11-9-2022

Oregon State Rank Assessment for Columbia Torrent Salamander (Rhyacotriton kezeri)

Eleanor P. Gaines
Portland State University, egaines@pdx.edu

Natural Heritage Ranking Form - Oregon State Rank

Oregon Ranking Form **Columbia torrent salamander (Rhyacotriton kezeri)** **Oregon Biodiversity Information Center**

SPECIES ASSESSED

Scientific Name ***Rhyacotriton kezeri*** **ELCODE** AAAAJ01040

Common Name **Columbia torrent salamander** **Element ID** 6286

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

Timber harvest negatively affects Rhyacotriton salamanders more than it does other amphibians (Bury and Corn 1988, Corn and Bury 1989). 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. 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). However, compared to other torrent salamanders, this species' continued presence in managed forests suggests it may be less sensitive to timber harvest and other activities that result in increased water temperature and sedimentation. There are very few adequately protected populations.

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 7620 **Unit Used for Estimate** Square Kilometers

Comments This species is found in the Oregon Coast Range from the Columbia River, south to the Little Nestucca River and the Grande Ronde Valley in Clastsop, Polk, Tillamook, and Yamhill counties, Oregon, USA (Good and Wake 1992, Russell et al. 2010, ORBIC 2022). iNaturalist shows additional research grade records from Washington and Columbia counties, Oregon (iNaturalist 2022). These iNaturalist records are included in the range extent estimate. Distribution within the range is patchy (Hallock and McAllister 2005).

Area of Occupancy

Grid Cell Size 4 km² Grid Cells

Rating (as Number of 4 km2 Grid Cells) E = 26-125

Comments The estimated area of occupancy is based on known records and does not include unverified iNaturalist records (iNaturalist 2022, ORBIC 2022). Including iNaturalist records would increase the estimate to approximately 100 4km² grid cells, still within the range of this rating.

ABUNDANCE AND CONDITION

Number of Occurrences

Rating 21 - 300

Comments

There are approximately 20 unique documented locations in Oregon (325 observations; ORBIC 2022). Additional records may exist. iNaturalist has 128 research grade records from approximately 90 unique locations from Oregon (iNaturalist 2022), although it is possible that some of these may be misidentified, and many of them overlap with existing records.

Population Size

Rating Unknown

Good Viability/Ecological Integrity

Number of Occurrences with Good Viability/Ecological Integrity

Rating Very few to few (1-12)

Comments

Most of the range of this species lies within private or state ownership that is subject to timber harvest (Hallock and McAllister 2005, Russell et al. 2010). Habitat in the northern end of the species range is more fragmented than that to the south (Emel et al. 2019).

Number of Protected and Managed Occurrences BC = Few to several (1-12) occurrences appropriately protected and manage

Number of Protected and Managed Occurrences Comments

No known adequately protected occurrences in Oregon. Most of this species' distribution falls within working timberlands.

THREATS

Threat Category Code	Threat Category	Calculated Impact	Scope	Severity	Timing	Comments
9.3.3	Herbicides and pesticides	Unknown	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Unknown	Moderate: In the short-term future, or now suspended but could return in short term	
4	Transportation & service corridors	CD = Medium - low	Restricted: Affects some (11-30%) of the total population or occurrences or extent	Serious - moderate	High: Continuing	
4.1	Roads & railroads	CD = Medium - low	Restricted: Affects some (11-30%) of the total population or occurrences or extent	Serious - moderate	High: Continuing	
5	Biological resource use	CD = Medium - low	Large: Affects most (31-70%) of the total population or occurrences or extent	Moderate - slight	High - moderate	
5.3	Logging & wood harvesting	CD = Medium - low	Large: Affects most (31-70%) of the total population or occurrences or extent	Moderate - slight	High - moderate	
9	Pollution	Unknown	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Unknown	Moderate: In the short-term future, or now suspended but could return in short term	
9.3	Agricultural & forestry effluents	Unknown	Small: Affects a small proportion (1-10%) of the total population or occurrences or extent	Unknown	Moderate: In the short-term future, or now suspended but could return in short term	
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 AC = Very high - medium

Assigned Overall Threat Impact AC = Very high - medium

Overall Threat Impact Comments

Logging can negatively impact this species by increasing stream temperature and sedimentation (Welsh and Hodgson 2008), though the cool, moist climate and rapid vegetation growth in the Coast Range may mitigate these effects to some degree (Russell et al. 2010). The species occupies areas that area intensively managed for timber. The effect of timber harvest on Rhyacotriton kezeri is not clear, but activities that result in higher stream temperature, increased sedimentation, altered hydrology, or population fragmentation (including logging and road construction and maintenance) can have a negative effect on this species (Hallock and McAllister 2005, Russell et al. 2010, Emel et al. 2019). Habitat fragmentation from logging limits dispersal (Emel et al. 2019). Torrent salamanders in general are sensitive to increased temperature and sedimentation, such as may result from logging or logging road construction (Bury and Corn 1988, Corn and Bury 1989), but specific information on the effect on R. kezeri is not available. Optimal mature forest habitat has been greatly reduced by timber harvest activities within the range of this species (Hallock and McAllister 2005). Road construction and maintenance, including for logging, can have negative impacts to this species through increased sedimentation and altered flows. Roads and culverts may also pose a barrier to movement, particularly in a species with limited dispersal ability (Howell and Maggiulli 2011). However, this species' continued presence in managed forests suggests it may be less sensitive to timber harvest and other activities that result in increased water temperature and sedimentation.
Torrent salamanders are vulnerable to environmental toxins (Howell and Maggiulli 2011). Herbicides to suppress the shrub layer on forest lands after harvest, or to control invasive vegetation, have the potential to negatively impact Rhyacotriton kezeri. The severity of this threat is unknown.
This species has been identified as moderate to highly vulnerable to the effects of climate change, largely due to anticipated changes in stream hydrology, warmer temperatures, and drier microclimates (Case 2014, Washington Department of Fish and Wildlife 2022)

TRENDS

Short-Term Trend

Rating U = Unknown

Comments

Short term trends are unknown for this species in Oregon, but in Washington it remains common in some areas (Hallock and McAllister 2005).

Long-Term Trend

Rating U = Unknown

Comments

Long term trends are unknown for this species.

ADDITIONAL SPECIES INFORMATION

Oregon Habitat Comments

Found in or near very cold, clear streams, seeps or springs within coastal coniferous forests. Adult also inhabits streamsides under moss-covered rocks around splash zones. In a study of the effects of timber harvest, they were found only in 45 to 60-year old forested areas and not in adjacent areas clearcut two to five years previously.

RANKING REFERENCES

Short Citation Author	Year	Full Citation
Bury and Corn	1988	Bury, R. B., and P. S. Corn. 1988a. Responses of aquatic and streamside amphibians to timber harvest: a review. Pages 165-181 in Raedaeke, K., editor. Streamside management: riparian wildlife and forestry interactions. Univ. Washington.
Case	2014	Case, Michael J. 2014. Assessing climate change vulnerability of species in northwestern North America. PhD Dissertation. University of Washington, Seattle, WA. University of Washington.
Corn and Bury	1989	Corn, P. S., and R. B. Bury. 1989. Logging in western Oregon: responses of headwater habitats and stream amphibians. Forest Ecology and Management 29:39-57.
Emel	2019	Emel, Sarah L.; Olson, Deanna H.; Knowles, L. Lacey; Storfer, Andrew. 2019. Comparative landscape genetics of two endemic torrent salamander species, Rhyacotriton kezeri and R. variegatus: implications for forest management and species conservation. Conservation Genetics. 20(4):801-815.
Good and Wake	1992	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.
Grialou et al.	2000	Grialou, J.A., S.D. West and R.N. Wilkins. 2000. The effects of forest clearcut harvesting and thinning on terrestrial salamanders. Journal of Wildlife Management 64: 105-113.
Hallock & McAllister	2005	Hallock, L.A. and K.R. McAllister. 2005. Washington Herp Atlas. A cooperative effort of Washington Natural Heritage Program, Washington Department of Fish and Wildlife, U.S.D.I. Bureau of Land Management, and U.S. Forest Service.
Howell	2011	Howell, Betsy L.; Maggiulli, Nicole M. 2011. Conservation assessment for the Cascade torrent salamander (Rhyacotriton cascadae). U.S.D.A. Forest Service Region 6 and U.S.D.I. Bureau of Land Management. Page 50.
Vesely, D.G. and W.C. McComb.	2002	Vesely, D.G. and W.C. McComb. 2002. Salamander abundance and amphibian species richness in riparian buffer strips in the Oregon Coast Range. Forest Science. 48: 291 - 297.
Welsh & Hodgson	2008	Welsh Jr, H.H. and Hodgson, G.R., 2008. Amphibians as metrics of critical biological thresholds in forested headwater streams of the Pacific Northwest, USA. Freshwater biology, 53(7), pp.1470-1488. Available at https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1365-2427.2008.01963.x.

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 Columbia torrent salamander (Rhyacotriton kezeri). Oregon Biodiversity Information Center. Institute for Natural Resources, Portland State University, Portland, OR.