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Oregon State Rank Assessment for Cascade Torrent Salamander (*Rhyacotriton cascadae*)

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Natural Heritage Ranking Form - Oregon State Rank

Oregon Ranking Form Cascade torrent salamander (*Rhyacotriton cascadae*)

Oregon Biodiversity Information Center

SPECIES ASSESSED

Scientific Name *Rhyacotriton cascadae* ELCODE AAAAJ01030
Common Name Cascade torrent salamander Element ID 6285

Species Concept Reference Citation

Good, D. A., and D. B. Wake. 1992. Geographic variation and speciation in the torrent salamanders of the genus *Rhyacotriton* (Caudata: Rhyacotritonidae). University of California Publications in Zoology 126:i-xii, 1-91.

CONSERVATION STATUS RANK

Assigned Rank **S2S3**

Rank Assignment Author	Eleanor Gaines	Rank Review Date	11/09/2022
Rank Factors Author	Eleanor Gaines	Rank Factors Date	11/09/2022
Calculated Rank	S2S3	Rank Change Date	11/09/2022
Rank Methodology Used	Rank calculation - Biotics v2		

Assigned Rank Reasons

Relatively small range in western Oregon; major threat is loss/degradation of habitat, such as may result from logging. It requires clear headwater streams and subsurface flows with cold water, high canopy cover, and cobble. Many occurrences are under federal ownership. Conservation concern is warranted based on the species' innate sensitivity to sedimentation and increased water temperatures such as may result from logging or logging road construction. Some populations are isolated by intervening areas of unsuitable habitat.

RANGE/DISTRIBUTION

Range Extent

Rating	5000-20,000 square km (about 2000-8000 square miles)		
Estimate	8726	Unit Used for Estimate	Square Kilometers
Comments	West slope of the Cascade Mountains to within 0.5 km north of the Middle Fork of the Willamette River, Lane County, Oregon (Good and Wake 1992, Wagner et al. 2006, Howell and Maggiulli 2011).		

Area of Occupancy

Grid Cell Size	4 km ² Grid Cells		
Rating (as Number of 4 km ² Grid Cells)	F = 126-500		
Comments	Known records intersect with approximately 125 4km ² grid cells. There are likely some additional records.		

ABUNDANCE AND CONDITION

Number of Occurrences

Rating	81 - 300		
Comments	There are about 150 unique location records for this species; about 25 of these are post-2000 records. There are likely additional records.		

Population Size

Rating	Unknown		
Comments	Fairly common in appropriate habitat, but no population estimates are available (Howell and Maggiulli 2011).		

Good Viability/Ecological Integrity

Number of Occurrences with Good Viability/Ecological Integrity

Rating Few to some (4-40)

Comments

Populations occurring on federal lands receive some protection, but viability of most populations is unknown.

Number of Protected and Managed Occurrences CD = Several to many (4-40) occurrences appropriately protected and managed

Number of Protected and Managed Occurrences Comments

Many occurrences fall on federal lands, but the degree of protection or management this provides is unclear.

THREATS

<u>Threat Category Code</u>	<u>Threat Category</u>	<u>Calculated Impact</u>	<u>Scope</u>	<u>Severity</u>	<u>Timing</u>	<u>Comments</u>
7.1.1	Increase in fire frequency/intensity	D = Low	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Slight: Likely to only slightly degrade/reduce occurrences or habitat, or reduce population 1-10%	High: Continuing	
9.3.3	Herbicides and pesticides	Unknown	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Unknown	High - moderate	
4	Transportation & service corridors	CD = Medium - low	Restricted: Affects some (11-30%) of the total population or occurrences or extent	Serious - slight	High: Continuing	
4.1	Roads & railroads	CD = Medium - low	Restricted: Affects some (11-30%) of the total population or occurrences or extent	Serious - slight	High: Continuing	
5	Biological resource use	B = High	Large: Affects most (31-70%) of the total population or occurrences or extent	Serious: Likely to seriously degrade/reduce occurrences or habitat, or reduce population 31-70%	High: Continuing	
5.3	Logging & wood harvesting	B = High	Large: Affects most (31-70%) of the total population or occurrences or extent	Serious: Likely to seriously degrade/reduce occurrences or habitat, or reduce population 31-70%	High: Continuing	
7	Natural system modifications	D = Low	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Slight: Likely to only slightly degrade/reduce occurrences or habitat, or reduce population 1-10%	High: Continuing	
7.1	Fire & fire suppression	D = Low	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Slight: Likely to only slightly degrade/reduce occurrences or habitat, or reduce population 1-10%	High: Continuing	

8	Invasive & other problematic species, genes & diseases	Unknown	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Unknown	High: Continuing
9	Pollution	Unknown	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Unknown	High - moderate
9.3	Agricultural & forestry effluents	Unknown	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Unknown	High - moderate
11	Climate change & severe weather	BC = High - medium	Pervasive: Affects all or most (71-100%) of the total population or occurrences or extent	Serious - moderate	High: Continuing

Calculated Overall Threat Impact AB = Very high - high

Assigned Overall Threat Impact AB = Very high - high

Overall Threat Impact Comments

The main threats to this species include activities that result in increased stream temperature, sedimentation, altered flow, and habitat fragmentation, including timber harvest and road construction and maintenance (Howell and Maggiulli 2011). This species is sensitive to disturbance and intolerant to habitat modification (J. Applegarth p.c.). Timber harvest and removal of streamside vegetation can degrade habitat by causing increased water temperatures, increased sedimentation, and altered flows (Steele et al. 2003, Howell and Maggiulli 2011). Timber harvest negatively affects *Rhyacotriton* salamanders more than it does other amphibians (Bury and Corn 1988, Corn and Bury 1989). Densities were significantly lower in streams in managed forests than in streams in unharvested forests. Presence of riparian buffers can help to mitigate this threat (Pollett et al. 2010), though riparian buffer strip widths currently required by state forest practices regulations may not be sufficient to ensure that amphibian communities in managed stands remain as diverse as in unlogged forests (Vesely & McComb 2002). In the Coast Range of western Oregon total salamander abundance, including *Rhyacotriton* spp., and amphibian species richness were found to be sensitive to forest practices in riparian areas (Vesely & McComb 2002). Road construction and maintenance, including for logging, can have negative impacts to this species through increased sedimentation, altered flows. Roads and culverts may also pose a barrier to movement, particularly in a species with limited dispersal ability (Howell and Maggiulli 2011). Herbicides to suppress the shrub layer on forest lands after harvest, or to control invasive vegetation, could have the potential to negatively impact *Rhyacotriton cascadae* (Howell and Maggiulli 2011). This species is highly vulnerable to climate change due to anticipated changes in stream temperature and flow (Case 2014, Washington Department of Fish and Wildlife 2022). Climate change is expected to result in more frequent and intense fires in the range of this species which may result in increased stream temperature and sedimentation (Howell and Maggiulli 2011). Managed fire is rare in the range of this species. Other suspected threats include disease and parasites, including chytrid fungus and viruses, the impact of this threat is unknown (Howell and Maggiulli 2011). Threats may be exacerbated by the species' limited dispersal capacity (Nijhuis and Kaplan 1998, Steele et al. 2003), limiting gene flow and the ability to recolonize areas after disturbance (Howell and Maggiulli 2011).

TRENDS

Short-Term Trend

Rating U = Unknown

Comments

Trends are unknown but there are several extant populations.

Long-Term Trend**Rating** U = Unknown**Comments**

Long term trend data are not available.

OTHER FACTORS**Intrinsic Vulnerability Rating** Highly to moderately vulnerable.**Comments**

As a group, torrent salamanders are highly vulnerable to activities that increase stream temperature, sedimentation, and result in barriers to movement.

Environmental Specificity Rating Very narrow to narrow.**Comments**

This species requires headwater streams and subsurface flows with cold water in forests with a dense canopy. It was almost absent from streams where water temperature was above 14°C for more than 35 consecutive hours (Steele 2003, Pollett et al. 2010).

ADDITIONAL SPECIES INFORMATION**Oregon Habitat Comments**

In or near cold clear seeps, streams or waterfall splash zones within older coniferous forests. Seepages running through moss-covered talus provide ideal habitat. Larvae are often found in gravel or under stones. Most common in forests older than 25 years. Despite the presence of assumed suitable stream conditions, populations are found at very low levels in streams surrounded by younger forests. Populations increase in streams surrounded by mid-rotation forests.

RANKING REFERENCES

<u>Short Citation</u>	<u>Author</u>	<u>Year</u>	<u>Full Citation</u>
Corn and Bury		1989	Corn, P. S., and R. B. Bury. 1989. Logging in western Oregon: responses of headwater habitats and stream amphibians. <i>Forest Ecology and Management</i> 29:39-57.
Steele, et al.		2003	Steele, C.A., E.D. Brodie, Jr. and J.G. MacCracken. 2003. Relationships between abundance of Cascade torrent salamanders and forest age. <i>Journal of Wildlife Management</i> 67: 447-453.

RESOURCES

Oregon Biodiversity Information Center, Institute for Natural Resources
 Portland State University, Mail Stop: INR, PO Box 751, Portland, OR 97207-0751 Phone: 503-725-9950

Additional ORBIC species ranking forms posted at
<https://inr.oregonstate.edu/orbic/rare-species/ranking-documentation>

Information on Natural Heritage ranking methodology is available at
<http://www.natureserve.org/biodiversity-science/publications/natureserve-conservation-status-assessments-methodology-assigning>

The Conservation Rank Calculator is developed and maintained by NatureServe and is available from
<http://www.natureserve.org/conservation-tools/conservation-rank-calculator>

ASSESSMENT CITATION

Eleanor Gaines. 2022. Oregon state rank assessment for Cascade torrent salamander (*Rhyacotriton cascadae*). Oregon Biodiversity Information Center. Institute for Natural Resources, Portland State University, Portland, OR.