposition, and larval and post-metamorphic individual presence depend on low flow velocity for all life stages (Jones et al. 2005, pp. 61, 65). Torrent salamander eggs are unattached to each other or the stream substrate, making low flow important in preventing the eggs from being washed away (Nussbaum 1969, p. 277; Thompson et al. 2018, p. 205). Torrent salamanders are typically found in streams with shallow water (Russell et al. 2002, p. 19; Jones et al. 2005, p. 61; Corkran and Thoms 2006, p. 53). Torrent salamanders are likely to be absent from streams where fish are present (Hunter 1998, p. 58; Kroll et al. 2008, p. 3734).

Torrent salamanders are associated with forests greater than or equal to 100 years old (Welsh 1990, p. 312). Torrent salamanders are found at four times the density in older (150 year) than younger (less than 75 years) forests (Corn and Bury 1991, p. 314). Studies on the genus found that torrent salamanders are closely tied to old-growth forests and riparian habitat (Nussbaum and Tait 1977, pp. 177–178; Good and Wake 1992, p. 20). While old-growth and mature forests support the greatest concentrations of torrent salamanders, they are not the only places these species are found (Welsh 1990, pp. 313–

314). Old growth and mature forests typically provide the characteristics needed to support the torrent salamander's habitat needs for moss, rocks, and organic debris in shallow, cold, percolating water (Welsh 1990, p. 312). Old-growth forests are often dynamic systems with old trees and structural attributes that include later stages of stand development that often differ from characteristics of earlier stages of stand development (U.S. Forest Service (USFS) 2023, p. 5). Mature forests comprise the forest development stage that immediately precedes old growth and ecologically is described as the time when the stand transitions to self-thinning, and a diversity of height and structure, including understory regeneration, occurs (USFS 2023, p. 5).

Canopy cover is a strong predictor of torrent salamander presence, as it relates to the amount of solar radiation that meets the ground (Emel and Storfer 2015, p. 218). Forest canopies can be structurally divided into upper-, mid-, and under-story canopy: Overstory is the uppermost canopy layer, including emergent, dominant, and codominant trees; midstory is the intermediate canopy layer, including trees below the overstory and above the understory layer; and understory is the lowermost canopy layer including seedlings, saplings, and other small trees. Cascade torrent salamanders have been associated with streams that have moderate upper-story canopy cover, and some mid-story cover along the stream (Hunter 1998, p. 51). When adjacent upland forest habitat is moist (seasonally or during rain events), post-metamorphic Columbia torrent salamanders have been observed moving away from seeps, springs, and streams into upland forested habitats, then reconcentrating in aquatic environments when the uplands dry; therefore, in-stream and upland forest habitat are also important for these species (Jones et al 2005, p. 65). Prey from both the terrestrial and aquatic environments contribute to their diet (O'Donnell and Richart 2012, pp. 17, 20–21).

To maintain resiliency, populations of Columbia and Cascade torrent salamanders need sufficient numbers of reproductive individuals in order to withstand stochastic

events. The number of individuals in a population is described as abundance, and this term relates to population stability and risk of stochastic losses. Other demographic factors such as survival and reproduction contribute to population abundance; all three factors are considered to be population-level needs.

Populations of Columbia and Cascade torrent salamanders also need sufficient habitat connectivity and forest cover to facilitate dispersal within and between populations. While torrent salamanders are generally found within 1 meter (m) (3.28 feet (ft)) of water, they can disperse over 50 m (164.0 ft) from a stream if upland habitat is moist enough (Butts 2001, p. 6; Olson et al. 2007, p. 88), and adult southern torrent salamanders (*R. variegatus*), a closely related species, have been documented at distances that range from 3 to 163 m (9.8 to 534.8 ft) from water (Emel and Storfer 2015, p. 217; Leppin et al. 2020, p. 57). Forest cover is a top predictor of Columbia torrent salamander gene flow, as it contributes to a moist microhabitat alongside humidity (Emel et al. 2019, pp. 215–220). Connectivity for torrent salamanders includes not only dispersal up- and downstream, but also in upland forested habitat, and over ridgelines between basins (Olson and Burton 2019, p. 22).

Columbia and Cascade torrent salamanders need multiple, connected, resilient populations across their ranges in order to withstand catastrophic events (i.e., stochastic events that are expected to lead to population collapse regardless of population health). Multiple, resilient populations distributed across the range of the species (i.e., redundancy) ensure that a catastrophic event in one geographic area will not result in the collapse of the entire species, essentially reducing the risk associated with catastrophic events. Connectivity between populations provides for dispersal and immigration following catastrophic events.

The ability of individuals to adapt to changes in their physical and biological environments (representation) is gauged by the genetic and ecological variation across

each species' range and is facilitated by connectivity between populations. For torrent salamanders, this ability is also affected by inherent life history traits such as low reproductive output, high habitat specificity, high site fidelity, restricted physiological tolerances, and low mobility; additionally, Cascade torrent salamanders have been shown to have a patchy distribution (Thurman et al. 2020, p. 522). Both Cascade and Columbia torrent salamanders appear to be patchily distributed throughout their ranges and are encountered in fewer sites relative to other co-occurring amphibian species (Corn and Bury 1989, p. 46; Thurman et al. 2025, p. 2). Maintaining genetic and ecological diversity allows for the species to adapt to changing environmental conditions in both the near and long term.

Table 1—Summary of Individual, Population, and Species-level Needs for the Cascade and Columbia Torrent Salamanders

Level	Need	Function of need	Conservation biology principles
Individual	Water availability (presence of surface and subsurface water, humidity, moist upland habitat)	Breeding, feeding, sheltering, dispersal, and survival	Resiliency
	Cool water temperature (less than or equal to 15 °C)	Breeding, feeding, sheltering, and survival	
	Water quality (minimal fine sediment, relatively high dissolved oxygen levels)	Breeding, seeding, sheltering, and survival	
	Stream substrate (cobble, gravel, and loose colluvium)	Breeding, seeding, and sheltering	
	Low flow velocity	Breeding, feeding, sheltering, and survival	
Population	Survival	Contributes to population abundance and allows adults to become reproductive	Resiliency
	Abundance	Relates to population stability and risk of stochastic losses	
	Reproduction	Contributes to population abundance	
	Habitat connectivity	Dispersal	Resiliency Redundancy Representation
Species		Ensure that a catastrophic event in one geographic area will not	Redundancy

	Multiple resilient populations across each species' range	result in the collapse of the entire species	
		Reduces the risk associated with catastrophic events	
	Connectivity between populations	Provides for dispersal and immigration following catastrophic events	Redundancy Representation
		Facilitates genetic and ecological variation	
	Genetic variation across each species' range	Maintains diversity and allows the species to adapt to changing environmental conditions in the near and long term	Representation
	Ecological variation across each species' range		

Threats

A thorough review of the threats affecting the Cascade and Columbia torrent salamanders is presented in chapter 4 of the SSA report (Service 2023, pp. 36–51). We evaluated the primary threats (past, current, and future) to the Cascade and Columbia torrent salamanders and their influences on species' viability, including: drought, severe heat, wildfire, and loss or habitat degradation due to roads, culverts, and timber harvest.

We did not identify climate change itself as an individual influence factor because its effects – notably the severity and frequency of drought, severe heat, and wildfire – are captured via other influence factors. Other potential threats considered in our SSA include development, flood events, disease, volcanism, wind events, recreation, predation, and chemical applications generally related to forest management. The best scientific and commercial data available indicate that these other potential threats are not having population- or species-level impacts, therefore, we are not addressing them further in the proposed rule. Additional discussions of these threats can be found in chapter 4 of the SSA report (Service 2023, pp. 47–50).

Drought

Within the ranges of the Columbia and Cascade torrent salamanders, drought has influenced, and will continue to influence, water availability and water and air temperature. Since the mid-20th century snowpack has decreased by roughly 20 percent;

snow melt occurs earlier; summer stream flow has declined; and average annual temperature has increased (Melillo et al. 2014, p. 489). Dry stream channels are not occupied by torrent salamanders; an additional 597–2,058 kilometers (km) (371–1,279 miles (mi)) of Cascade torrent salamander stream habitat is expected to dry by 2055 (Olson and Burton 2019, pp. 22, 24). Relative abundance of Cascade and Columbia torrent salamander was 33 percent lower during a moderate drought year than in a non-drought year (Ojala-Barbour et al. 2024, p. 8). In the Pacific Northwest's streams, earlier and lower spring peak flow, higher winter flow, and lower late-summer flow (Raymondi et al. 2013, p. 46), along with more frequent extreme hydrological events, are expected. Trends in precipitation are more variable than expected trends for temperature; however, summer precipitation in this region is projected to decrease by as much as 30 percent by the end of the century (Mote et al. 2014, p. 489). Given future projections of increasing average annual temperature, drought in the western United States is expected to increase in frequency and duration (Furniss et al. 2010, p. 24). Across future climate scenarios in years 2055 to 2085, a 4.5 to 11.5 percent loss in headwater surface streamflow is projected to result in 597 to 2,058 km (370 to 1,279 mi) of additional dry channel lengths of headwater streams in the range of the Cascade torrent salamander (Olson and Burton 2019, p. 1).

Drought is expected to negatively affect resource needs of Cascade and Columbia torrent salamanders, including water availability and water temperature, due to their need for cool water and their intolerance to desiccation. Reduced precipitation decreases snowpack and rain, thereby decreasing water availability in streams fed by snow melt, groundwater, or springs. Warming temperatures and altered precipitation will affect several hydrological processes, including the amount, timing, and type of precipitation (Luce et al. 2012, pp. 15–20; 2013, p. 1361). Lower precipitation is expected to result in reduced connectivity within and among streams due to loss of stream flow, as well as

over ridgelines due to a loss of headwater streams and moist upland habitat, which limits access to habitat that is essential for completing torrent salamander life history. Additionally, habitat loss and fragmentation due to drought will limit torrent salamanders' ability to maintain genetic exchange and to reestablish locally extirpated populations when they are impacted by drought (Olson and Burton 2019, pp. 3, 21). In 2019, Cascade torrent salamanders were only found at 16 of the 48 (33 percent) historical sites surveyed (Thurman et al. 2025, p. 10). In 2022, Cascade torrent salamanders were found at 38 percent of 65 historical sites surveyed (Rowe et al. 2023, unpaginated). Habitat fragmentation and isolation within the range of the Cascade torrent salamander which is composed of six demographically independent populations with gene flow largely constrained within populationsis likely to result in reduced genetic diversity and evolutionary fitness (Cousins et al. 2026, pp. 7–10).

Based on future climate projections (Olson and Burton 2019, p. 3), habitat loss is expected to occur due to loss of headwater surface streamflow in the range of the Cascade torrent salamander. Increased air temperature will elevate water temperature, which is anticipated to reduce the amount of suitable habitat and specific microhabitats used by the species. Elevated air temperature is expected to stress or reduce riparian vegetation, resulting in less canopy cover and fewer inputs of organic material from outside the stream, such as fallen leaves, which are important substrate for the species. In turn, stream temperature could increase due to less shade, and prey resources could decline from the decrease in organic inputs that provide the substrate where prey live (Welsh and Lind 1996, p. 392).

Drought may affect torrent salamander breeding, feeding, sheltering, and dispersal habitat for all life stages. Individuals or eggs that experience a loss of habitat may die due to their dependence on water. Post-metamorphic torrent salamanders disperse in-stream, directly adjacent to streams, and through upland forest and over ridgelines during

seasonal wet periods and rain events, and do not often disperse over dry land. Terrestrial adults of the closely related southern torrent salamander are highly susceptible to desiccation and rarely move far from water (Leppin et al. 2020, pp. 58-59). Due to their intolerance to desiccation (Ray 1958, pp. 77–79, 81), we expect drought to cause mortality and forced migration as torrent salamanders must leave sites that no longer provide for their needs. In some cases, the inability to disperse due to a lack of water and moist habitat is expected to restrict gene flow among populations and may lead to loss of genetic diversity as a result of drought (Emel and Storfer 2015, pp. 216–218). Reduced gene flow and genetic diversity are concerns for both species, notably for the Columbia torrent salamander given it is composed of two genetic populations, of which the northern population already exhibits reduced genetic diversity relative to the southern population (Emel et al. 2019, pp. 806–807). Relative abundance of (the closely related) Olympic torrent salamander was 41 percent lower during a drought year than in a non-drought year (Ojala-Barbour et al. 2024, p. 8).

The impacts of drought on water availability and temperature are anticipated to result in decreased survival and reproduction at the population level. Loss of riparian habitat connectivity can cause genetic isolation, which restricts gene flow and promotes inbreeding, further decreasing population resiliency (Emel et al. 2019, p. 812). The inability to disperse due to drought has already been documented to reduce gene flow in the closely related southern torrent salamander, leading to a loss of genetic diversity (Emel and Storfer 2015, pp. 216–218). Thus, a large-scale drought could severely affect multiple populations of Cascade and Columbia torrent salamanders.

Drought was considered a primary influence factor in our assessment of current and future condition of Cascade and Columbia torrent salamanders.

Severe Heat

Severe heat is defined here as conditions that would cause water temperatures in streams to exceed the range of temperatures needed by torrent salamanders, which is typically less than 14 °C (57.2 °F) (Pollett et al. 2010, p. 1086). Within the range of Cascade and Columbia torrent salamanders, air temperatures have increased roughly 1.12 °C (2 °F) over the previous 120 years (Melillo et al. 2014, p. 488; May et al. 2018, p. 1041). Further, air temperatures are expected to additionally increase by more than 1.85 °C (3.3 °F) from 2070 to 2099 (Melillo et al. 2014, p. 489). Increases in air temperature translate directly to warmer stream temperatures, which impact the Cascade and Columbia torrent salamanders directly. Abundance of Cascade torrent salamander was significantly (roughly seven times) lower in streams with temperatures above 8.7 °C (47.7 °F) than in cooler streams (Steele et al. 2003, p. 450). Cascade torrent salamanders are absent from streams in which temperatures are greater than 14 °C (57.2 °F) for more than 35 consecutive hours (Pollett et al. 2010, p. 1085). Stream temperatures in the Pacific Northwest may increase by 0.73 to 1.42 °C (1.24 to 2.56 °F) by 2040 to 2080, respectively (Isaak et al. 2017, p. 9193), which would result in fewer streams within the thermal range needed by torrent salamanders.

Clear, well-aerated, and cool streams and springs are important habitats for torrent salamanders (Good and Wake 1992, p. 20). Water temperature and dissolved oxygen exhibit an inverse relationship. As stream temperature increases, the amount of dissolved oxygen available for respiration decreases. Dense canopy cover and closure maintain cool temperatures in riparian areas where torrent salamanders occur, whereas open canopy areas have a wider range of temperatures (Welsh and Lind 1996, p. 392) that tend higher. Stream reaches with elevated stream temperatures may act as barriers to dispersal that inhibit access to habitat essential for completing the species' life history. Thermal barriers may also prevent over-ridgeline movement of salamanders to new watersheds and habitat, genetic exchange, and reestablishing populations (Olson and Burton 2019, p.

22). Further, if stream temperatures increase in an upstream (and elevational) direction, the species will be constrained to small, headwater reaches, increasing the risk of extirpation from stochastic disturbances and reducing their ability to move to new habitats. However, patches of thermal refugia (i.e., small areas where the water is cooler than the surrounding habitat) may remain in streams, particularly where there are cool-water inputs that may buffer the negative effects of severe heat.

Severe heat may affect torrent salamander breeding, feeding, sheltering, and dispersal habitat for all life stages. Both species have thermal tolerances that are among the lowest for amphibians (Bury 2008, pp. 64, 66–68; Pollett et al. 2010, p. 1085; Thompson et al. 2018, p. 204). Thus, eggs or individuals that experience increases in water temperature from severe heat are expected to experience reduced physiological condition, which can lead to direct and indirect mortality, an inability to move to other suitable habitat, and habitat loss due to the water temperature not meeting their thermal needs. For example, in a before-and-after controlled study, long-term density of Cascade and Columbia torrent salamanders declined by 68 percent in the same streams that experienced a significant increase in temperature following a timber harvest where no riparian forest buffer (to help maintain cooler temperatures) was retained (McIntyre et al. 2021, p. 124).

For torrent salamanders, loss of riparian habitat connectivity can cause genetic isolation, which restricts gene flow, further decreasing population resiliency (Emel et al. 2019, p. 812). Large-scale heat waves could severely affect multiple populations, but a single stochastic event would be unlikely to impact these species at the range-wide scale.

Severe heat was considered a primary influence factor in our assessment of current and future condition of Cascade and Columbia torrent salamanders.

Wildfire

Cascade and Columbia torrent salamanders can be negatively impacted by fire (Howell and Maggiulli 2011, p. 3), as are all *Rhyacotriton* speciesdue to narrow geographic ranges, highly specific microhabitat conditions, and adaptation to very long fire-return intervals (Pilliod et al. 2003, p. 165). Wildfires occur more regularly within the range of the Cascade torrent salamander, which is drier compared to the coastal range of the Columbia torrent salamander. Historical fire regimes in the range of these species were dominated by infrequent, large, high-severity wildfires, with fire-return intervals ranging from 200 to nearly 1,200 years (Gaines et al. 2022, p. 2). While large wildfire events created the majority of total area burned, small moderate- and low-severity wildfires were also common. Currently, most wildfires in moist-zone forests are readily suppressed (Gaines et al. 2022, p. 2). However, during some warm and dry summers, with late-summer drought and strong, dry east winds, large wildfires can occur within these species' ranges, such as the 2020 wildfires in Oregon, which included the Riverside, Lionshead, Beachie Creek, and Holiday Farm fires along the west slope of the Cascades, and the Yacolt and Tillamook burns in the Coast range (Gaines et al. 2022, p. 2; Reilly et al. 2022, p. 7). Higher intensity wildfires are more likely to occur in western Washington now than they were historically due to the replacement of old-growth forest with dense, even-aged stands (McIntyre 2022, pers. comm.). High intensity fire results in similar environmental impacts as canopy removal from timber harvest, in that it increases air and water temperatures, triggers sedimentation and loss of riparian and upland forest cover, and reduces moisture and water availability in riparian areas (Pilliod et al. 2003, pp. 165, 168, 169), and thus is likely to have similar adverse impacts on Cascade and Columbia torrent salamanders as those historically observed in timber harvested areas. Future projections indicate that future fire-return intervals in the Pacific Northwest will continue to shorten, fire severity will increase, and more areas will become susceptible to fire due to reduced precipitation and warmer temperatures (Gaines et al. 2022, p. 4).

Wildfire can negatively affect resource needs of Cascade and Columbia torrent salamanders including water availability, water temperature, water quality, adequate stream substrate, and connectivity, as well as lead to direct injury and mortality of individuals (Pilliod et al. 2003, pp. 165, 167). However, torrent salamanders have been documented using sub-surface flows of headwater streams (Kroll et al. 2008, p. 3733), and those sub-surface flows could provide refuge for them during wildfire events. The main stressors linked to wildfire include sedimentation, increased air temperatures, and riparian and upland habitat loss and modification (Pilliod et al. 2003, p. 165). Related habitat loss likely includes loss of canopy cover, which is important for torrent salamander presence and movement (Emel and Storfer 2015, p. 218). Amphibians with narrow geographic ranges and specific microhabitat conditions, such as the torrent salamanders, that occur in areas with very long fire-return intervals, are likely susceptible to fire (Pilliod et al. 2003, p. 165). Increased ash, debris, and fine sediment inputs to headwater streams from a fire event, as well as post-fire erosion and debris flows, increase stream temperature and decrease water quality for years after the fire (Pilliod et al. 2003, p. 169). Higher air temperatures during a fire event also increase stream temperatures (Pilliod et al. 2003, p. 168). Fire has been shown to reduce soil permeability, which may temporarily alter water availability and moisture in riparian habitat (Certini 2005, pp. 3–4).

Other indirect effects of wildfires include water chemistry changes (increases in nitrogen, nitrates, ammonium, and phosphorus), which could cause significant increases in mortality rates (Spencer and Hauer 1991, p. 26). Increased nitrogen and phosphorus from fires can be transported into streams from the water in soils, as well as aerial ash deposition and diffusion of smoke gases into streams (Spencer and Hauer 1991, p. 28).

Riparian and upland habitat modification (i.e., reduced canopy cover and changes in overstory composition) from a fire can lead to additional aquatic and terrestrial

impacts. Less shade over a headwater stream will increase water temperature, reduce humidity, and increase sun exposure (Spence et al. 1996, p. 35). Sites with less canopy cover in riparian areas have reduced densities of torrent salamanders due to rising water temperature, lower humidity, and drying of springs (Spence et al. 1996, p. 35; Olson and Ares 2022, p. 1). Burned riparian vegetation can increase debris inputs to streams, initially causing changes in the amount and quality of organic and inorganic substrates and changes in water table infiltration due to reductions in vegetative cover. This results in a decrease in detritus and organic substrate stream inputs (Spence et al. 1996, p. 35). Loss of riparian vegetation can decrease moisture in upland habitat, limiting dispersal of salamanders and fragmenting their habitat both within and between streams. Additionally, water quality can be reduced by the application of herbicides, pesticides, and fire retardants related to fire prevention and suppression, or post-fire vegetation management (Pilliod et al. 2003, pp. 174–175). Further, fire retardants have been shown to reduce the survival of salamander larvae (Ozeri et al. 2021, p. 4713). Fire suppression efforts involving the construction of new roads and maintenance of old roads can also adversely impact the aquatic ecosystem (Furniss et al. 2010, p. 27) by altering stream velocity and hydrology and removing tree cover near the road.

The high-intensity Tillamook fires (1931 to 1951) fragmented the landscape and have had long-term impacts on the habitat within the range of the Columbia torrent salamander. Genetic connectivity for the species is lower in the area impacted by the fires due to habitat fragmentation and reduced canopy cover (Emel et al. 2019, p. 808). In addition, the impacts of forest management and road construction that occurred in the years after the fires further impacted connectivity for the species.

Wildfire can negatively affect torrent salamander breeding, feeding, sheltering, and dispersal at all life stages and could cause immediate or delayed mortality, which can adversely impact populations of these relatively long-lived species. Individuals and eggs

that experience a loss or degradation of habitat may face increased mortality risk due to desiccation. In-water dispersal may occur during a fire, but overland dispersal is unlikely during a fire event since torrent salamanders have low tolerance of exposure to dry air (Ray 1958, p. 81; Pilliod et al. 2003, p. 167).

The impacts of wildfire on water availability, water temperature, water quality, and stream substrate result in decreased survival and reproduction at the population level. A single fire event affecting a small geographic area would be unlikely to impact either species at the range-wide scale, but a large-scale wildfire could severely impact the resiliency of one or more populations through loss of habitat connectivity and subsequent genetic isolation (Emel et al. 2019, p. 812). Wildfires currently occur throughout the range of the Cascade torrent salamander and occur more frequently in drier portions of the species' range. In 2020, multiple high intensity (catastrophic) wildfires occurred within the range of the Cascade torrent salamander in Oregon (Reilly et al. 2022, p. 7; Gaines et al. 2022, p. 2). Further, current trends suggest wildfire will become more frequent in the future (Gaines et al. 2022, p. 5). In the range of Columbia torrent salamander, wildfire is considered a rare event due to the current cool and wet climate, although projected future changes in temperature and precipitation will likely increase the impact of fire on the species (Gaines et al. 2022, p. 4).

Therefore, we considered wildfire a primary influence factor in our assessment of the current condition of the Cascade torrent salamander, and the future condition of both species.

Roads and Culverts

Cascade and Columbia torrent salamanders may be negatively impacted by paved and unpaved roads (including railroads) and culverts, which have been constructed in all watersheds occupied by both species. Often roads and culverts are correlated: where a road crosses a stream or drainage area, there is likely to be an associated culvert,

particularly along permanent roads. New road construction that crosses a stream would likely require a culvert or bridge. Culverts also occur where trails, pipelines, and other infrastructure cross streams; thus, road-stream crossings do not represent a complete estimate of culverts. Most existing culverts were designed to move water, but not to move sediment, fish, wildlife, woody debris, or to accommodate the natural hydrology of the stream (Jackson 2003, p. 20). Some efforts have been made to accommodate movements of migratory fish, but in some cases, culverts designed to move adult fish were not designed to move smaller juvenile fish (Jackson 2003, p. 21) and rarely have amphibians or their prey been taken into consideration during culvert design and placement (Ward 2005, p. 69). Culverts increase sedimentation in streams, alter hydrology and streamflow characteristics, and modify stream gradient and substrate, which negatively impacts egg, larval, and adult stages of amphibians as well as their invertebrate prey by washing them away and fragmenting habitat. Small pipe culverts with long downstream drop-offs create a connectivity barrier for amphibians, including torrent salamanders. In contrast, large, open-bottomed culverts can have less of a negative impact on connectivity for amphibians (Pilliod and Wind 2008, pp. 20–21).

Roads (including railroads) and culverts affect all individual resource needs of both species: water availability, water temperature, water quality, flow velocity, stream substrate, and connectivity (Pilliod and Wind 2008, pp. 20–21; Howell and Maggiulli 2011, p. 19). Breeding, feeding, sheltering, and dispersal and all age classes of both species may be negatively impacted by roads and culverts; during surveys multiple dead torrent salamanders were observed on roads (Leppin et al. 2020, p. 58). Studies of other salamander species show that logging roads reduce nearby salamander abundance (Ochs et al. 2024, p. 76). Direct and indirect mortality may also occur as a result of road and culvert installation, maintenance, and use. Loss of habitat connectivity due to roads is also associated with reduced gene flow, which can cause genetic isolation and further

decrease population resiliency in torrent salamanders (Emel et al. 2019, pp. 801, 812). Roads contribute to reduced genetic connectivity of Columbia torrent salamander (Emel et al. 2019, p. 801).

Road and culvert construction, maintenance, and use are sources of habitat fragmentation, runoff, and erosion, which cause stream sedimentation (Jochimsen et al. 2004, p. 28). They also impact water temperature, water quality, flow velocity, stream substrate, and habitat connectivity (La Marche and Lettenmaier 2001, p. 134; Ward 2005, p. 2). These impacts are particularly prevalent in instances where roads or culverts are poorly designed, poorly maintained, or poorly built or installed (Pilliod and Wind 2008, pp. 20–21). Culverts can result in changes to stream hydrology, stream gradient, and streamflow for Cascade torrent salamanders and other salamanders (Ward 2005, pp. 77–79; Howell and Maggiulli 2011, p. 19).

Road maintenance activities often require the use of sand, salt, or other chemicals. Vehicles on roads can be a source of chemical inputs to streams that degrade water quality, which is detrimental to amphibians because of their permeable skin (Pilliod and Wind 2008, p. 25). Road maintenance and operations may negatively impact water quality, flow (Pilliod and Wind 2008, p. 21), water availability, and water temperature. Human use of roads increases the dispersal of noxious weeds, invasive species, and diseases into watersheds occupied by torrent salamanders, which may negatively impact all individual resource needs.

Historically, road development in these species' habitats increased along with increased urbanization, logging, and development of recreation opportunities. There are often culverts at stream-road crossings and other drainage areas along roads. Federal lands—as opposed to State and private lands—typically have restrictions on road density, but they vary by land-use allocation. In areas where urbanization is expected to increase, more roads will be built and culverts installed. Additionally, as wildfire danger increases

in the future, the density of permanent, open roads and their associated culverts may increase to accommodate wildfire prevention and control, but the potential rate of increase and locations are currently unknown.

Therefore, we considered the loss and degradation of habitat due to roads and culverts a primary influence factor in our assessment of current and future condition resiliency for both the Cascade and Columbia torrent salamander.

Timber Harvest

Timber harvest in the range of the Cascade and Columbia torrent salamanders includes tree harvest and harvest-associated activities (e.g., tree felling, yarding, staging and equipment use, herbicide treatment). Modern forest management practices are governed by rules that may partially or fully limit the location and scope of timber harvest on private, State, and Federal lands and may require riparian buffer retention (see Conservation Efforts and Regulatory Mechanisms below). Forest practices rules on Federal, State, and private land may be subject to change in the future (for example, if land ownership changes, conservation plans are developed, or policies dictating riparian management are altered). The Cascade torrent salamander's range is predominantly on Federal (48 percent) and private lands (44 percent), with a smaller proportion on State lands (7 percent). An estimated 68 percent of the Cascade torrent salamander range (7,984 out of 11,819 square kilometers (km^2) (3,083 out of 4,563 square miles (mi^2)) is currently under a land use allocation where harvest is a primary objective. Columbia torrent salamander's range is predominantly on private land (68 percent), with smaller proportions on State land (25 percent), and in Federal ownership (5 percent, predominantly in Oregon). An estimated 95 percent of the Columbia torrent salamander range (9,577 out of 10,089 km^2 (3,698 out of 3,895 mi^2)) is currently under a land use allocation where harvest is a primary objective.

Species' resource needs that are affected by timber harvest include water availability, water temperature, water quality, stream substrate, flow velocity, and connectivity. The main stressors to the species from timber harvest include sedimentation, loss and modification of terrestrial habitat and canopy cover, and habitat fragmentation.

When trees are not retained in riparian areas to absorb water into the soil or reduce flow rates, this can increase runoff, resulting in sedimentation and higher flow velocity. Soil disturbance and accelerated surface erosion from tree removal increases the occurrence of fine sediments in streams, which in turn decreases the availability of the species' oviposition sites; these changes may persist for many years post-harvest (Spence et al. 1996, pp. 5–6). Additionally, harvesting timber on steep slopes can result in increased sedimentation, which can adversely impact torrent salamanders (Pilliod and Wind 2008, p. 52). Timber harvest can also result in increased debris inputs to streams when trees are no longer able to stabilize the soil and promote infiltration, causing changes in amount or quality of organic and inorganic substrate and a decrease in detritus and organic substrate (Spence et al. 1996, pp. 5–6). Additionally, the application of herbicides, pesticides, and fertilizers may occur in managed forests. Torrent salamander sensitivity to chemicals associated with forest management is poorly understood (Howell and Maggiulli 2011, pp. 21–22); however, amphibians are generally sensitive to chemical inputs to water quality because of their permeable skin (Pilliod and Wind 2008, p. 25).

Riparian and upland habitat modification resulting in less stream shading will increase water temperature, reduce humidity, and reduce streamflow in headwater streams (Spence et al. 1996, pp. 5–6; Welsh and Lind 1996, p. 392). When no trees are retained in the stream riparian management zone, stream temperatures can increase by up to 3.8 °C (6.8 °F), and watersheds can retain those elevated temperatures for 10 years after timber harvest (McIntyre et al. 2021, pp. 4–68). For example, when a two-sided

15.2-m (50-ft) buffer is applied along 50 percent of the riparian management zone (the current Washington Forest Practices buffer prescription for non-fish-bearing streams), stream temperatures increase by 1.1 °C (1.98 °F) and returned to pre- timber harvest temperatures after 2 years (McIntyre et al. 2021, pp. 4–68). Past and current timber harvest and riparian management can increase the amount of blowdown from wind events, resulting in further loss and modification of riparian and upland habitat (Spence et al. 1996, pp. 57, 221–222; McIntyre et al. 2018, pp. 6–7, 6–8).

Riparian buffers with dense canopy cover can help to create connectivity across landscapes, and canopy cover is strongly associated with gene flow for torrent salamanders (Emel and Storfer 2015, p. 209). Genetic studies of closely related, aquatic-reliant salamander species have observed loss of genetic diversity due to forest fragmentation from timber harvest activities on genetic diversity (Curtis and Taylor 2003, pp. 50–52; Crawford et al. 2016, pp. 2237–2240; González-Fernández et al. 2019, pp. 1996–1997). Forest canopy cover is considered essential to dispersal for torrent salamanders due to their need for moist microclimates. Forest cover and roads, which are influenced by timber harvest activities, have been shown to have the most impact on genetic distance in these species (Emel et al. 2019, p. 215). Cascade torrent salamander densities are 7 times lower in streams in managed forests than in streams in unharvested forest, due to higher stream temperatures (Pollett et al. 2010, p. 1083). Additionally, Cascade torrent salamander abundance has been documented to be three-fold lower in unbuffered and clearcut areas, when compared to buffered streams in second-growth forests that have regenerated after initial harvest (Pollet et al. 2010, p. 1085). Torrent salamanders were also positively associated with streams having 46-m (150 ft) buffers on either side (Stoddard and Hayes 2005, p. 818). Cascade and (closely related) southern torrent salamander densities were significantly lower where riparian forest was removed during timber harvest than in areas where it was not (Olson and Ares 2022, p. 10). Areas

in Oregon with continuous habitat and buffers about 70 m (229.7 ft) wide on both sides of the stream (for a total of 140 m (459.3 ft)) ameliorated the effects of timber harvest such that torrent salamander density was higher in these areas relative to areas without any buffer, and no-harvest buffers of 6 m (19.7 ft) and 15 m (49.2 ft), as well as 140 m (459 ft) buffers that have been thinned throughout (Olson and Ares 2022, p. 10).

Torrent salamanders benefit from riparian buffers, but full realization of their benefits may not occur immediately post-harvest but rather take years to realize (McIntyre et al. 2021, pp. 4–68). Specifically, research has shown that there is very little effect of timber harvest on torrent salamander density within 2 years following harvest, but abundance and density of Cascade and Columbia torrent salamanders decreased 64 percent 8 years after the implementation of upland clearcut harvest at sites under the Washington Forest Practices rules (McIntyre et al. 2021, pp. 9–50). In a before-after-control-impact study, occupancy of Columbia torrent salamanders was reduced following clear cut, even in areas where a 12-m riparian forested buffer was retained (Duarte et al. 2023, p. 6). Short-duration, variable sampling and available analytical techniques make understanding the effects of timber harvest and riparian buffer widths on torrent salamanders and other stream-associated amphibians difficult (Kroll 2009, p. 1188; Martin et al. 2021, p. 1); however, recent long-term research has begun to demonstrate more clearly the demographic effects of some timber harvest prescriptions on torrent salamanders over time (McIntyre et al. 2021, entire; Olsen and Ares 2022, entire). These findings provide a more long-term understanding of how varying buffer widths may influence torrent salamander densities compared to earlier reports from the same study (Olson et al. 2014, entire; Olson and Burton 2014, entire) and other studies in the immediate years after timber harvest treatments were implemented (McIntyre et al. 2018, p. 15).

The delayed onset of effects to abundance suggests that the effect of reduced canopy cover may be less tied to direct mortality or reduced fitness of adults, and instead may be related to reduced habitat quality to support long-term persistence and reproduction, because the egg and larval stages of the torrent salamander life cycle require the coolest water temperatures. In summary, some effects on torrent salamanders from timber harvest may not be fully realized until years after harvest, and large no-harvest buffers around streams may ameliorate harvest effects.

Timber harvest can affect torrent salamanders when they are breeding, feeding, sheltering, and dispersing at all life stages. Increased sedimentation can smother eggs, degrade oviposition sites, reduce fitness of individuals, and decrease prey availability (Pogue 2008, pp. 43–44). Individuals in areas with loss of overstory and changes in understory vegetation may be susceptible to desiccation and heat stress, in addition to loss of microhabitat (i.e., small pockets of shade with cooler water than the surrounding habitat).

The impacts of timber harvest on water availability, water temperature, water quality, habitat connectivity, and stream substrate result in decreased survival and reproduction at the population level. Loss of habitat connectivity from roads and land cover changes can cause genetic isolation, which restricts gene flow, further decreasing population resiliency in torrent salamanders (Emel et al. 2019, pp. 801, 812). The magnitude and extent of impact timber harvest can have on these species varies greatly depending on the location, total area, proximity and size of other harvested areas, slope, practices used, buffers, duration, and intensity of harvest. Timber harvest can impact Cascade and Columbia torrent salamanders to varying degrees, and effects can range from the individual scale or stream-level scale to affecting multiple populations.

Therefore, we considered the loss and degradation of habitat due to timber harvest a primary influence factor in our assessment of current and future condition of both the Cascade and Columbia torrent salamanders.

Conservation Efforts and Regulatory Mechanisms

In Washington, the Cascade torrent salamander has been a Candidate for Listing as State Endangered, Threatened, or Sensitive since 1993 (Washington Department of Fish and Wildlife (WDFW) 2022, p. 2). In Oregon, both species have State sensitive status (ODFW 2021, p. 8). The Cascade torrent salamander is also a Bureau of Land Management (BLM) and USFS sensitive species in Washington and Oregon (Interagency Special Status/Sensitive Species Program (ISSSSP) 2025, p. 33). Columbia torrent salamander is considered a BLM and USFS sensitive species in Oregon, but not in Washington, because the species is not currently known to occur on BLM or USFS lands there (ISSSSP 2025, not paginated). Both are identified as Species of Greatest Conservation Need under Washington's Comprehensive Wildlife Conservation Strategy (WDFW 2005, pp. 167–168), the Washington State Wildlife Action Plan (WDFW 2015, pp. A3-6 to A3-9), and the Oregon Conservation Strategy (ODFW 2026a,b, unpaginated). The Cascade torrent salamander is also a Priority Species under WDFW's Priority Habitat and Species Program (WDFW 2008, p. 113). Given there are no legal protections provided with these designations, we did not consider them as having population-level effects on the species.

The Cascade torrent salamander's range is predominantly on Federal (48 percent) and private lands (44 percent), with a smaller proportion on State lands (7 percent). In Washington, Cascade torrent salamanders are primarily on Federal with some State and private lands, and in Oregon, the species occurs mainly on Federal and private lands. The Columbia torrent salamander's range is predominantly on private land (68 percent), with less land in State (25 percent) or Federal ownership (5 percent). In Washington,

Columbia torrent salamanders are predominantly on State and private lands, and in Oregon they occur mostly on State and private lands, with some Federal lands.

Washington State and Private Lands

The Washington Department of Natural Resources (WDNR) Forest Practices program developed the Forest Practices Habitat Conservation Plan (HCP) under section 10(a)(1)(B) of the Act, which provides conservation for species covered by the HCP and support for an economically viable timber industry and creates regulatory stability for landowners (WDNR 2005, entire). The Forest Practices HCP covers all private landowners in Washington, except those with their own HCPs, and provides for the maintenance and restoration of aquatic and riparian habitat and covers multiple amphibians, including Columbia and Cascade torrent salamanders (WDNR 2005, pp. 123–127).

The WDNR Forest Practices program uses a water typing classification system of streams and other water bodies that identifies whether streams are used by fish, and whether or not streams experience perennial or seasonal flow. Under the Forest Practices HCP, conservation measures for non-fish-bearing streams, where the Columbia and Cascade torrent salamanders most commonly occur, include riparian management and equipment limitation zones. Equipment limitation zones are in place to minimize ground disturbance and are 9 m (30 ft) wide along either side of non-fish-bearing perennial and seasonal streams. Riparian management zones along perennial non-fish-bearing streams provide habitat protection through 15- to 17-m-wide (50- to 56-ft-wide) no-harvest buffers along either side of streams for at least 50 percent of each stream length (WDNR 2005, pp. 194–196). While torrent salamanders occupy both perennial and seasonal streams, riparian management zones pertain only to the perennial non-fish-bearing streams. The Forest Practices HCP protects side-slope and headwall seeps (when

associated with an identified stream) with a 15-m (50-ft) buffer and protects known headwater springs with a 17-m (56-ft) radius buffer.

We expect road-related erosion and sediment introduction into streams to be reduced under the Forest Practices HCP. Under the HCP, standards for roads on forest landowner lands require drainage structures, stabilization or removal of roads susceptible to mass wasting, and repair and maintenance of roads parallel to streams (WDNR 2005, pp. 246, 260).

Long-term research has demonstrated a negative effect of clearcut harvest to torrent salamanders under the Washington Forest Practices rules that were not observed until 7 and 8 years following harvest, when a 64 percent decrease in torrent salamander density was observed (McIntyre et al. 2021, pp. 4–68). Additionally, other studies in Oregon have shown that buffers with distances of 1-tree length (about 70 m (229.7 ft) wide on both sides of the stream for a total of 140 m (459.3 ft)) ameliorated the effects of timber harvest prescriptions over time (Olson and Ares 2022, p. 10). Therefore, conservation measures in the HCP ameliorate some but not all negative effects on the species. These measures would reduce the detrimental effects of forest practices on the resiliency of torrent salamander populations in the stream segments of perennial non-fish-bearing streams that receive protections from riparian management zones. However, non-fish-bearing seasonal streams are not protected under riparian management zones, so the conservation measures of this HCP are likely providing limited to no benefit for these habitats that support torrent salamanders.

The WDNR Forest Lands HCP applies to WDNR-managed State lands in Washington. While Cascade and Columbia torrent salamanders are not covered under this HCP, it provides a 30.5-m (100-ft) no-harvest buffer on both sides of non-fish-bearing perennial streams. For non-fish-bearing seasonal streams, the HCP applies the buffer width necessary to protect identifiable channels and unstable ground, but this provision is

not well-defined and appears to provide very limited protection for torrent salamanders (WDNR 1997, pp. IV–58). Conservation measures in the HCP ameliorate some but not all negative effects on the species. These measures would limit the detrimental effects of forest practices on the resiliency of torrent salamander populations in the stream segments of non-fish-bearing streams that receive protections from riparian management zones. The riparian management buffers described in the HCPs provide a greater benefit to the torrent salamanders than the conditions that would result without management buffers; however, larger buffers would generally provide greater benefits to the species overall (McIntyre et al. 2021, p. ES-5; Olson and Ares 2022, p. 10).

Oregon State and Private Lands

The Oregon Forest Practices Act of 1971 (Oregon Revised Statues Chapter 527) established water protection rules for forest management practices on State and private forestlands. The Oregon Forest Practices Act includes its own water-typing system for identifying whether or not streams are used by fish, and whether or not they have any domestic use as defined by the statute. The statute and associated rules provide some benefit to torrent salamander habitat through requiring retention of no-harvest riparian buffers.

The Oregon Board of Forestry adopted new Forest Practices Act rules on October 26, 2022. The rules first took effect on November 15, 2022; however, the rules applied initially only to the formation of an adaptive management committee, and in July 2023 the rules expanded to include stream buffer requirements for large private forestland owners (Oregon Forest Resources Institute (OFRI) 2022, p. 2). Beginning January 1, 2024, all new rules went into effect for all private forestland owners. The rules apply to "on the ground" implementation and require a 11-m (35-ft) equipment limitation zone for seasonal streams that flow into fish-bearing streams (OFRI 2022, p. 2). These areas do

not have a formal no-harvest buffer, but rather a limitation on use of logging equipment in the 11-m (35-ft) area on each side of the stream.

Small perennial non-fish-bearing streams that flow into fish-bearing streams are afforded a no-harvest Riparian Management Area buffer of 22.9 m (75 ft) from the confluence with the fish-bearing stream for the first 182.9 m (600 ft). Small perennial non-fish-bearing streams that flow into fish-bearing streams with salmonids or bull trout (*Salvelinus confluentus*) have a no-harvest Riparian Management Area buffer of 22.9 m (75 ft) from the confluence with the fish-bearing stream for the first 152.4 m (500 ft) and then a 15.2-m (50-ft) no-harvest Riparian Management Area for the next 198.1 m (650 ft) (OFRI 2022, p. 2).

Road-related erosion and sediment introduction into streams is expected to be reduced under the new rules (compared to past Forest Practices Act rules) through increased hydrologic disconnection of the road system and ensuring adequate aquatic organism passage at stream-road crossings. Further, both small and large forest landowners are required to update their roads to revised standards. These riparian management buffers provide a benefit to the torrent salamanders above conditions that would result without management buffers; however, larger buffers would generally provide greater benefits to the species overall (McIntyre et al. 2021, p. ES-5; Olson and Ares 2022, p. 10).

Private landowners are in the planning phases of developing an HCP for the Private Forest Accords, which would cover the Oregon Department of Forestry (ODF's) implementation of the Oregon Forest Practices Act and apply to all private, county/municipal forest, and Tribes on a voluntary basis across the State. Funding for the HCP may be available from Federal HCP planning grants, State appropriations, and the timber industry. Based on the Private Forest Accord Report (ODF 2022a, chapter 7), we expect the HCP to include the Columbia torrent salamander, but not the Cascade torrent

salamander. The updated Forest Practices Act rules include some improvements to riparian management, slope, and bank stability, improve culvert design, and reduce disconnected hydrology due to roads, which are all expected to improve conditions for torrent salamanders in Oregon (ODF 2022a, chapter 7).

ODF is developing an HCP for western Oregon State forests that they expect will contribute to the conservation of Cascade and Columbia torrent salamanders and their habitats on lands that the Department manages in western Oregon with an anticipated permit term of 70 years. Based on the 2022 draft HCP, activities they anticipate covering include timber harvest, stand management, road system management, recreation infrastructure construction and maintenance, and HCP conservation areas (ODF 2022b, p. ES-5). Based on the 2022 draft HCP, the ODF is planning to implement riparian conservation areas where seasonal streams would receive 11-m (35-ft) equipment limitation zones, small perennial non-fish-bearing streams would receive a 11-m (35-ft) no-harvest buffer, and small perennial non-fish-bearing streams that flow into fish-bearing streams would have a 36.6-m (120-ft) no-harvest buffer for the first 152.4 m (500 ft) above the confluence (ODF 2024, pp. 1–8). This HCP is in early planning phases, and the details of this effort are still in development.

While the equipment limitation zones and riparian management areas described in these draft HCPs are expected to provide a greater benefit to the torrent salamanders than the conditions that would result absent any management buffers, larger buffers would generally provide greater benefits to the species overall (McIntyre et al. 2021, p. ES-5; Olson and Ares 2022, p. 10). These efforts to develop HCPs are still in their developmental phases and have not yet been implemented, so they are not sufficiently certain to be implemented or effective under the Policy for Evaluation of Conservation Efforts when Making Listing Decisions (68 FR 15100, March 28, 2003). Since final

drafts of these HCPs are not yet complete, we cannot consider the actions associated with these documents as voluntary and regulatory conservation efforts in our analysis.

Some of the information provided in the previous paragraphs, which provides an update of ongoing forest practices in Oregon, was not available when we developed the SSA report. We will incorporate this information, and any new information received after publication of this proposal, as appropriate, in any final decision document.

In 2023, the Port Blakely HCP for the John Franklin Eddy Forestlands in Oregon, which included the Cascade torrent salamander, was finalized. This HCP is not within the range of the Columbia torrent salamander. Protections for Cascade torrent salamander include riparian management areas and a conservation strategy for the species (Port Blakely 2023, entire). Generally, riparian management areas for small non-fish-bearing seasonal streams and seeps include a 9.1-m (30-ft) equipment limitation zone. For small non-fish-bearing perennial streams, a 15.2-m (50-ft) buffer would be applied to each side of the stream, which includes a 7.6-m (25-ft) no-harvest zone adjacent to the stream and a 7.6-m (25-ft) managed buffer with 50 percent tree retention (Port Blakely 2023, appendix B). The riparian management buffers described in this HCP would create better conditions for the torrent salamanders than would result absent any management buffers; however, larger buffers would generally provide greater benefits to the species overall (McIntyre et al. 2021, p. ES-5; Olson and Ares 2022, p. 10).

Federal Lands

On Federal lands administered by the USFS and BLM, riparian protections are provided by the Northwest Forest Plan (NWFP) (USFS 1994, entire) and the BLM 2016 Resource Management Plans (RMPs). However, in 2023 the USFS proposed to amend the 1994 NWFP (88 FR 87393) and the BLM published a Notice of Intent (91 FR 8017) to revise those RMPs in 2026. The protections from individual Forest or District plans apply where they are more restrictive: The Land and Resource Management Plans of

Gifford Pinchot, Mt. Baker Snoqualmie, Mt. Hood, Willamette, and Siuslaw National Forests have less protective riparian management guidelines, so the NWFP is the source of riparian protections on these USFS lands (USFS 1994, p. 11). The NWFP designates land-use allocations that include specific management objectives, some of which include timber production, while others are more restrictive but may still include timber harvest to meet various objectives on managed lands (USFS 1994, entire). The NWFP provides two key protections for riparian species. First, the designation of key watersheds, where timber harvest cannot occur without a watershed analysis. Second, the designation of riparian reserves, where timber harvest is prohibited except where it meets aquatic conservation strategy objectives. The width of riparian reserves applied to streams depends on their category (USFS 1994, pp. 80–88). Riparian reserves on permanently flowing non-fish-bearing streams generally provide buffers of 45 m (150 ft) on each side, and on seasonally flowing or intermittent streams, riparian reserves provide a 30-m (100-ft) buffer on one side.

The BLM developed the Northwest and Coastal Oregon RMP in 2016, which defines "riparian reserve distances" differently from the NWFP and provides zone-specific management in these reserves. The guidelines for intermittent non-fish-bearing streams generally prohibit thinning within 15 m (50 ft) of the stream, and then depending on the subwatershed class there may be a requirement for maintaining 30 percent canopy cover beyond that point up to one-site potential tree height (BLM 2016, pp. 68–74). The guidelines for fish-bearing and perennial streams generally prohibit thinning within 36.6 m (120 ft) of the stream, and then depending on the subwatershed class there may be a requirement for maintaining 30 percent canopy cover beyond that point up to one site-potential tree height.

The USFS has developed guidance on the importance of aquatic organism passage, assessing existing passage conditions, and the design and construction of new

and replacement road-stream crossings (USFS 2005, entire; USFS 2008, entire). Although upgraded passage at road-stream crossings may improve habitat connectivity and quality, the available information indicates that few such improvements that will occur in the range of Cascade or Columbia torrent salamanders, since these improvements often focus on fish-bearing streams where torrent salamanders are not expected to occur (Hunter 1998, p. 58; Kroll et al. 2008, p. 3734).

The BLM similarly has aquatic management strategies that are part of their aquatic restoration program (BLM 2016, entire), although they also focus on road-stream crossings to improve fish passage. The USFS and BLM sensitive species policies (BLM 2008, p. 5; USFS 2011, p. 18) requires that projects affecting sensitive status species should be evaluated under the National Environmental Policy Act (NEPA). Since the Cascade torrent salamander is a sensitive status species in Oregon and Washington and the Columbia torrent salamander is sensitive in Oregon, effects of projects implemented by the BLM and the USFS within the range of the species in those States are evaluated through the NEPA process. Since Columbia torrent salamanders are not identified as sensitive status species in Washington (ISSSSP 2025, not paginated), effects of projects conducted by the BLM and USFS on these species are not evaluated through the NEPA process.

These USFS and BLM aquatic management strategies largely focus on fish-bearing streams and do not include many important habitat types for torrent salamanders. These aquatic management strategies provide a benefit to the torrent salamanders above conditions that would result absent management buffers; larger buffers would generally provide greater benefits to the species overall (McIntyre et al. 2021, p. ES-5; Olson and Ares 2022, p. 10).

Summary

Ultimately, the current regulatory mechanisms for timber harvest, road, and culvert management activities occurring in or near headwater streams, seeps, and splash zones in Washington and Oregon are not adequate to eliminate the current and ongoing threats to these species. While these conservation measures may provide some benefit to the torrent salamanders, expanded conservation measures, including larger riparian management buffers, would provide greater benefits to the species overall (McIntyre et al. 2021, p. ES-5; Olson and Ares 2022, p. 10). The two HCPs that are in development in Oregon have not yet been implemented (or even finalized), so they are not sufficiently certain to be implemented or effective under the Policy for Evaluation of Conservation Efforts when Making Listing Decisions (68 FR 15100, March 28, 2003).

Cumulative Effects

By using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have analyzed the cumulative effects of identified threats and conservation actions on the species. To assess the current and future condition of the species, we evaluate the effects of all the relevant factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative-effects analysis.

Current Condition

Analysis

A thorough review of the Cascade and Columbia torrent salamanders' current condition is presented in chapter 5 of the SSA report (Service 2023, pp. 55–87).

To assess the current condition of the Cascade and Columbia torrent salamanders, we defined analytical units (AUs) using the U.S. Geological Survey's 12th level hydrologic unit codes (HUC-12s) in which the species has been observed since 1980

(roughly six generations for both species). The best scientific and commercial data available indicate that a HUC-12 could include multiple populations given torrent salamanders' limited gene flow (Olson and Burnett 2009, p. S119; Emel and Storfer 2015, p. 214; Emel et al. 2019, p. 220). HUC-12s provide a biologically relevant scale to characterize variation in influence factors across the species' range, and HUCs are an accepted system of delineating study areas of interest for torrent salamanders and other aquatic species (Olson and Burton 2019, p. 13). Currently, the Cascade torrent salamander occupies 149 AUs (see figure 2), and the Columbia torrent salamander occupies 123 AUs (see figure 3).

Analytical Units for Cascade Torrent Salamander

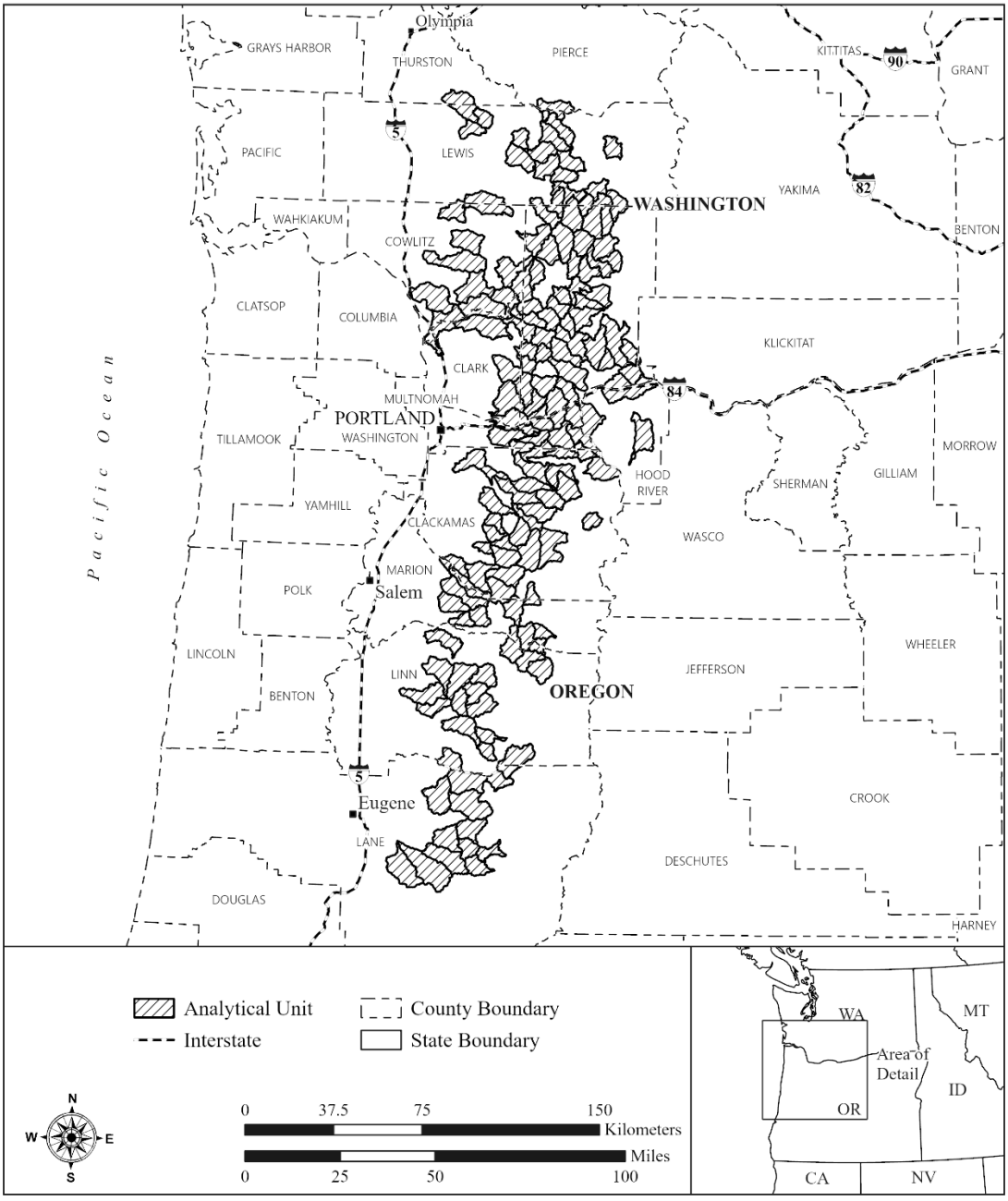


Figure 2—Cascade torrent salamander HUC-12 analytical units.

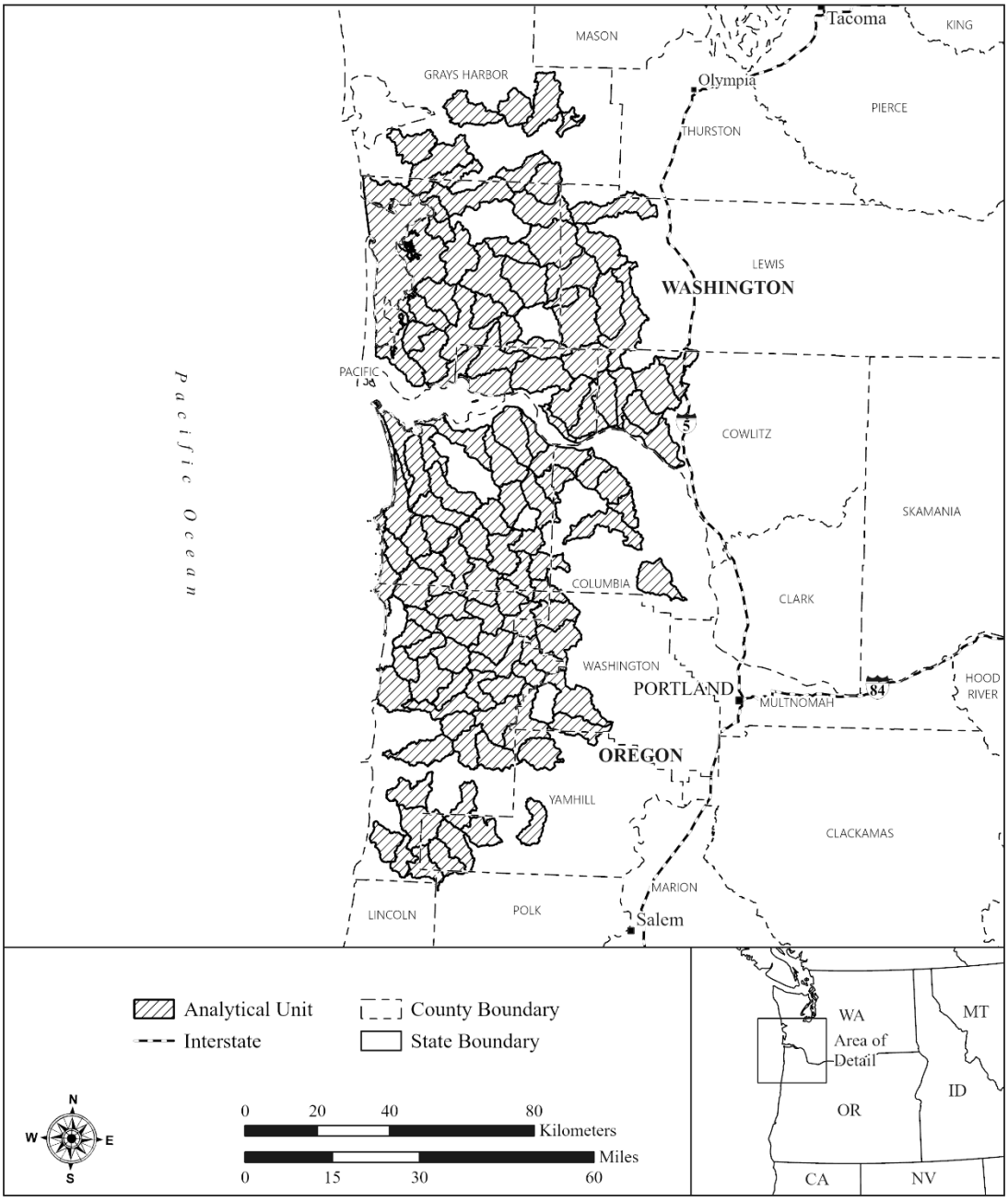


Figure 3—Columbia torrent salamander HUC-12 analytical units.

To analyze resiliency, we considered how the effects of primary threats (drought, severe heat, wildfire, and the loss or degradation of habitat due to roads, culverts, and timber harvest) and influences to habitat quality and quantity affect the species' resource needs and the species at the population level. There have not been any long-term demographic studies on either of these species that estimate the species' population

growth rates, population sizes, or other demographic parameters across all analytical units. In the absence of long-term demographic data, we used spatially explicit data on habitat quality and quantity to assess resiliency for the species within and across the AUs. The analysis focused on evaluating the quality and quantity of habitat resources, as well as the threats that impact these resources. This approach assumes that where there is high-quality habitat and low magnitude of threats, the species can reproduce and sustain high-resiliency populations. Conversely, where there is low-quality habitat and high magnitude of threats, the species are not expected to sustain high-resiliency populations.

The best available information finds that both Cascade and Columbia torrent salamanders have experienced direct habitat impacts from loss of forest cover, drought, and declining stream flow, which all influence its current condition. Cascade torrent salamander abundance was significantly lower in forests that were cut within 0-22 years than in older stands (Steele et al. 2003, p. 450). Cascade and (closely related) southern torrent salamander densities were significantly lower where riparian forest was removed during timber harvest than in areas where it was not (Olson and Ares 2022, p. 10). Cascade torrent salamanders across public and private lands were positively associated with mature and old growth forests at both fine and coarse scales (Herrera et al. 2026, p. 6).

Timber harvest fragmented forests and reduced genetic connectivity in Columbia torrent salamander (Emel et al. 2019, p. 808). Columbia torrent salamander occurrence was significantly lower where riparian forest was removed during timber harvest than in areas where it was not (Stoddard and Hayes 2005, p. 817). In a before-after-control-impact study, occupancy of Columbia torrent salamanders was reduced following clear cut, even in areas where a 12-m riparian buffer was retained (Duarte et al. 2023, p. 6). Habitat loss and fragmentation due to drought limits torrent salamanders' ability to

maintain genetic exchange and limits their ability to re-found locally extirpated populations when they are impacted by drought (Olson and Burton 2019, pp. 3, 21).

We developed a conceptual model that focused on characterizing habitat quality and quantity and assessing the impact of key influence factors for the species. As part of this conceptual model, we used a statistical species distribution model (interpreted as a habitat suitability model) developed by Thurman et al. (2022, entire). Briefly, the habitat suitability model related presence and absence data to a large set of topographical, hydrological, land cover, and climate variables that best describe the current known spatial distribution of Cascade and Columbia torrent salamanders, respectively. These variables characterize most of the species' resource needs (water availability, stream temperature, canopy cover, etc.) and some of the key influence factors for the species, including drought and severe heat. The model was subsequently used to predict habitat suitability across stream segments, and from those habitat suitability rankings, the modeling team field validated (surveyed) a subset of HUC-12 watersheds characterized as low, moderate, and high suitability to determine how well they predicted Columbia and Cascade torrent salamander presence.

Overall, the model predicted Columbia torrent salamander presence well: the species was detected at 26 of 32 sites modeled as high habitat suitability, and higher local relative abundance was correlated with higher habitat suitability. However, the model did not predict Cascade torrent salamander presence as well: the species was detected at 13 of 37 sites modeled as high habitat suitability. The model was then further refined to capture the Cascade torrent salamander's habitat associations more accurately (Thurman 2019, pp. 2–3). This refined habitat suitability model was built using recent climate and habitat data combined with current (1980 and later) occurrence records. Predictions from the model should be viewed as an optimistic depiction of habitat suitability, particularly for Cascade torrent salamander, given its patchy distribution. Additional discussion on the

model used in our analysis is described in detail in appendix A of the SSA report (Service 2023, pp. 143–155).

The habitat suitability model did not include variables that sufficiently represent the ongoing threats of wildfire, and loss or degradation of habitat due to roads, culverts, or timber harvest, and thus does not represent the impact these influence factors can have on the species. We therefore used additional spatial data to characterize the impact that these factors pose to the species in each AU. Additionally, the habitat suitability model did not assess habitat quantity. The seeps, ephemeral streams, and small headwater streams that this species occupies are not thoroughly mapped, and there have not been comprehensive surveys for the species across its range, so it was not possible to directly assess habitat quantity in each AU. Instead, we used development to inform our assessment of habitat quantity by calculating the area of a watershed that has appropriate habitat cover (forested), and the area that does not (where development is present). While the impacts of development were evaluated in our analysis, the best scientific and commercial data available indicate that development alone is not impacting either species at the population level. The habitat suitability model serves as our baseline, from which wildfire and habitat loss or degradation due to roads, culverts, timber harvest, and development subtract from that model's assessment of population resiliency.

Timber harvest was not prominent in the quantitative model, due to the uncertainty around timing and location of timber harvest, and the lack of range-wide spatial data to assess this factor. However, because timber harvest is a key population-level threat to the species, we also provided a qualitative analysis of the magnitude of the timber harvest threat now and over the next 5 years, to help provide greater context and understanding of this threat. We used published timber harvest simulations to characterize timber harvest over the next 5 years in this qualitative analysis (Wilson et al. 2014, entire). This study used a spatially explicit state-and-transition simulation model to

simulate land use change and timber harvest, which we considered the best scientific and commercial data available for this analysis. For more information about the qualitative assessment of timber harvest used in our current conditions analysis, please refer to the SSA report (Service 2023, p. 67).

We describe the current condition of the Cascade and Columbia torrent salamanders by characterizing their overall viability in terms of resiliency, redundancy, and representation. We analyzed the current resiliency of each AU by considering habitat quality and the effects of threats on individual- and population-level needs. To evaluate adaptive capacity at the species level, we defined representation units (RUs) for current condition by performing a niche overlap analysis for each species. The niche overlap analysis assessed geographic differentiation in both environmental conditions and neutral genetic markers (i.e., population structure) to provide useful information for delineating patterns of adaptive capacity across both species' ranges. The niche overlap analysis found three RUs for the Cascade torrent salamander (North, Columbia, and South) (see figure 4) and two RUs for Columbia torrent salamander (North and South) (see figure 5).

Representative Units for Cascade Torrent Salamander

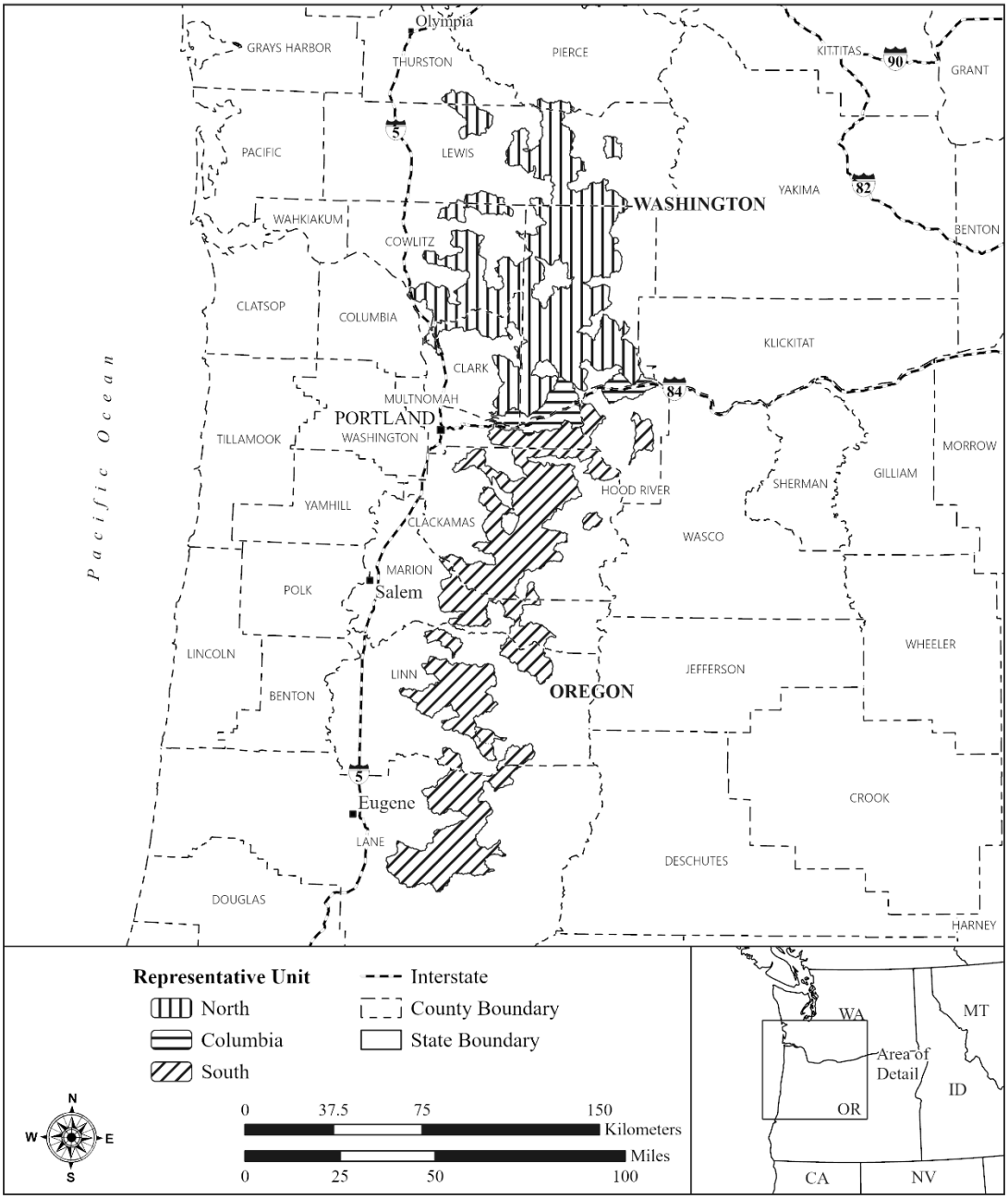


Figure 4—Cascade torrent salamander representation units.

Representative Units for Columbia Torrent Salamander

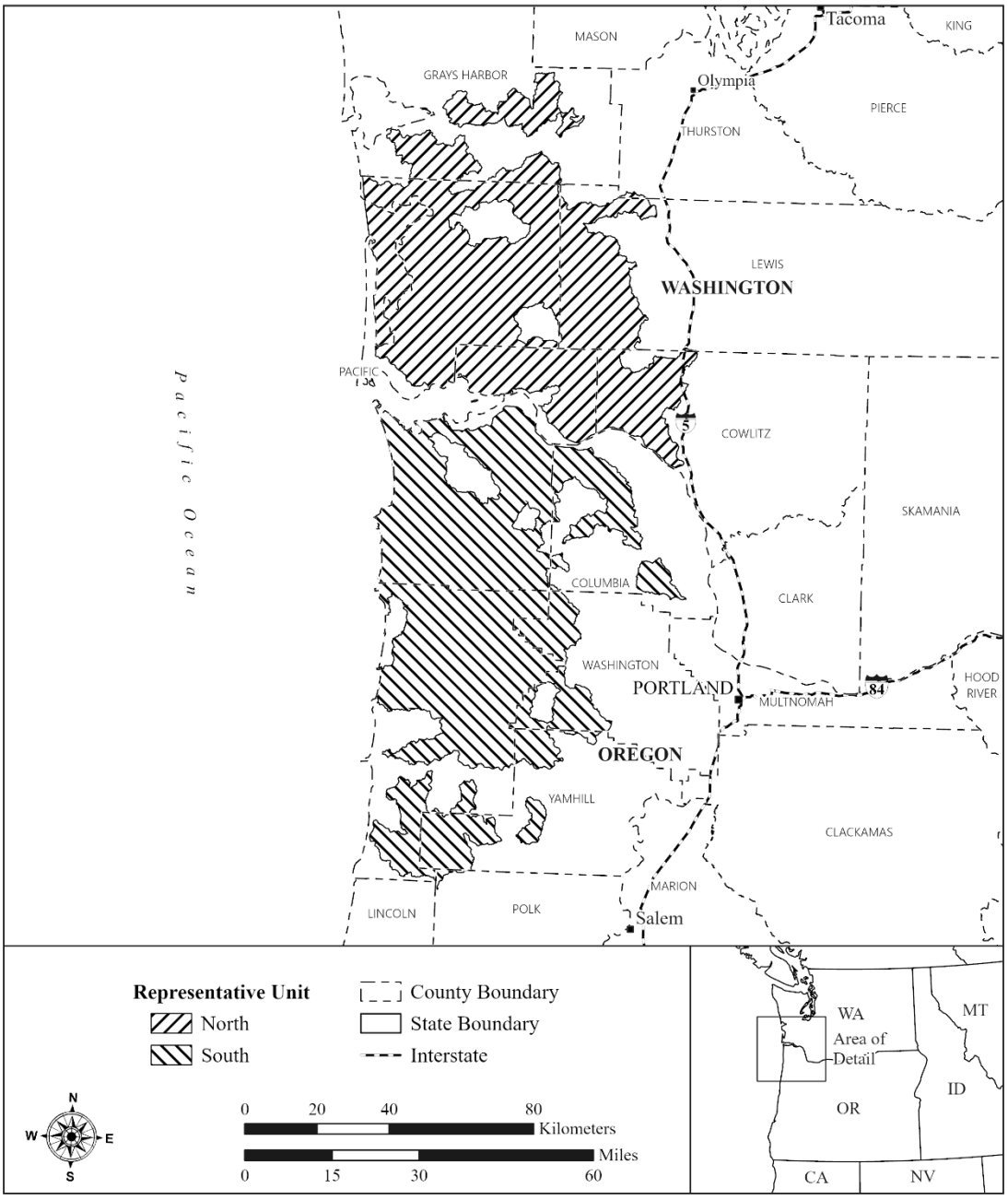


Figure 5—Columbia torrent salamander representation units.

Cascade Torrent Salamander Current Condition

Of the 149 AUs assessed, 65 percent currently exhibit high or very high resiliency, 9 percent exhibit moderate resiliency, and 26 percent exhibit low or very low resiliency. High-condition AUs are located throughout the species' range and are present in all RUs. Nearly all the low- and very-low-condition AUs are adjacent to high or

medium AUs. As such, there may be a higher potential for genetic exchange and recolonization in low- and very-low-condition AUs following a catastrophic event. Of the individual influence factors assessed in the quantitative analysis, habitat quality and recent wildfire largely drove the current condition resiliency scores of the Cascade torrent salamander AUs. In contrast, roads, culverts, and timber harvest collectively only reduced resiliency scores in 10 AUs (7 percent) in the quantitative model. However, most AUs (83 percent) may be susceptible to timber harvest in areas of land surrounding small headwater streams where timber harvest is a primary objective, so timber harvest could pose a threat to the species over most AUs in the next 5 years. As mentioned above, the effect of timber harvest was not prominent in the quantitative analysis due to uncertainty about the timing and locations of where harvest would occur so a qualitative analysis was done to better understand the magnitude of the threat to the species in both current and future conditions. Based on the qualitative analysis, within the range of the Cascade torrent salamander, we estimate that 68 percent of the land area (7,984 out of 11,819 km^2 or 4,961 mi^2 out of 7,344 mi^2) is currently under a land use allocation where timber harvest is a primary objective. The Cascade torrent salamander is expected to be exposed to timber harvest in approximately 3.5 percent of the analyzed riparian area around headwater streams in the next 5 years, and roughly 5 percent of the species' range in total. Due to their use of upland habitat for dispersal for genetic exchange, and the high proportion of the area immediately surrounding headwater streams having few harvest protections, impacts to individual Cascade torrent salamanders due to timber harvest activities may occur over the next 5 years.

Nearly all (98 percent) of AUs in high current condition face a likely threat of catastrophic wildfire in the next 5 years if ignition occurs during severe fire weather conditions. Based on historical trends, catastrophic wildfires may occur in approximately 11 AUs (7 percent of AUs) in the next 5 years, which would reduce the species' ability to

sustain populations in the wild. Adaptive capacity for the Cascade torrent salamander is low due to its relatively long generation time, low mobility, small clutch size, long egg development (210–290 days), high site fidelity, restricted physiological tolerances, high sensitivity to environmental conditions, low prevalence of occurrence and relative abundance at high and moderate quality sites, and patchy distribution (Thurman et al. 2019, p. 2; 2020, p. 522). However, the widespread distribution of high- and medium-resiliency AUs across the species' range indicates there is sufficient high-quality habitat to maintain connectivity and gene flow and thus adequate representation.

In summary, Cascade torrent salamanders currently have multiple high-resiliency populations throughout their range, despite reductions in the quality and quantity of available habitat and threats from wildfire, timber harvest, and to a lesser extent, roads and culverts. These high-resiliency populations are distributed across multiple RUs, and most of them are expected to be retained over the next 5 years in the face of catastrophic wildfire, which indicates an adequate degree of redundancy and representation for the species.

Columbia Torrent Salamander Current Condition

Of the 123 total AUs, occurrence records were available for 121 AUs and were therefore assessed in the habitat suitability model. The remaining two AUs were not assessed in the model. Of the 121 AUs assessed, 59 percent currently exhibit high resiliency, 21 percent exhibit moderate resiliency, and 19 percent exhibit low or very low resiliency. Of all the individual influence factors assessed, habitat suitability largely drove the current-condition resiliency scores of the Columbia torrent salamander AUs. Timber harvest impacted our final estimation of resiliency in only 10 AUs (8 percent) because it did not factor heavily into the quantitative model. However, most AUs (88 percent) are not protected by timber harvest restrictions, so timber harvest could pose a threat to the species over most AUs in the next 5 years. Similar to the Cascade torrent

salamander, a qualitative analysis was done to better understand the magnitude of the threat to the species in both current and future condition. Based on the qualitative analysis, within the range of Columbia torrent salamander, we estimate that 95 percent of the land area (9,577 out of 10,089 km^2 or 5,951 mi^2 out of 6,269 mi^2) is currently under a land use allocation where harvest is a primary objective. The Columbia torrent salamander is expected to be exposed to timber harvest in approximately 4.8 percent of the analyzed riparian area around headwater streams in the next 5 years, and roughly 5 percent of the species' range in total. Due to their use of upland habitat for dispersal and genetic exchange, and the high proportion of the area immediately surrounding headwater streams having few harvest protections, impacts to individual Columbia torrent salamanders due to harvest activities may occur over the next 5 years.

Finally, development did not ultimately impact current condition in any AUs as development was a threat in AUs that already had very low habitat suitability, and the combined effects of timber harvest, roads, and culverts posed a threat in only 12 AUs and thus impacted current condition in only 12 AUs (10 percent). High-resiliency AUs are distributed throughout both RUs, with 23 in the north and 49 in the south, and we do not expect an appreciable loss in redundancy from catastrophic wildfire in either RU in the next 5 years. The widespread distribution of high- and medium-resiliency AUs across the range of the species indicates that there is sufficient high-quality habitat to maintain connectivity and gene flow, and thus retain adaptive capacity (representation). In the areas surveyed within their range, Columbia torrent salamanders are found in moderate relative abundance (Thurman et al. 2019, p. 2), which may support connectivity and gene flow. However, adaptive capacity for the Columbia torrent salamander is limited due to its relatively long generation time (5 to 8 years to sexual maturity), small clutch size, long egg development (210–290 days), low mobility, high site fidelity, restricted physiological tolerances, and high sensitivity to environmental conditions.

In summary, Columbia torrent salamanders currently have multiple high-resiliency populations throughout their range despite reductions in the quality and quantity of available habitat and threats from timber harvest and, to a lesser extent, wildfire, roads, and culverts. These high-resiliency populations are distributed across the multiple RUs, and most of them are expected to be retained over the next 5 years in the face of catastrophic wildfire, which indicates an adequate degree of redundancy and representation for the species.

Future Conditions

To characterize future resiliency, we used the estimated current-condition resiliency and assessed whether resiliency is expected to remain the same or change in the future given the projected magnitude of threats. We developed two future-condition scenarios that projected out to approximately 2080, as future projections were available for most metrics for the "late century" (around 2070 to 2099), and thus centered around 2080. We also considered this late-century period an appropriate estimate of the species' response to threats over approximately seven generations, given the relatively long generation time (approximately 5 to 8 years to sexual maturity) of the Cascade and Columbia torrent salamanders. The scientific community uses representative concentration pathways (RCPs) to explore and model potential anthropogenic development paths based on trajectories of concentrations and emissions of greenhouse gas and air pollutants, as well as changes in land use, through 2100 (van Vuuren et al. 2011, pp. 5–7). We used RCPs 4.5 and 8.5 to serve as the bookends for our future scenarios. Mirroring the current-condition analysis, we assessed habitat quality and the impacts of the primary threats (drought, severe heat, wildfire, development, and timber harvest) in our assessment of future condition, as the magnitude of these threats are expected to increase in the future. We did not project road and stream intersections into the future because there were no spatially explicit future projections of roads. However,

since this influence factor was included in the current-condition analysis, it is carried into the future, remaining at its current status.

Timber harvest did not factor heavily into our quantitative model of current or future conditions due to uncertainty in when and where timber harvest will occur and our limited ability to quantify the threat. However, qualitatively, approximately 93 percent of AUs in the Columbia torrent salamanders' range and 77 percent of AUs in the Cascade torrent salamanders' range are not protected from timber harvest, demonstrating that most populations are vulnerable to this threat. Our future-conditions model could underestimate the full extent of timber harvest as a threat to the species, and as a result, it potentially overestimates resiliency.

Due to the salamanders' desiccation intolerance, water availability is one of the most important indicators of habitat quality. As such, we determined stream flow volume to be an appropriate indicator of habitat quality for the species in the absence of a habitat suitability model for the future timeframe. Analytical details for each element of our analysis (i.e., factors that contribute to habitat quality, as well as indicators of the population-level threats to the species) are presented in chapter 6 of the SSA report (Service 2023, pp. 88–98).

Cascade Torrent Salamander Future Conditions

In Scenario 1 (RCP4.5), 44 percent of AUs are projected to exhibit high resiliency in the future and 5 percent are projected to exhibit medium resiliency. Resiliency was projected to be low, very low, or presumed extirpated in 51 percent of AUs. In this scenario, future conditions for the Cascade torrent salamander were largely driven by current condition, with the added impacts of drought, severe heat, and low stream-flow volume (habitat quality). Sixteen AUs (11 percent) are projected to face severe drought conditions with four others (3 percent) facing extreme drought conditions. In the 14 AUs facing a threat from severe heat, we estimated that a median of 14 percent of stream

length would be below the 15 °C (59 °F) tolerance level of the species. We estimated that changes in habitat quality would impact resiliency for 21 AUs, with a median of 67 percent reduction in stream flow volume across those AUs.

We estimated stochastic wildfire to pose a threat to 33 AUs (with a median 91 percent probability of at least one wildfire by 2080), and the remaining 116 AUs that did not meet the "very likely" threat threshold (90 percent) had a probability of 85 percent. However, stochastic wildfire did not ultimately reduce future condition in any AUs in our resiliency model because, either (1) all watersheds with a threat from wildfire were already classified as low, very low, or presumed extirpated from other threats, or (2) it was the only threat in an AU, and we did not consider this threat alone would reduce future resiliency. Timber harvest or development are not expected to reduce resiliency in any AUs under this scenario based on the quantitative analysis. However, as mentioned above, the effect of timber harvest was not prominent in the quantitative analysis due to uncertainty about the timing and locations of where harvest would occur so a qualitative analysis was completed to better understand the magnitude of the threat to the species in both current and future condition. We estimate that roughly 29 percent (2,473 km^2 or 1,537 mi^2) of the headwater riparian areas and 29 percent (3,396 km^2 or 2,110 mi^2) total land area across the species range under Scenario 1 may be harvested between 2022 and 2080.

Regardless of the scenario, only eight analytical units (5 percent) have greater than or equal to 50 percent of the area around headwater streams (140 m or 459 ft) protected from timber harvest, indicating that timber harvest may continue to occur near headwater streams into the future. Further, by 2080 some sites may be harvested more than once, potentially exacerbating impacts to torrent salamander resiliency from repeated harvest and habitat fragmentation in either scenario. Harvest within and outside of riparian areas may exacerbate habitat fragmentation in the species' range and further

limit connectivity and gene flow. Declines in connectivity are potentially consequential for this species, as it already has a patchy distribution. Given that demographic impacts of timber harvest may be delayed in this species, long term impacts from timber harvest incurred by multiple generations could have compounding effects on this species' populations into the future.

The high-resiliency AUs are distributed throughout the range of the species and in all RUs, which may provide the potential for recolonization and genetic rescue of populations following a catastrophic event. However, even at high-quality sites, the species currently appears to have low relative abundance with low incidence of occurrence and, therefore, may be limited in its ability to recolonize new areas in the future (Thurman et al. 2019, p. 2). Cascade torrent salamanders innately have a low potential for adaptive capacity due to the species' patchy distribution, low prevalence of occurrence, and life history traits (e.g., relatively long generation time, low mobility, small clutch size, long egg development, high site fidelity, restricted physiological tolerances, and high sensitivity to environmental conditions). Overall, the future redundancy of the species is reduced compared to current condition under Scenario 1, because fewer clusters of high-resiliency AUs are present in each RU, with the exception of the Columbia River RU. We expect representation in the Cascade torrent salamander to decline at late century under Scenario 1.

Under Scenario 2 (RCP8.5), 17 percent of the AUs are projected to exhibit high resiliency in the future and 1 percent are projected to exhibit medium resiliency. Resiliency was projected to be low, very low, or presumed extirpated in 83 percent of AUs. In Scenario 2, future conditions for the Cascade torrent salamander were largely driven by current condition with the added impacts of drought, severe heat, and changes in habitat quality. Fifty-five AUs (37 percent) are projected to face severe drought conditions with 22 others (15 percent) facing extreme drought conditions. In the 52 AUs

facing the threat of severe heat, we estimated that a median of 5 percent of stream length would remain in the thermal range of the species. We determined changes in habitat quality would impact resiliency for 21 AUs, with a median of 67 percent reduction in stream flow volume (habitat quality) across watersheds. Decreased stream flow volume of 4.5 to 11.5 percent, a smaller decline than what we projected for most AUs, has been shown to substantially impact connectivity for Cascade torrent salamanders (Olson and Burton 2019, p. 1). We projected that resiliency would be reduced in 10 AUs (7 percent) by timber harvest, in 58 AUs (39 percent) by development, and in 33 AUs (22 percent) by wildfire. Importantly, the remaining 116 AUs that did not meet the "very likely" threat threshold for stochastic wildfire of 90 percent (probability of at least one wildfire occurring by 2080) had a probability of 89 percent—just below the 90 percent threshold. However, these factors did not reduce future conditions in any AUs in our model because, either (1) all AUs with impacts from timber harvest, development, or wildfire were already classified as low, very low, or presumed extirpated from other threats; or (2) only one of these elements was present in an AU, and we did not deem one of these elements alone enough to reduce future resiliency.

Furthermore, based on the qualitative analysis, we estimate that roughly 36 percent (3,133 km^2 or 1,947 mi^2) of headwater riparian areas and 36 percent (4,280 km^2 or 2,659 mi^2) total land area across the species range in Scenario 2 will be harvested between 2022 and 2080. By late century, timber harvest is likely to have an impact on torrent salamander resiliency under either future scenario. With their patchy distribution, reduced habitat availability and increasingly fragmented and degraded habitat, along with the high proportion of the area immediately surrounding headwater streams with few timber harvest protections in place, we expect that future timber harvest will continue to reduce this species' ability to maintain connectivity and population viability into the future, and their overall resiliency.

Fewer high-resiliency AUs are immediately adjacent to one another, reducing connectivity and the ability for colonization following a catastrophic event. With fewer high-resiliency AUs in the future, redundancy is greatly reduced under Scenario 2. As discussed under Scenario 1, Cascade torrent salamanders innately have a low potential for adaptive capacity. We expect representation in the Cascade torrent salamander to undergo greater decline under Scenario 2 than under Scenario 1 by late century.

In summary, Cascade torrent salamander population resiliency was projected to be low, very low, or presumed extirpated in 84 AUs (56 percent) under Scenario 1 and 125 AUs (84 percent) under Scenario 2. We expect redundancy of the Cascade torrent salamander to decline under Scenario 1 and more so under Scenario 2, as multiple high-resiliency populations distributed across the species' range are projected to be impacted by catastrophic wildfire within the future timeframe considered for this analysis. Given the magnitude of ongoing impacts from drought, severe heat, reductions in habitat quality, catastrophic wildfire, continued impacts from timber harvest, and future projections indicating the increased frequency and severity of these threats, the species will likely experience a decline in resiliency, redundancy, and representation into the future.

Columbia Torrent Salamander Future Conditions

In Scenario 1, 20 percent of AUs are projected to exhibit high resiliency in the future and 3 percent are projected to exhibit medium resiliency. Resiliency was projected to be low, very low, or presumed extirpated in 75 percent of AUs. In Scenario 1, future conditions for the Columbia torrent salamander were largely driven by current conditions and the threats posed by drought and severe heat. Thirty-three AUs (27 percent) are projected to face severe drought conditions, and 32 (26 percent) extreme drought conditions. In the 36 AUs facing a threat from severe heat, we estimated a median of 6 percent of stream length will remain in the thermal range of the species. We do not

expect development or changes in habitat quality to reduce species' resiliency in any watersheds under this scenario. Although we expect that stochastic wildfire will pose a threat to every watershed (with a 97 percent probability of at least one wildfire by 2080 across the range), stochastic wildfire did not ultimately reduce future conditions in any watersheds in our resiliency model because, either (1) the watershed was already classified as low, very low, or presumed extirpated from other threats; or (2) it was the only threat in an AU, and in our model this threat alone did not reduce future resiliency. In the quantitative model, timber harvest posed a threat to only one AU but did not ultimately impact its future conditions, as this watershed was already in low current condition, and timber harvest represented the sole threat. However, based on the qualitative model, we estimate that roughly 44 percent (3,402 km^2 or 2,114 mi^2) of the headwater riparian areas and 43 percent (4,319 km^2 or 2,684 mi^2) total land area across the species range under Scenario 1 may be harvested between 2022 and 2080.

Regardless of the scenario, only one AU (less than 1 percent) has greater than or equal to 50 percent of the area around headwater streams (140 m or 459 ft) protected from timber harvest, indicating that timber harvest may continue to occur near headwater streams into the future. Further, by 2080 some sites may be harvested more than once, potentially exacerbating impacts to torrent salamander resiliency from repeated harvest and habitat fragmentation in either scenario. Harvest within and outside of riparian areas may exacerbate habitat fragmentation in the species' range and further limit connectivity and gene flow. Given that demographic impacts of timber harvest may be delayed in this species, long term impacts from timber harvest incurred by multiple generations could have compounding effects on this species' populations into the future.

The high-resiliency AUs are distributed throughout the range of the species, in both RUs, but five AUs are not directly adjacent to any other high-resiliency watersheds, which limits the ability for recolonization and rescue of populations following a

catastrophic event. Columbia torrent salamanders innately have a low potential for adaptive capacity due to the species' life history traits (e.g., relatively long generation time, small clutch size, long egg development, low mobility, high site fidelity, restricted physiological tolerances, and high sensitivity to environmental conditions). Overall, the future redundancy of the species is reduced compared to current condition under Scenario 1, because fewer clusters of high-resiliency AUs are present in each RU. Thus, representation for Columbia torrent salamander declines over the next 60 years under Scenario 1.

In Scenario 2, 7 percent of AUs are projected to exhibit high resiliency in the future. Resiliency was projected to be low, very low, or presumed extirpated in 93 percent of AUs. In Scenario 2, future conditions for the Columbia torrent salamander were largely driven by current condition and the threats posed by drought and severe heat. Like Scenario 1, stochastic wildfire will pose a threat to every watershed (with a 97 percent probability of at least one wildfire by 2080 across the range) but did not ultimately reduce future conditions in any watersheds in our resiliency model. Timber harvest posed a threat to 17 watersheds, development posed a threat to 8, and reductions in stream flow (habitat quality) posed a threat to 0 watersheds. However, neither of these influence factors ultimately altered future conditions in the quantitative model because all the watersheds in which these factors were a threat were already classified as low, very low, or presumed extirpated based on other influence factors. For timber harvest, based on the qualitative analysis, we estimate that roughly 59 percent (4,517 km^2 or 2,807 mi^2) of headwater riparian areas and 56 percent (5,704 km^2 or 3,544 mi^2) total land area across the species range in Scenario 2 will be harvested between 2022 and 2080. By late century, timber harvest is likely to have an impact on torrent salamander resiliency under either future scenario. Timber harvest could also have synergistic interactions with other threats. For instance, dispersal for the species relies on both forested habitat and water

availability, and reduced canopy cover can exacerbate stream drying at stream origins, thus limiting dispersal (Olson and Burton 2019, p. 23).

The high-resiliency AUs are present in single clusters in both RUs, which increases connectivity between remaining populations but also increases vulnerability to extirpation by a single catastrophic event, such as catastrophic wildfire. Overall, the future redundancy of the species is greatly reduced compared to current condition under Scenario 2, given that multiple clusters of high-resiliency AUs are not present in each RU. As discussed under Scenario 1, Columbia torrent salamanders innately have a low potential for adaptive capacity. Overall, representation for the Columbia torrent salamander declines significantly over the next 60 years under Scenario 2.

In summary, Columbia torrent salamander population resiliency was projected to be low, very low, or presumed extirpated in 96 AUs (78 percent) under Scenario 1 and 114 AUs (93 percent) under Scenario 2. We expect redundancy of the Columbia torrent salamander to decline in the future under both Scenario 1 and Scenario 2, where several of the few high-resiliency populations distributed across the species' range are expected to be impacted by catastrophic wildfire in the future timeframe considered. Given these factors, and the severe magnitude of ongoing threats from drought, catastrophic wildfire, and severe heat, continued impacts from timber harvest, and future projections indicating the increased frequency and severity of these threats, the species will likely experience a decline in resiliency, redundancy, and representation into the future.

Determination of Cascade Torrent Salamander Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an endangered species or a threatened species. The Act defines an "endangered species" as a species in danger of extinction throughout all or a significant portion of its range, and a "threatened species" as a species likely to become an endangered species

within the foreseeable future throughout all or a significant portion of its range. The Act requires that we determine whether a species meets the definition of an endangered species or a threatened species because of any of the following factors: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range: Cascade Torrent Salamander

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we assessed the status of the Cascade torrent salamander to determine if the species meets the definition of an endangered species. We considered the primary threats impacting the species, including drought, severe heat, wildfire (Factor E) and the loss or degradation of habitat due to roads, culverts, and timber harvest (Factor A).

Our assessment of the best scientific and commercial data available indicates the current condition of the species is affected by the quality and quantity of available habitat, which has been degraded primarily by recent large wildfires, roads, culverts, and timber harvest. Within the range of the Cascade torrent salamander, recent large-scale high severity wildfire has impacted 11 AUs (7 percent) and is considered a likely catastrophic threat in 133 AUs (89 percent). Historically, road development in the species' habitat has increased along with increased urbanization, forest management, and development. Timber harvest is a current threat in 124 AUs (83 percent), and we estimate that 68 percent of the land area across the range of the Cascade torrent salamander is currently under a land-use allocation where timber harvest is a primary objective.

Based on our quantitative analysis, we found the Cascade torrent salamander currently has 111 AUs (75 percent of all AUs) in moderate (14 AUs), high (96 AUs), or

very high resiliency (1 AU) distributed across its historical range, including all three RUs. High-resiliency-condition AUs are located throughout the species' range and present in all RUs, providing high redundancy to the species, thus facilitating the species' ability to recover from catastrophic events, such as severe wildfire, or the ongoing impacts of timber harvest. In addition, nearly all the low- (18 AUs) and very-low condition (20 AUs) AUs are adjacent to high- or medium-condition AUs, which provides potential for population recovery. While adaptive capacity (representation) for the Cascade torrent salamander is low due to its relatively long generation time, low mobility, small clutch size, long egg development, high site fidelity, restricted physiological tolerances, high sensitivity to environmental conditions, low prevalence of occurrence, and patchy distribution, the widespread distribution of high- and medium-resiliency AUs across the species' range indicates there is sufficient high-quality habitat to maintain connectivity, gene flow, and representation. Our analysis indicates that the ongoing threats to the species have not significantly affected the species' current or near-term viability. Thus, after assessing the best scientific and commercial data available, we conclude that the Cascade torrent salamander is not in danger of extinction throughout all of its range.

We next considered whether the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. In considering the foreseeable future for the Cascade torrent salamander, we analyzed the species' response to the primary threats (i.e., drought, severe heat, wildfire, roads, culverts, and timber harvest) out to 2080 under two scenarios (RCPs 4.5 and 8.5). We also directly projected habitat quality and quantity into the future under these scenarios. In the future, Cascade torrent salamander viability is primarily driven by reductions in habitat quality, as well as the threats of drought, severe heat, catastrophic wildfire, and timber harvest. Torrent salamanders are highly desiccation and heat-intolerant. As such, reductions to stream

flow volume and increases in stream temperatures are expected to reduce the resiliency of Cascade torrent salamander AUs range-wide through the end of the century.

By late century, timber harvest is likely to continue to have an impact on Cascade torrent salamander resiliency under both future scenarios. Of the total harvestable land within their range, we estimated that 29 to 36 percent of the total land area may be harvested by 2080 under Scenario 1 and Scenario 2, respectively. Timber harvest could increase habitat fragmentation and exacerbate the effects of drought across the species' range. We expect that, with the species' patchy distribution, reduced habitat availability, and increasingly fragmented and degraded habitat, along with the high proportion of the area immediately surrounding headwater streams with few timber harvest protections provided by riparian management areas, the compounding threat of timber harvest will reduce this species' ability to maintain connectivity and population resiliency into the future and its overall viability.

Cascade torrent salamander is projected to have a substantial decline in the number of high resiliency AUs compared to current condition (97 AUs), losing 32 high-resiliency AUs (33 percent reduction) under Scenario 1, and 73 high-resiliency AUs (75 percent) under Scenario 2. A decline in resiliency has several implications: (1) increased vulnerability to environmental and demographic stochasticity; (2) reduced opportunity for demographic and genetic rescue, and thereby greater vulnerability to catastrophic events; and (3) reduced overall adaptive capacity due to loss of locally adapted populations and decline in potentially adaptive gene flow.

As noted in the current condition analysis, 11 AUs (7 percent) in the species' range experienced large-scale high severity wildfire, with at least 90 percent of those AUs burned between 2017 and 2022. While every AU in the range of the Cascade torrent salamander is at least 89 percent likely to be impacted by stochastic wildfire by 2080, catastrophic wildfire is also expected to impact at least 40 percent of the species range by

2080. These implications are most severe under Scenario 2 in which there are fewer and less connected high-resiliency AUs projected to remain, limiting the potential for recolonization. Therefore, the species is expected to experience a decline in resiliency, redundancy, and representation over the next several decades, particularly under Scenario 2.

Based on the projected threats under both future scenarios, the Cascade torrent salamander will not have sufficient resiliency, redundancy, and representation to support species viability. Thus, after assessing the best scientific and commercial data available, we conclude that the Cascade torrent salamander is not in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range: Cascade Torrent Salamander

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. The court in *Center for Biological Diversity* v. *Everson*, 435 F. Supp. 3d 69 (D.D.C. 2020) (*Everson*), vacated the provision of the Final Policy on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (hereafter "Final Policy;" 79 FR 37578, July 1, 2014) that provided if the Services determine that a species is threatened throughout all of its range, the Services will not analyze whether the species is endangered in a significant portion of its range.

Therefore, we proceed to evaluating whether the species is endangered throughout a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and (2) the species is in danger of extinction in that portion. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first

question that we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding in *Everson*, we now consider whether the species is in danger of extinction throughout a significant portion of its range. In undertaking this analysis for Cascade torrent salamander, we choose to address the status question first.

We evaluated the range of the Cascade torrent salamander to determine if the species is in danger of extinction throughout any portion of its range. The range of a species can theoretically be divided in an infinite number of ways. We focused our analysis on portions of the species' range that may meet the Act's definition of an endangered species. For the Cascade torrent salamander, we considered whether the threats or their effects on the species are greater in any biologically meaningful portion of the species' range than in other portions such that the species is in danger of extinction in that portion.

As described in Current Condition, for assessing viability of the Cascade torrent salamander, we divided the range in several ways in the SSA. The Cascade torrent salamander is currently found in Oregon and Washington, grouped into three different RUs, and further broken down into 149 HUC-12s. The RUs reflect geographic variation and known genetic differences for the species. Individuals of the species are likely to interact with each other more frequently within RUs than across RUs. In addition, at this largest unit level of the RU, we can assess whether there are multiple resilient populations in a geographic distribution that can help guard against losses from catastrophic events. In summary, RUs are the units that provide the appropriate scale to assess extinction risk and potential differences in regulatory status across the Cascade torrent salamanders' range.

We examined the following threats: drought, severe heat, and wildfire (Factor E) and the loss or degradation of habitat due to roads, culverts, and timber harvest (Factor

A), including cumulative effects as described in the Threats section above in determining portions to consider.

The best scientific and commercial data available indicate that the time horizon on which those threats to the species and the species' responses to those threats are likely to occur is the foreseeable future. In addition, the best scientific and commercial data available do not indicate that any of the threats to the species and the species' response to those threats are more immediate in any portions of the species' range. The Cascade torrent salamander currently has very high (1), high (96), and moderate-resiliency (14) AUs (68 percent of AUs) spread across all three RUs. The widespread distribution of high- and medium-resiliency AUs within each RU indicates that there is sufficient high-quality habitat to maintain connectivity and gene flow and thus retain adaptive capacity (representation). The primary threats acting in the near-term on the species are not of a magnitude to increase the risk of extinction to the point where the species is in danger of extinction in any RU. As a result, we found no biologically meaningful portion of the Cascade torrent salamander's range where threats are impacting the species differently from how they are affecting the species elsewhere in its range, or where the biological condition differs from the condition elsewhere in the range such that the status in that portion differs from status in any other portion of the Cascade torrent salamander's range.

Therefore, we determine that the Cascade torrent salamander is not in danger of extinction in any portion of their range, but that the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. This determination does not conflict with the courts' holdings in *Desert Survivors v. U.S. Dep't of the Interior*, 321 F. Supp. 3d 1011, 1070–74 (N.D. Cal. 2018) and *Ctr. for Biological Diversity* v. *Jewell*, 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects of the Final Policy, including the definition of "significant" that those court decisions held to be invalid.

Determination of Status: Cascade Torrent Salamander

Based on the best scientific and commercial data available, we determine that the Cascade torrent salamander meets the Act's definition of a threatened species because it is likely to become in danger of extinction within the foreseeable future throughout all of its range. Therefore, we propose to list the Cascade torrent salamander as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Determination of Columbia Torrent Salamander Status

Status Throughout All of Its Range: Columbia Torrent Salamander

After evaluating threats to the species and assessing the cumulative effect of the threats under the Act's section 4(a)(1) factors, we assessed the status of the Columbia torrent salamander to determine if the species meets the definition of an endangered species. We considered the primary threats impacting the species, including drought, severe heat, and wildfire (Factor E) and the loss or degradation of habitat due to roads, culverts, and timber harvest (Factor A).

Our assessment of the best scientific and commercial data available indicates that the current condition of the species is affected by the quality and quantity of available habitat, which has been degraded from historical condition primarily by roads, culverts, and timber harvest. While wildfire has not recently impacted populations of Columbia torrent salamanders, 45 percent (66 AUs) are likely currently at risk of catastrophic wildfire. Historically, road development in the species' habitat has increased along with increased urbanization, logging efforts, and development. Timber harvest is a current threat in 114 AUs (78 percent), and we estimate that 95 percent of the land area across the range of the Columbia torrent salamander is currently under a land-use allocation where timber harvest is a primary objective.

Based on our quantitative analysis, we assessed 121 AUs of the 123 total AUs occupied and found the Columbia torrent salamander currently has 98 AUs (80 percent of

all AUs) in moderate (26 AUs) or high (72 AUs) resiliency. High-resiliency-condition AUs are located throughout the species' range and present in both RUs, providing high redundancy to the species and thus facilitating the species' ability to recover from catastrophic events, such as severe wildfire, or the ongoing impacts of timber harvest. Of the 23 AUs (19 percent) in low or very low condition, the majority appear to be clustered along the eastern edge of the species' range, which is likely due to lower levels of precipitation and water availability there. Most of the AUs in high condition are adjacent to others in high condition, and only three are isolated from other high-resiliency units. The adjacency of the high-resiliency AUs increases the potential for recolonization following a catastrophic event, such as wildfire. While adaptive capacity (representation) for the Columbia torrent salamander is low, the widespread distribution of high- and medium-resiliency AUs across the species' range indicates there is sufficient high-quality habitat to maintain connectivity, gene flow, and representation. Our analysis indicates that the ongoing threats to the species have not significantly affected the species' current or near-term viability. Thus, after assessing the best scientific and commercial data available, we conclude that the Columbia torrent salamander is not in danger of extinction throughout all of its range.

We next considered whether the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. In considering the foreseeable future for the Columbia torrent salamander, we analyzed the species' response to the primary threats (i.e., drought, severe heat, wildfire, roads, culverts, and timber harvest) out to 2080 under two scenarios (RCPs 4.5 and 8.5). We also directly projected habitat quality and quantity into the future under these scenarios. In the future, Columbia torrent salamander viability is primarily driven by drought, severe heat, catastrophic wildfire, and timber harvest. Torrent salamanders are highly desiccation and heat intolerant. As such, reductions to stream flow volume and increases in stream

temperatures are expected to reduce the resiliency of Columbia torrent salamander AUs range-wide through the end of the century.

By late century, our qualitative analysis indicates that timber harvest is likely to continue to impact Columbia torrent salamander resiliency under both future scenarios. Of the total harvestable land within the range of Columbia torrent salamander, we estimated that 43 to 56 percent of the total land area within the species' range may be harvested by 2080 under Scenario 1 and Scenario 2, respectively. Timber harvest could increase habitat fragmentation and can exacerbate the effects of drought across the species' range. With reduced habitat availability, increasingly fragmented and degraded habitat, and the high proportion of habitat with few riparian management areas in place, we expect that timber harvest will reduce this species' ability to maintain connectivity and population viability into the future and reduce its overall resiliency.

Columbia torrent salamander is projected to have a substantial decline in the number of high-resiliency AUs compared to current condition (72 AUs), losing 47 high-resiliency AUs (65 percent) under Scenario 1, and 65 high-resiliency AUs (90 percent) under Scenario 2. A decline in resiliency has several implications: (1) increased vulnerability to environmental and demographic stochasticity; (2) reduced opportunity for demographic and genetic rescue, and thereby greater vulnerability to catastrophic events; and (3) reduced overall adaptive capacity due to loss of locally adapted populations and decline in potentially adaptive gene flow.

Though catastrophic wildfire has been considered a rare event within the range of the species, the probability compounds over time with additive factors and is plausible by 2080. Increasing temperatures and drought are expected to increase the tendency for large catastrophic wildfires due to an abundance of fuels, and recent severe wildfires in the west Cascades have demonstrated that large high severity wildfires can occur in the Pacific Northwest. The ability of Columbia torrent salamanders to retain populations in

the wild could be compromised by a catastrophic wildfire under either scenario, given the projected number, resiliency, and distribution of populations by late century. The best scientific and commercial data available indicate there is a greater than or equal to 97 percent probability of at least one wildfire igniting in all 4-km (2.49-mi) grids within the species' range under both future scenarios. Thus, a catastrophic wildfire could occur within the range of Columbia torrent salamander by late century. Further, one of the two RUs for Columbia torrent salamander is projected to retain only one AU in high condition under Scenario 2, posing an additional risk to adaptive capacity. As such, we expect the species to experience a decline in resiliency, redundancy, and representation into the future.

Based on the projected threats under both future scenarios, the Columbia torrent salamander will not have sufficient resiliency, redundancy, and representation to support species viability. Thus, after assessing the best scientific and commercial data available, we conclude that Columbia torrent salamander is not in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

Status Throughout a Significant Portion of Its Range: Columbia Torrent Salamander

As previously described above, following the court's holding in *Everson*, we now consider whether the species is in danger of extinction throughout a significant portion of its range. In undertaking this analysis for Columbia torrent salamander, we choose to address the status question first.

We evaluated the range of the Columbia torrent salamander to determine if the species is in danger of extinction in any portion of its range. The range of a species can theoretically be divided in an infinite number of ways. We focused our analysis on portions of the species' range that may meet the definition of an endangered species. For the Columbia torrent salamander, we considered whether the threats or their effects on

the species are greater in any biologically meaningful portion of the species' range than in other portions such that the species is in danger of extinction in that portion.

As described in Current Condition, for assessing viability of the Columbia torrent salamander, we divided the range in several ways in the SSA. The Columbia torrent salamander is currently found in Oregon and Washington, grouped into two different RUs, and further broken down into 123 HUC-12 units. The RUs reflect geographic variation and known genetic differences for the species. Individuals of the species are likely to interact with each other more frequently within RUs than across RUs. In addition, at this largest unit level of the RU, we can assess whether there are multiple resilient populations in a geographic distribution that can help guard against losses from catastrophic events. In summary, RUs are the units that provide the appropriate scale to assess extinction risk and potential differences in regulatory status across the Columbia torrent salamanders' range.

We examined the following threats: drought, severe heat, and wildfire (Factor E) and the loss or degradation of habitat due to roads, culverts, and timber harvest (Factor A), including cumulative effects.

The best scientific and commercial data available indicate that the time horizon on which those threats to the species and the species' responses to those threats are likely to occur is the foreseeable future. In addition, the best scientific and commercial data available do not indicate that any of the threats to the species and the species' response to those threats are more immediate in any portions of the species' range. Of the 121 AUs assessed, the Columbia torrent salamander currently has many high-resiliency (72) and moderate-resiliency (26) AUs (81 percent of AUs) within each RU. The widespread distribution of high- and medium-resiliency AUs across the range of the species indicates that there is sufficient high-quality habitat to maintain connectivity and gene flow, and thus retain adaptive capacity (representation). The primary threats acting in the near-term

on the species are not of a magnitude to increase the risk of extinction to the point where the species is in danger of extinction in either RU. As a result, we found no biologically meaningful portion of the Columbia torrent salamander's range where threats are impacting the species differently from how they are affecting the species elsewhere in its range, or where the biological condition differs from the condition elsewhere in the range such that the status in that portion differs from status in any other portion of the Columbia torrent salamander's range.

Therefore, we determine that the Columbia torrent salamander is not in danger of extinction in any portion of its range, but that the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. This determination does not conflict with the courts' holdings in *Desert Survivors v. U.S. Dep't of the Interior*, 321 F. Supp. 3d 1011, 1070-74 (N.D. Cal. 2018) and *Ctr. for Biological Diversity v. Jewell*, 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects of the Final Policy, including the definition of "significant" that those court decisions held to be invalid.

Determination of Status: Columbia Torrent Salamander

Based on the best scientific and commercial data available, we determine that the Columbia torrent salamander meets the definition of a threatened species because it is likely to become in danger of extinction within the foreseeable future throughout all of its range. Therefore, we propose to list the Columbia torrent salamander as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition as a listed species, planning and implementation of recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and

conservation by Federal, State, Tribal, and local agencies, foreign governments, private organizations, and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed species. The protection required by Federal agencies, including the Service, and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Section 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species unless we determine that such a plan will not promote the conservation of the species. Under section 4(f)(1)(B)(ii), recovery plans must, to the maximum extent practicable, include objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of section 4 of the Act, that the species be removed from the Lists of Endangered and Threatened Wildlife and Plants.

Recovery plans provide a roadmap for us and our partners on methods of enhancing conservation and minimizing threats to listed species, as well as measurable criteria against which to evaluate progress towards recovery and assess the species' likely future condition. However, they are not regulatory documents and do not substitute for the determinations and promulgation of regulations required under section 4(a)(1) of the Act. A decision to revise the status of a species, or to delist a species, is ultimately based on an analysis of the best scientific and commercial data available to determine whether a species is no longer an endangered species or a threatened species, regardless of whether that information differs from the recovery plan.

The recovery planning process begins with development of a recovery outline made available to the public soon after a final listing determination. The recovery outline

guides the immediate implementation of urgent recovery actions while a recovery plan is being developed. Recovery teams (composed of species and other experts, including those from Federal and State agencies, Tribes, the academic community, or nongovernmental organizations) may be established to develop or implement recovery plans. The recovery outline, draft recovery plan, final recovery plan, and any revisions will be available on our website as they are completed (https://www.fws.gov/program/endangered-species), or from our Oregon Fish and Wildlife Office or Washington Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If these species are listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost-share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of Oregon and Washington would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Cascade torrent salamander and Columbia torrent salamander. Information on our grant programs that are available to aid species recovery can be found at: https://www.fws.gov/service/financial-assistanc*e*.

Although the Cascade torrent salamander and Columbia torrent salamander are only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for these species. Additionally, we invite you to submit any new information on these species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7 of the Act is titled "Interagency Cooperation" and mandates all Federal action agencies to use their existing authorities to further the conservation purposes of the Act and to ensure that their actions are not likely to jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. Regulations implementing section 7 are codified at 50 CFR part 402.

Section 7(a)(2) of the Act states that each Federal action agency shall, in consultation with the Secretary, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Each Federal agency shall review its action at the earliest possible time to determine whether it may affect listed species or critical habitat. If a determination is made that the action may affect listed species or critical habitat, formal consultation is required (50 CFR 402.14(a)), unless the Service concurs in writing that the action is not likely to adversely affect listed species or critical habitat. At the end of a formal consultation, the Service issues a biological opinion, containing its determination of whether the Federal action is likely to result in jeopardy or adverse modification.

In contrast, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action which *is likely* to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. Although the conference

procedures are required only when an action is likely to result in jeopardy or adverse modification, action agencies may voluntarily confer with the Service on actions that may affect species proposed for listing or critical habitat proposed to be designated. In the event that the subject species is listed or the relevant critical habitat is designated, a conference opinion may be adopted as a biological opinion and serve as compliance with section 7(a)(2).

Examples of discretionary actions for the Cascade torrent salamander and Columbia torrent salamander that may be subject to conference and consultation procedures under section 7 are land management or other landscape-altering activities on Federal lands administered by the Service, BLM, Bureau of Reclamation, National Park Service, USFS, U.S. Army Corps of Engineers, Department of Energy (Bonneville Power Administration), Department of War, and the Department of Transportation as well as actions that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 et seq.) or a permit from the Service under section 10 of the Act) or actions funded by Federal agencies (such as the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat—and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal agency—do not require section 7 consultation. Federal agencies should coordinate with the Oregon Fish and Wildlife Office or Washington Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**) with any specific questions on section 7 consultation and conference requirements.

Section 9 of the Act provides a specific list of prohibitions for endangered species but does not provide these same prohibitions for threatened species. Instead, pursuant to section 4(d) of the Act, for any species listed as a threatened species, the Secretary must

issue protective regulations that are "necessary and advisable to provide for the conservation of such species" (these are referred to as "4(d) rules"). Additional measures for the Cascade torrent salamander and Columbia torrent salamander are described below (see **Protective Regulations Under Section 4(d) of the Act**, below).

We may issue permits to carry out otherwise prohibited activities involving threatened wildlife under certain circumstances. Regulations governing permits for threatened wildlife are codified at 50 CFR 17.32, and general Service permitting regulations are codified at 50 CFR part 13. With regard to threatened wildlife, a permit may be issued: for scientific purposes, for enhancing the propagation or survival of the species, or for take incidental to otherwise lawful activities. The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

II. Protective Regulations Under Section 4(d) of the Act

Background

As discussed in **Available Conservation Measures**, section 9 of the Act provides a specific list of prohibitions for endangered species but does not provide these same prohibitions for threatened species. Instead, pursuant to section 4(d) of the Act, for any species listed as a threatened species, the Secretary must issue protective regulations that are "necessary and advisable to provide for the conservation of such species" (these are referred to as "4(d) rules"). Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary shall issue such regulations as they deem necessary and advisable to provide for the conservation of species listed as threatened species. Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states that the Secretary may by regulation

prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. With these two sentences in section 4(d), Congress delegated broad authority to the Secretary to determine what protections would be necessary and advisable to provide for the conservation of threatened species, and even broader authority to put in place any of the section 9 prohibitions, for a given species.

Courts have recognized the extent of the Secretary's discretion under section 4(d) to develop regulations that are appropriate for the conservation of threatened species. For example, courts have upheld, as a valid exercise of agency authority, rules developed under section 4(d) that included limited prohibitions against takings (see *Alsea Valley Alliance* v. *Lautenbacher*, 2007 WL 2344927 (D. Or. 2007); *Washington Environmental Council* v. *National Marine Fisheries Service*, 2002 WL 511479 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana* v. *Verity*, 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, "once an animal is on the threatened list, the Secretary has an almost infinite number of options available to [them] with regard to the permitted activities for those species. [They] may, for example, permit taking, but not importation of such species, or [they] may choose to forbid both taking and importation but allow the transportation of such species" (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Under our section 4(d) authorities, we put in place protections intended to both prevent a threatened species from becoming an endangered species and to promote its recovery. Section 4(d) rules explain what is prohibited for a threatened species, thus making the activity unlawful without a permit or authorization under the Act for the prohibited activity unless otherwise excepted in the 4(d) rule and may also include affirmative requirements. Section 4(d) rules are therefore directly related to what actions

may require permits in the future. As discussed in **Available Conservation Measures**, permits may be issued for purposes described in our threatened species permitting regulations at 50 CFR 17.32, including for recovery actions, conservation benefit agreements (previously referred to as candidate conservation agreements with assurances and safe harbor agreements), or HCPs. We may also except otherwise prohibited activities through a 4(d) rule itself, in which case threatened species permits would not be required for those activities. For otherwise prohibited take or activities that require permits under section 10 of the Act, programmatic approaches—such as general conservation plans and template habitat conservation plans—may be available as another way for project proponents to comply with prohibitions or requirements applicable to one or more species while reducing the time that would otherwise be associated with developing individual permit applications. In addition, the Service and project proponents can reduce the need for such permits by developing standardized conservation measures that avoid the risk of "take."

The provisions of this species' proposed protective regulations under section 4(d) of the Act are one of many tools that we would use to promote the conservation of the Cascade torrent salamander and Columbia torrent salamander. The proposed protective regulations would apply only if and when we make final the listing of the Cascade torrent salamander and Columbia torrent salamander as threatened species and finalize the 4(d) rules. Nothing in 4(d) rules changes in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of the Cascade torrent salamander or Columbia torrent salamander. As mentioned previously in **Available Conservation Measures**, section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened

species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, even before the listing of any species or the designation of its critical habitat is finalized, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. These requirements are the same for a threatened species regardless of what is included in the 4(d) rules for the species.

Section 4(d) rules do not alter section 7 obligations, including the criteria for informal or formal consultations or the analytical process used for biological opinions or concurrence letters. Section 7 consultation is required for Federal actions that "may affect" a listed species regardless of whether take caused by the activity is prohibited or excepted by a 4(d) rule. For example, as with an endangered species, if a Federal agency determines that an action is "not likely to adversely affect" a threatened species, this determination will require the Service's written concurrence (50 CFR 402.13(c)). Similarly, if a Federal agency determines that an action is "likely to adversely affect" a threatened species, the action will require formal consultation with the Service and the formulation of a biological opinion (50 CFR 402.14(a)).

At the end of a formal consultation, the Service issues a biological opinion, containing its determination as to whether the Federal action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat (a "jeopardy" biological opinion) (50 CFR 402.14(h)). If the Service determines in its biological opinion the action is likely to jeopardize listed species or destroy or adversely modify critical habitat, it shall include reasonable and prudent alternatives, if any exist, it believes would avoid the likelihood of jeopardy or destruction or adverse modification (50 CFR 402.14(h)). In accordance with 50 CFR 402.14(i), when

there is a “no jeopardy” biological opinion but “take” of a listed species is reasonably certain to occur, the Service is required to issue an incidental take statement that specifies those reasonable and prudent measures (RPMs) the Service considers necessary or appropriate to minimize the impact of the incidental take and terms and conditions (TCs) that must be complied with to implement those measures. These requirements exist regardless of what is included in a 4(d) rule. However, we recognize that whether or not take associated with certain activities is prohibited by a 4(d) rule may be relevant to our consideration of the extent of RPMs we may consider necessary or appropriate. In most situations, we would not consider RPMs necessary or appropriate to minimize the impact of take that is not prohibited or that is excepted by a 4(d) rule. Regardless, the RPMs/TCs cannot alter the basic design, location, scope, duration, or timing of the action and may involve only minor changes (50 CFR 402.14(i)(2)). They should not prevent the action subject to consultation from proceeding as essentially proposed (89 FR 24268).

Because consultation obligations and processes are unaffected by 4(d) rules, we may consider developing tools to streamline future intra-Service and interagency consultations for actions that result in forms of take that are not prohibited by the 4(d) rule (but that still require consultation). These tools may include consultation guidance, online consultation processes via the Service’s digital project planning tool (Information for Planning and Consultation; https://ipac.ecosphere.fws.gov/), template language for biological opinions, or programmatic consultations.

Provisions of the Proposed 4(d) Rule

Exercising the Secretary’s authority under section 4(d) of the Act, we have developed a proposed rule that is designed to address the Cascade and Columbia torrent salamanders’ conservation needs. As discussed previously in **Summary of Biological Status and Threats**, we have concluded that the Cascade torrent salamander and Columbia torrent salamander are likely to become in danger of extinction within the

foreseeable future primarily due to drought, severe heat, and wildfire associated with climate change and the loss or degradation of habitat due to roads, culverts, and timber harvest. Section 4(d) requires the Secretary to issue such regulations as they deem necessary and advisable to provide for the conservation of each threatened species and authorizes the Secretary to include among those protective regulations any of the prohibitions that section 9(a)(1) of the Act prescribes for endangered species (*In re: Polar Bear Endangered Species Act Listing and 4(d) Rule Litigation, 818 F. Supp. 2d 214, 228 (D.D.C. 2011) (citing Sweet Home Chapter of Cmtys. for a Great Or.* v. *Babbitt, 1 F.3d 1, 8 (D.C. Cir. 1993), rev'd on other grounds, 515 U.S. 687 (1995)))*. Our necessary and advisable determination includes consideration of conservation and economic impacts (*Kan. Nat. Res. Coal., et al.* v. *USFWS* 780 F. Supp. 3d 650 (W.D. Tex. 2025) (hereafter "*Kansas*") (also see 91 FR 45723, July 21, 2026). We explain below why we find that, if finalized, the prohibitions and exceptions in this proposed rule as a whole satisfy the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the Cascade torrent salamander and Columbia torrent salamander.

The protective regulations we are proposing for the Cascade torrent salamander and Columbia torrent salamander incorporate prohibitions from section 9(a)(1) to address the threats to the species. We proposed to include the following prohibitions of section 9(a)(1) of the Act, and implementing regulations codified at 50 CFR 17.21 which make it illegal for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit or to cause to be committed any of the following acts with regard to any endangered wildlife: (1) import into, or export from, the United States; (2) take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect) within the United States, within the territorial sea of the United States, or on the high seas; (3) possess, sell, deliver, carry, transport, or ship, by any means

whatsoever, any such wildlife that has been taken illegally; (4) deliver, receive, carry, transport, or ship in interstate or foreign commerce, by any means whatsoever and in the course of commercial activity; or (5) sell or offer for sale in interstate or foreign commerce.

As discussed above under Summary of Biological Status and Threats, we have concluded that the Cascade torrent salamander and Columbia torrent salamander are likely to become in danger of extinction within the foreseeable future primarily due to drought, severe heat, and wildfire and the loss or degradation of habitat due to roads, culverts, and timber harvest. These threats impact individuals and the quality, availability, and connectivity of their habitat. In addition, although collection and commercial trade of the Cascade torrent salamander and Columbia torrent salamander is not a threat driving the status of the species, the section 9 prohibitions related to trade and commerce through our application of 50 CFR 17.21(b), (e), and (f) will help limit any loss of individuals and assist in maintaining population dynamics for these species.

Under the Act, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulations at 50 CFR 17.3. Take can result knowingly or otherwise, intentionally or incidentally. Regulating take is intended to help preserve the species' remaining populations, slow their rate of decline, and decrease cumulative effects from other ongoing or future threats. Therefore, we propose to prohibit take of the Cascade torrent salamander and Columbia torrent salamander, except for take resulting from those actions and activities specifically excepted by the 4(d) rule.

The proposed 4(d) rule would also provide for the conservation of the species by helping to incentivize conservation actions or actions that are not expected to rise to the level that would have a negative impact (i.e., would have only de minimis impacts) on the species' conservation. Exceptions to the prohibitions include the exceptions to the

prohibition for endangered wildlife, as set forth in 50 CFR 17.21(c)(2)–(4), (d)(2) and exceptions for threatened wildlife at 50 CFR 17.31(c). This includes allowing law enforcement to possess and conduct other acts with illegally taken Cascade torrent salamanders and Columbia torrent salamanders.

To further the conservation of the species, any employee or agent of the Service, any other Federal land management agency, the National Marine Fisheries Service, a State conservation agency, or a federally recognized Tribe, who is designated by their agency or Tribe for such purposes, may, when acting in the course of their official duties, take threatened wildlife without a permit if such action is necessary to: (i) aid a sick, injured, or orphaned specimen; or (ii) dispose of a dead specimen; or (iii) salvage a dead specimen that may be useful for scientific study; or (iv) remove specimens that constitute a demonstrable but nonimmediate threat to human safety, provided that the taking is done in a humane manner. Such taking may involve killing or injuring only if it has not been reasonably possible to eliminate such threat by live capturing and releasing the specimen unharmed, in an appropriate area. Any taking must be reported in writing to the Office of Law Enforcement, via contact methods listed at https://www.fws.gov, within 5 calendar days. The specimen may only be retained, disposed of, or salvaged under directions from the Office of Law Enforcement.

We recognize the special and unique relationship that we have with our State natural resource agency partners in contributing to conservation of listed species. State agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist us in implementing all aspects of the Act. In this regard, section 6 of the Act provides that we must cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act.

Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with us in accordance with section 6(c) of the Act, who is designated by their agency for such purposes, would be able to conduct activities designed to conserve Cascade torrent salamanders and Columbia torrent salamanders that may result in otherwise prohibited take without additional authorization.

In addition, any employee or agent of the Service or of the National Marine Fisheries Service, who is designated by their agency for such purposes, may, when acting in the course of their official duties, take Cascade torrent salamanders and Columbia torrent salamanders.

We may under certain circumstances issue permits to carry out one or more otherwise-prohibited activities, including those described above. The regulations that govern permits for threatened wildlife state that the Director may issue a permit authorizing any activity otherwise prohibited with regard to threatened species. These include permits issued for the following purposes: for scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act (50 CFR 17.32). The statute also contains certain exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

Additionally, we recognize that certain actions promote or are inconsequential to the conservation of the salamanders. These include streamflow reestablishment activities. These activities are designed to improve aquatic habitat conditions for these species and would address the impacts of barriers such as culverts, roads, and other water management structures to aquatic habitat quality, availability, and connectivity. If these activities are subsequently determined to result in incidental take of Cascade torrent salamander or Columbia torrent salamander, such take is excepted from the prohibitions

of the Endangered Species Act that are made applicable to Cascade torrent salamander and Columbia torrent salamander by this rule.

Streamflow reestablishment is a technique to restore natural streamflow to obstructed or otherwise altered hydrologic regimes. These activities must follow Service best management practices for the species, which will be provided during pre-project coordination with the Service. These efforts must be part of and carried out in accordance with finalized conservation plans or strategies specifically identified for the Columbia and/or Cascade torrent salamanders, or their habitats, and developed in coordination with the Service. When implemented correctly, these streamflow reestablishment projects reduce bank erosion and instream sedimentation, resulting in improved habitat conditions for torrent salamanders, in addition to improving connectivity. These projects remove and/or replace existing obstructions and modifications to flow (e.g., pipe culverts) to restore streamflow condition to its natural velocity, sinuosity, substrate, and gradient, and establish continuity of those habitat characteristics above and below the obstruction to allow unobstructed passage of aquatic animals. These activities are associated with removal of the obstruction and the installation of culverts or bridges with the following qualities to simulate natural stream conditions:

- Of the shortest length and smallest footprint feasible;
- Appropriately sized for high-flow events (e.g., 100-year flood event) to allow for natural velocity and sinuosity, and transport of sediment and other streambed materials;
- Open-bottomed or embedded in the stream substrate;
- Aligned with upstream and downstream gradients; and
- With site-appropriate stream substrate materials.

The 4(d) rule provides for the conservation of the Cascade torrent salamander and Columbia torrent salamander because it will regulate activities that pose a threat to the species or that may become a threat in the future. However, it also helps to incentivize

conservation actions for activities that are expected to have negligible impacts to the Cascade torrent salamander and Columbia torrent salamander, as discussed above. We considered the economic impacts of the implementation of the 4(d) rule. We anticipate minimal to no costs from any proposed prohibitions in the 4(d) rule except for those associated with take of either species. There may be costs associated with private landowners, Tribes, local governments, or States that voluntarily amend existing section 10(a)(1)(B) permits to include Cascade and Columbia torrent salamanders, or that choose to develop new HCPs and apply for permits. However, we do not have an estimate of how many landowners may pursue these options or what those associated costs may be at this time. Please see our 2026 "Consideration of Economic Impacts for the 4(d) Rule for the Cascade torrent salamander and Columbia torrent salamander" on https://www.regulations.gov for our consideration of economic impacts. After considering the conservation needs of the species and the economic costs of the 4(d) rule, we have determined that the 4(d) rule is necessary and advisable to provide for the conservation of the species. We appreciate any public comment on the potential impacts (conservation and economic) of the proposed 4(d) rule.

III. Critical Habitat

Background

Section 4(a)(3) of the Act requires that, to the maximum extent prudent and determinable, we designate a species' critical habitat concurrently with listing the species. Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as an area that may generally be delineated around species' occurrences, as determined by the Secretary (i.e., range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (e.g., migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals).

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that each Federal action agency ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of designated critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation also does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Rather, designation requires that, where a landowner requests Federal agency funding or authorization for an

action that may affect an area designated as critical habitat, the Federal agency consult with the Service under section 7(a)(2) of the Act. If the action may affect the listed species itself (such as for occupied critical habitat), the Federal agency would have already been required to consult with the Service even absent the designation because of the requirement to ensure that the action is not likely to jeopardize the continued existence of the species. Even if the Service were to conclude after consultation that the proposed activity is likely to result in destruction or adverse modification of the critical habitat, the Federal action agency and the landowner are not required to abandon the proposed activity, or to restore or recover the species; instead, they must implement "reasonable and prudent alternatives" to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat).

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Section 4(b)(2) of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the *Federal Register* on July 1, 1994 (59 FR

34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information from the SSA report and information developed during the listing process for the species. Additional information sources may include any generalized conservation strategy, criteria, or outline that may have been developed for the species; the recovery plan for the species; articles in peer-reviewed journals; conservation plans developed by States and counties; scientific status surveys and studies; biological assessments; other unpublished materials; or experts' opinions or personal knowledge.

A critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) conservation actions implemented under section 7(a)(1) of the Act; (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species; and (3) the prohibitions found in the 4(d) rule. These protections and conservation tools will continue to contribute to recovery of the species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans, or other

species conservation planning efforts if new information available at the time of those planning efforts calls for a different outcome.

Critical Habitat Determinability

Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

(i) Data sufficient to perform required analyses are lacking, or

(ii) The biological needs of the species are not sufficiently well known to identify any area that meets the definition of "critical habitat."

We reviewed the available information pertaining to the biological needs of the species and habitat characteristics where these species are located. Additionally, in making a critical habitat determination, we may exclude an area from designation if the benefits of excluding it outweigh the benefits of inclusion, provided the exclusion does not result in the extinction of the species. To properly conduct this analysis, we need data on the economic and environmental impacts that may occur due to a critical habitat designation. Those assessments for the Cascade and Columbia torrent salamanders are not yet complete, and we are in the process of working with Federal, State, and other partners in acquiring the complex data needed to perform those required assessments. Until we obtain these data, we do not have sufficient information to perform those assessments. Therefore, we conclude that the designation of critical habitat for the Cascade torrent salamander and Columbia torrent salamander is not determinable at this time. The Act allows the Service an additional year to publish a critical habitat designation that is not determinable at the time of listing (16 U.S.C. 1533(b)(6)(C)(ii)).

Required Determinations

Clarity of the Rule

We are required by E.O.s 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

Regulatory Planning and Review (Executive Orders 12866, 13563, and 14192)

E.O. 12866 provides that the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget will review significant regulatory actions. E.O. 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the Nation's regulatory system to promote predictability, to reduce uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. E.O. 13653 directs agencies to consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. We have developed this proposed rule in a manner consistent with these requirements. OIRA has determined that this rule is significant. This rule is an E.O. 14192 regulatory action.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 et seq.), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA; title II of Pub. L. 104–121, March 29, 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended the RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

While we do not conduct RFA analyses on our classification determinations under the Act, in accordance with recent caselaw (*Kansas)* we comply with RFA through consideration of conservation and economic impacts when promulgating 4(d) rules. Under the RFA, as amended, and as understood in light of recent court decisions, Federal agencies are required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself; in other words, the RFA does not require agencies to evaluate the potential impacts to indirectly regulated entities. Although some of the actions regulated by the proposed 4(d) rule are likely to involve Federal action agencies, 4(d) rules do not alter any obligations for Federal agencies under section 7 of the Act. Federal agencies, in consultation with the Service, are required to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Therefore, under section 7, only Federal action agencies are directly subject to those specific regulatory requirements.

Consequently, it is our position that only Federal action agencies would be directly regulated during any potential future section 7 consultations (regardless of what is prohibited in 4(d) rules). The RFA does not require evaluation of the potential impacts to entities not directly regulated. Moreover, Federal agencies are not small entities.

We expect the 4(d) rule will likely have some level of impact on small entities requesting permits for purposeful take associated with conservation actions in both Oregon and Washington. Small entities who require permits for purposeful take associated with scientific purposes or to enhance the propagation or survival of the species are anticipated to experience negligible (not significant) impacts. We are seeking public comment regarding small entities that may be impacted from the proposed 4(d) rule.

Please see our 2026 "Consideration of Economic Impacts for the 4(d) Rule for the Cascade torrent salamander and Columbia torrent salamander" on https://www.regulations.gov for further consideration of economic impacts.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

Regulations adopted pursuant to section 4(a) of the Act are exempt from (42 U.S.C. 4321 et seq.) and do not require an environmental analysis under NEPA. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244). This includes listing, delisting, and reclassification rules, as well as critical habitat designations and species-specific protective regulations promulgated concurrently with a decision to list or reclassify a species as threatened. The courts have upheld this position (*e.g.*, *Douglas County* v. *Babbitt*, 48 F.3d 1495 (9th Cir. 1995) (critical habitat); *Center for Biological Diversity* v. *U.S. Fish and Wildlife Service.*, 2005 WL 2000928 (N.D. Cal. Aug. 19, 2005) (concurrent 4(d) rule)).

Government-to-Government Relationship with Tribes

In accordance with the President's memorandum of April 29, 1994 ("Government-to-Government Relations with Native American Tribal Governments;" 59 FR 22951, May 4, 1994), E.O. 13175 ("Consultation and Coordination with Indian Tribal Governments"), the President's memorandum of November 30, 2022 ("Uniform Standards for Tribal Consultation;" 87 FR 74479, December 5, 2022), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with federally recognized Tribes and Alaska Native Corporations on a government-to-government basis. In accordance with Secretary's Order 3206 of June 5, 1997 ("American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act"), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes.

The Service reached out to Tribes in the SSA development process, which occurred prior to the publication of this proposed rule. We will continue to work with Tribal entities during the development of a proposed rule for the designation of critical habitat for the Cascade and Columbia torrent salamanders.

References Cited

A complete list of references cited in this rulemaking is available on the internet at https://www.regulations.gov and upon request from the Oregon Fish and Wildlife Office or Washington Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Plants, Reporting and recordkeeping requirements, Transportation, Wildlife.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

AUTHORITY: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

2. In § 17.11, paragraph (h), amend the List of Endangered and Threatened Wildlife by adding an entry for "Salamander, Cascade torrent" and an entry for "Salamander, Columbia torrent" to in alphabetical order under AMPHIBIANS to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
* * * * * * *				
AMPHIBIANS				
* * * * * * *				
Salamander, Cascade torrent	*Rhyacotriton cascadae*	Wherever found	T	[*Federal Register* citation when published as a final rule]; 50 CFR 17.43(j); [4d]
* * * * * * *				
Salamander, Columbia torrent	*Rhyacotriton kezeri*	Wherever found	T	[*Federal Register* citation when published as a final rule]; 50 CFR 17.43(j); [4d]
* * * * * * *				

3. Further amend § 17.43, as proposed to be amended on December 5, 2023, at 88 FR 84252 and on July 7, 2026, 91 FR 41606 by adding paragraph (j) to read as follows:

§ 17.43 Species-specific rules—amphibians.

* * * * *

(j) Cascade torrent salamander (*Rhyacotriton cascadae*) and Columbia torrent salamander (*Rhyacotriton kezeri*).

(1) *Prohibitions.* The following prohibitions that apply to endangered wildlife also apply to the Cascade torrent salamander and the Columbia torrent salamander. Except as provided under paragraph (j)(2) of this section and §§ 17.4, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to these species:

(i) Import or export, as set forth at § 17.21(b) for endangered wildlife.

(ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife.

(iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.

(iv) Interstate or foreign commerce in the course of commercial activity, as set forth at § 17.21(e) for endangered wildlife.

(v) Sale or offer for sale, as set forth at § 17.21(f) for endangered wildlife.

(2) *Exceptions from prohibitions.* In regard to these species, you may:

(i) Conduct activities as authorized by a permit under § 17.32.

(ii) Take, as set forth at § 17.21(c)(2) through (c)(4) for endangered wildlife.

(iii) Take, as set forth at § 17.31(b).

(iv) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife.

(v) If the activities identified in paragraph (vi) of this rule are subsequently determined to result in incidental take of the Columbia or Cascade torrent salamanders, such take is excepted from the prohibitions under section 9 of the Endangered Species Act that are made applicable to the Columbia or Cascade torrent salamanders by this rule.

(vi) Actions that promote or are inconsequential to the conservation of the species, specifically streamflow reestablishment activities that follow Service best management practices, which will be provided during pre-project coordination with the Service. These efforts must be part of and carried out in accordance with finalized conservation plans or strategies specifically identified for the Columbia or Cascade torrent salamanders, or their habitats, and developed in coordination with the Service. These activities remove and/or replace existing obstructions and modifications to flow (e.g., pipe culverts) to restore streamflow condition to its natural velocity, sinuosity, substrate, and gradient, and establish continuity of those habitat characteristics above and below the obstruction. These activities are associated with the removal of the obstruction and the installation of culverts or bridges with the following qualities to simulate natural stream conditions:

(A) Of the shortest length and smallest footprint feasible;

(B) Appropriately sized for high-flow events (e.g., 100-year flood event) to allow for natural velocity and sinuosity and transport of sediment and other streambed materials;

(C) Open-bottomed or embedded in the stream substrate;

(D) Aligned with upstream and downstream gradients; and

(E) With site-appropriate stream substrate materials.

Brian Nesvik,
Director,
U.S. Fish and Wildlife Service.

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