

COEUR D'ALENE SALAMANDER

Plethodon idahoensis

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Species Information

Taxonomy

The Coeur d'Alene Salamander is in the Plethodontidae family (lungless salamanders). Until recently, the Coeur d'Alene Salamander was considered by some authors to be a subspecies of Van Dyke's salamander (*Plethodon vandykei*) (Nussbaum et al. 1983). Recent genetic work and morphometric analysis, however, have confirmed that *P. idahoensis* is a distinct species (Howard et al. 1993; Wilson and Larsen 1999). There are no recognized subspecies.

Description

The Coeur d'Alene Salamander is a lungless, terrestrial salamander. They are blackish brown, with a yellowish throat patch and a yellow, orange, or mustard-coloured dorsal stripe with irregular margins. Occasionally, individuals with a reddish stripe are encountered. Females are larger than males (Lynch 1984) and may reach up to 130 mm in total length, with snout-vent lengths reaching 65 mm (Ohanjanian 2000a). Coeur d'Alene Salamanders have distinct parotoid glands at the rear of the head (Nussbaum et al. 1983), long legs, and short, slightly webbed toes (Cassirer et al. 1994).

Distribution

Global

The known distribution of the Coeur d'Alene Salamander is fragmented. Isolated populations are scattered throughout northern Idaho, western Montana, and southeastern British Columbia (Cassirer et al. 1994; Wilson et al. 1989, 1997).

British Columbia

Coeur d'Alene Salamanders are distributed in tributaries and seepages that drain into Moyie River, Duck Lake, Kootenay Lake, the Duncan Reservoir, Lower and Upper Arrow lakes, and St. Mary's River (Ohanjanian 1997a, 1998, 2000b; Dulisse 1999; L. Amos, pers. comm.). The species has recently (2001) been confirmed near Revelstoke, thereby extending the northern limits of its range by 120 km. In addition, this species has been confirmed in the West Kootenays (Kimberley and Cranbrook areas) (Ohanjanian, unpubl. data).

Forest region and districts

Southern Interior: Arrow Boundary, Columbia, Kootenay Lake, Rocky Mountain

Ecoprovinces and ecoregions

SIM: CCM, MCR, SCM, SFH, SPM

Biogeoclimatic units

ICH: dw, mk1 (in MCR), mw2 (in CCM and SFH), wk1 (in CCM), xw (in SCM and SFH),

IDF: un (SFH)

MS: dk

Broad ecosystem units

AV, RO, SP (DP, DF, IH on steep south-facing slopes associated with talus habitats)

Elevation

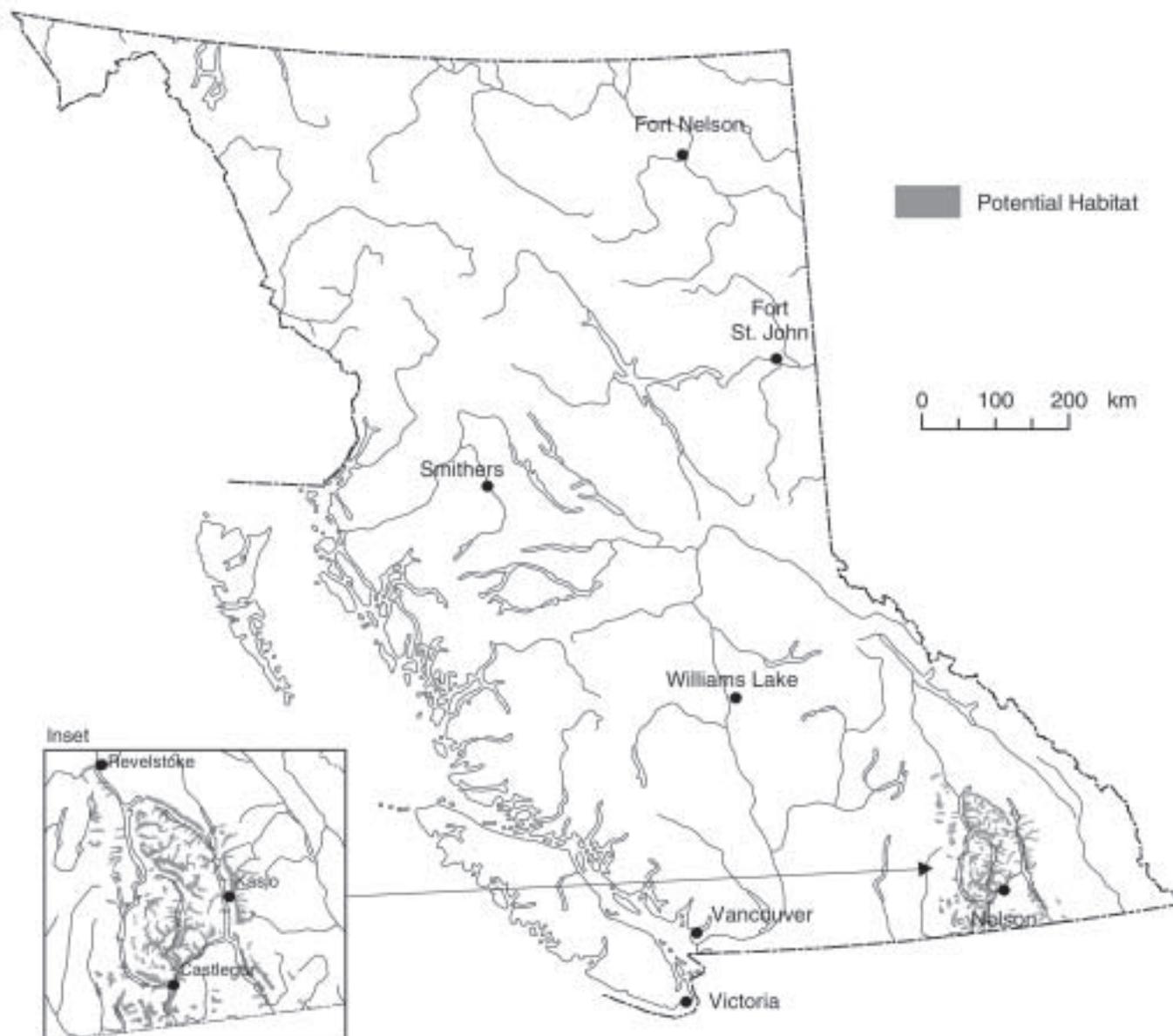
500–1550 m (Groves et al. 1996; Wilson et al. 1997)

Life History

Diet and foraging behaviour

Coeur d'Alene Salamanders are nocturnal, and feed primarily on insects (Wilson and Larsen 1988). They

Coeur d'Alene Salamander (*Plethodon idahoensis*)



Note: This map represents a broad view of the distribution of potential habitat used by this species. The map is based on several ecosystem classifications (Ecoregion, Biogeoclimatic and Broad Ecosystem Inventory) as well as current knowledge of the species' habitat preferences. This species may or may not occur in all areas indicated. Recent records (2001, 2002) not included.

forage on the surface during wet periods in spring, summer and fall within suitable habitats (moist areas), usually near subsurface retreats, but they may, under optimal conditions, travel farther (Cassirer et al. 1994).

Reproduction

Mating occurs primarily in the late summer and fall but may also occur in the spring. Young hatch in early fall directly from eggs. There is no larval stage. Female Coeur d'Alene Salamanders lay eggs only in alternate years and are not reproductive until they are 4 years old (Lynch 1984).

Site fidelity

There is no information on movements of Coeur d'Alene Salamanders from site to site. Certain individuals appear to remain under specific cover objects at a site, but this is not consistent (Ohanjanian 2000a).

Home range

Home range size has not yet been determined; however, one individual is known to have moved at least 31 m over 14 days, and another was detected on a rainy night 50 m away from a waterfall area (Ohanjanian 1997b, 2000a).

Movements and dispersal

Although these salamanders spend much of the year in subsurface retreats, they are active above ground during the spring and fall (May through October) or during wet periods in the summer. During this time they will forage, mate, and disperse.

Since plethodontid salamanders require a damp environment for respiration and rehydration (Spotila 1972), and parts of their range in British Columbia are characterized by a dry, severe climate (Braumandl and Curran 1992), opportunities to disperse are likely poor and must coincide with relatively rare periods of extended rainfall. Some dispersal may occur on an elevational gradient, as they have been found at more than one location on a given watercourse (Ohanjanian 1998).

Habitat

Structural stage

3b: tall shrub	6: mature forest
4: pole sapling	7: old forest
5: young forest	

Important habitats and habitat features

This species has highly specialized habitat requirements (Cassirer et al. 1994). A damp environment is essential for respiration and rehydration. Generally, Coeur d'Alene Salamanders occur in wet micro-habitats associated with fissured bedrock or deep, wet talus (Cassirer et al. 1994; Ohanjanian 1997a). They require moist underground rocky retreats to avoid desiccation in summer and freezing in winter. Important habitat features with these characteristics include waterfall splash zones; rock seepages; fissured bedrock in association with streams; and deep, wet, talus. Occupied watercourses vary in size and individuals have been found on rock walls where surficial water is present for only a part of the year (Ohanjanian 1997b).

Suitable habitat generally occurs in areas of steep topography where bedrock is near the surface. Areas overlain with unconsolidated glacial or alluvial deposits do not provide underground habitat for Coeur d'Alene Salamanders and these features may limit their distribution (Wilson and Larsen 1998).

In spring, summer, and fall, rock slabs, moist cracks in bedrock, deep moss, and coarse woody debris in the wetted areas of streams provide seasonal cover near the surface. However, when it is dry or cold, Coeur d'Alene Salamanders must be able to retreat deep into bedrock or talus.

Overstorey vegetation in forested areas adjacent to rocky retreats and streams reduces evaporation caused by incident solar radiation and raises the humidity of the substrate. Minimum canopy cover at stream sites in the United States was 42% with a mean of $83\% \pm 15\%$ (Cassirer et al. 1994). At seepage sites, this mean is lower ($57\% \pm 5\%$), probably because the terrain is often near vertical at seepages. The forests between streams and seepages provide the Coeur d'Alene Salamander with

additional opportunities for foraging and may allow the dispersal of juveniles from one watercourse to another during prolonged rain events.

Conservation and Management

Status

The Coeur d’Alene Salamander is on the provincial *Blue List* in British Columbia. It is considered a species of *Special Concern* in Canada (COSEWIC 2002).

Summary of ABI status in BC and adjacent jurisdictions (NatureServe Explorer 2002)

BC	ID	MT	Canada	Global
S3	S3	S2	N3	G4

Trends

Population trends

In British Columbia, the Coeur d’Alene Salamander is known from 44 sites on 41 distinct watercourses in 16 localities. Although no data are available on absolute abundance or trends, populations are likely small, as encounter rates seem low when compared with some sites in the United States (Ohanjanian 1997a).

Habitat trends

As the human population increases, more water may be diverted from streams for community watersheds. Ongoing road construction may also reduce habitat availability.

Threats

Population threats

In addition to being small, populations also tend to be “scarce and clustered” and some are likely isolated (Dupuis and Ohanjanian 1997). This species’ limited dispersal ability and sensitivity to desiccation may impede genetic exchange or recolonization of sites.

In addition, its low reproductive rate makes it difficult for populations to recover should habitat loss, disturbance, or direct mortality cause it to decline. Thus, it may be vulnerable to local extirpations.

Habitat threats

The greatest threat to this species’ habitat is the alteration of the hydrology of occupied wet micro-habitats (i.e., fissured bedrock or deep, wet talus, and associated foraging habitat). The main activities that are likely to result in changes to the hydrology of known Coeur d’Alene Salamander sites are forest management and road development (Cannings et al. 1999). If climate change results in lower precipitation or decreases in snowpack, populations associated with seepages and low volume creeks will likely dry out and be extirpated. Blasting for road maintenance or widening can also eliminate populations (Ohanjanian 1997a, 1997b; A.G. Wilson, pers. comm.)

Alterations in hydrology include upslope water diversion (may desiccate downslope habitat), loss of overstorey vegetation (decreases substrate moisture and therefore reduces foraging opportunities or prevents movement of salamanders between sites), and flooding from increases in peak flows. Populations that occupy seepages flowing along rock faces may be particularly vulnerable to decreases in flow caused upslope, as many of these sites have low flow for much of the year.

Structural changes to the habitat may also threaten Coeur d’Alene Salamanders. These include sedimentation or slumping, which may clog salamander retreats; blasting of rock for road construction, or culvert construction, which may directly kill salamanders; and silvicultural practices such as herbicide application and burning, which alter vegetative structure, abundance of coarse woody debris, and the invertebrate prey base. Operation of heavy equipment and cross-stream yarding may directly kill salamanders and destroy their cover objects.

Legal Protection and Habitat Conservation

The Coeur d'Alene Salamander is protected, in that it cannot be killed, collected, or held in captivity without special permits, under the provincial *Wildlife Act*.

Of the 44 known occurrences, one is in a provincial park, three are in proposed Goal 2 Protected Areas, and one is in a Ministry of Forests recreation site. The remaining occurrences are on private land, highway right-of-ways, or Crown land.

The greatest protection the Crown land sites can receive, under the results based code, is the Best Management Practices for S2 and S3 streams. These practices recommend a “no logging” reserve zone (30 and 20 m wide, respectively) as well as a 20 m management zone. Guidelines for smaller streams (i.e., S4, S5, and S6) do not adequately protect Coeur d'Alene Salamanders. Ephemeral rock seepages are not protected under the results based code. Some sites may be established as wildlife habitat features under the results based code.

Identified Wildlife Provisions

Sustainable resource management and planning recommendations

- ❖ Maintain hydrological characteristics (surface and subsurface) of slopes above and/or influencing downstream hydrology and micro- and macro-drainage patterns of streams and seepages within the range of the Coeur d'Alene Salamander.
- ❖ Maximize connectivity between known occurrences and suitable habitat (wet talus and fissured bedrock associated with water below 1550 m within the range of the Coeur d'Alene Salamander). Riparian connectivity and/or forested habitat in addition to underground passages are expected to provide the principal dispersal avenues for juveniles.
- ❖ Wherever possible, increase forest retention on stream reaches adjacent to WHAs.
- ❖ Avoid activities that affect the hydrology, microclimate, or rock structure, particularly blasting, between neighbouring occurrences.

Wildlife habitat area

Goal

Protect populations by maintaining the structural and hydrological integrity of known subsurface retreats and adjacent above-surface foraging and breeding habitat (adjacent forested areas).

Feature

Establish WHAs at known occurrences within natural habitats. Use the wildlife habitat feature designation to address occurrences within human-made habitats (i.e., road structures).

Size

Typically, <20 ha; however, the size will be based on the extent of suitable habitat, microclimate, and hydrological considerations.

Design

The WHA should consist of a core area plus a 20–40 m management zone. The core area should be delineated to include all suitable habitat (i.e., wet, fissured bedrock or deep wet talus) plus adjacent suitable foraging habitat (i.e., forested habitat within 50 m of the wet bedrock or talus). The management zone should be designed to protect the windfirmness and microclimate of the core area.

General wildlife measures

Goals

1. Maintain microhabitat conditions by ensuring streamside moisture levels and natural flow regimes of watercourses are unaltered.
2. Ensure that the integrity of structural habitat (fissured bedrock and/or talus) remains intact and is protected from destruction by blasting or siltation.
3. Protect population from physical disturbance and direct mortality.
4. Prevent compaction of interstitial spaces.
5. Ensure WHA boundaries are windfirm.

Measures

Access

- Do not construct roads unless there is no other practicable option. When roads are determined to be necessary, locate downslope from the WHA to prevent siltation. If roads must be built upslope, ensure every measure is taken to prevent water diversion, which can lead to desiccation of habitat downslope.
- Do not build stream crossings unless there is no other practicable option. Where crossings are determined to be necessary, use open-bottomed structures (e.g., bridges or log culverts). Ensure adequate silt and sediment control measures are implemented.
- Do not remove rock or talus.

Harvesting and silviculture

- In core area, do not harvest or salvage, except when there are serious forest health concerns and disturbance to aquatic habitats are minimized.
- Do not harvest within management zone between 1 May to 30 October. Up to 30% basal area or greater, where topographic shading dominates the microsite, may be removed in the management zone to create a windfirm boundary zone and maintain the microclimatic conditions of the core area.
- Leave wildlife trees, deciduous trees, and shrubs in the management zone.
- Leave coarse woody debris, moss, and understorey intact.
- Do not disturb substrate.
- Burning should not be carried out in the management zone or core area.

Pesticides

- Do not use pesticides.

Recreation

- Do not establish recreation sites.

Additional Management Considerations

Apply best management practices, according to riparian management recommendations, on streams where Coeur d'Alene Salamanders are present.

Information Needs

1. Movement and distribution along creeks.
2. Information on species' occurrence on eastern slopes of Purcell Mountains (near Kimberley).
3. Dispersal and ability to move between sites.

Cross References

Rocky Mountain Tailed Frog

References Cited

- Braumandl, T.F. and M.P. Curran. 1992. A field guide for site identification and interpretation for the Nelson Forest Region. B.C. Min. For., Nelson For. Reg., Nelson, B.C.
- Cannings, S.G., L.R. Ramsay, D.F. Fraser, and M.A. Fraker. 1999. Rare amphibians, reptiles and mammals of British Columbia. B.C. Min. Environ., Lands and Parks, Wildl. Br. and Resour. Inv. Br., Victoria, B.C. 198 p.
- Cassirer, F.E., C.R. Groves, and D.L. Genter. 1994. Coeur d'Alene Salamander conservation assessment. U.S. Dep. Agric. For. Serv. Reg. 1, Missoula, Mont.
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2002. Canadian Species at Risk. www.speciesatrisk.gc.ca
- Dulisse, J. 1999. Syringa Creek Provincial Park rare and endangered species evaluation. Report to BC Parks. 25 p.
- Dupuis, L.A. and P. Ohanjanian. 1997. Status report on the salamander, *Plethodon idahoensis*, in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa, Ont.
- Groves, C.R., F.E. Cassirer, D.L. Genter, and J.D. Reichel. 1996. Coeur d'Alene salamander (*Plethodon idahoensis*). Nat. Areas J. 16(3):238–247.
- Howard, J.H., L.W. Seeb, and R. Wallace. 1993. Genetic variation and population divergence in the *Plethodon vandykei* species group (Caudata: Plethodontidae). Herpetologica 49:238–247.
- Lynch, J.E. Jr. 1984. Reproductive ecology of *Plethodon idahoensis*. M.Sc. thesis. Univ. Idaho, Moscow, Idaho. 59 p.
- NatureServe Explorer. 2002. An online encyclopaedia of life. Version 1.6. NatureServe. Arlington, VA. Available at <http://www.natureserve.org/explorer/>

- Nussbaum, R.A., E.D. Brodie, Jr., and R.M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. Univ. Idaho Press, Moscow, Idaho. 332 p.
- Ohanjanian, I.A. 1997a. The Coeur d'Alene salamander (*Plethodon idahoensis*) in southeastern British Columbia. Report to BC Environ., Nelson, B.C.
- _____. 1997b. Confidential folio of *P. idahoensis* occurrences in southeastern British Columbia: Detailed locational information, survey results and site-specific risk assessments and recommendations. BC Environ., Nelson, B.C.
- _____. 1998. Coeur d'Alene Salamander inventory. Report to Wynndel Box and Lumber Co. Ltd., BC Environ., and Forest Renewal BC.
- _____. 2000a. The Coeur d'Alene Salamander (*Plethodon idahoensis*) in the operating area of Wynndel Box and Lumber Co. Ltd., additional inventory information and preliminary population studies. Report prepared for Wynndel Box and Lumber Co. Ltd., Forest Renewal BC, and B.C. Min. Environ., Lands and Parks. 39 p.
- _____. 2000b. The Coeur d'Alene Salamander (*Plethodon idahoensis*) distribution in the Kootenay Lake and Arrow Forest Districts. Report to B.C. Min. Environ., Lands and Parks, and Habitat Conserv. Trust Fund. In prep.
- Spotila, J.R. 1972. Role of temperature and water in the ecology of lungless salamanders. Ecol. Monogr. 42:95–125.
- Wilson, A.G., Jr. and J.H. Larsen, Jr. 1988. Activity and diet in seepage-dwelling Coeur d'Alene salamanders (*Plethodon vandykei idahoensis*). Northwest Sci. 62(5):211–217.
- _____. 1999. Morphometric analysis of salamanders of the *Plethodon vandykei* species group. Am. Midland Nat. 141:266–276.
- Wilson, A.G., Jr., E. Simon, Jr., and J.H. Larson, Jr. 1989. Range extension for the Coeur d'Alene salamander, *Plethodon vandykei idahoensis*, to the Canada–United States border. Can. Field-Nat. 103:93–94.
- Wilson, A.G., Jr., E.M. Wilson, C.R. Groves, and R.L. Wallace. 1997. U.S. distribution of the Coeur d'Alene salamander (*Plethodon idahoensis* Slater and Slipp). Great Basin Nat. 57(4):359–362.

Personal Communications

- Amos, L. 2001. Interior Reforestation Ltd., Cranbrook, B.C.
- Wilson, A.G., Jr. 2000. Spokane Falls Community College, Spokane, Wash.

