

SHUSWAP STEWARDSHIP MANUAL



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BC HYDRO
FISH & WILDLIFE
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Canada

Screech-owls and Their Habitats

This manual is intended to help landowners along the Shuswap River manage habitats on their land to help support the existing screech-owl population. Much of the information presented is the result of the screech-owl research project conducted in the area between 2004 and 2008.

Western Screech-owls

Western screech-owls in the Shuswap area are of the *Megascops kennicottii macfarlanei* subspecies. This subspecies is listed by the Committee on the Status of Endangered Species in Canada (COSEWIC) as “Endangered”. It is estimated that there are only 200 pairs in all of BC. One other subspecies of screech-owl (*Megascops kennicottii kennicottii*) occurs in BC along the coast, but it is listed as “Special Concern”.

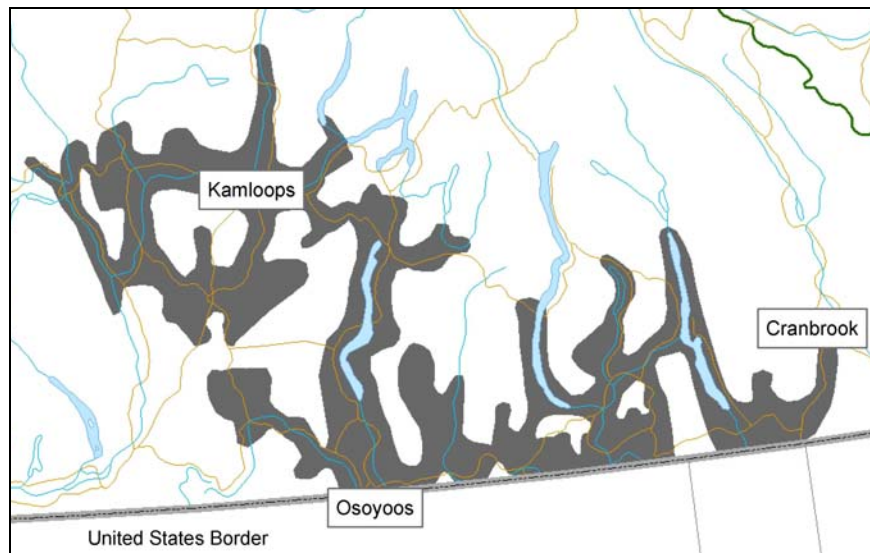


Figure 1. The range of the interior subspecies of screech-owls in BC.

Quick Facts

- Screech-owls are small grayish-brown owls.
- They have yellow eyes and prominent ear tufts.
- They are approximately 23 cm (9”) long.
- Female screech-owls are bigger than males (in the Shuswap, they average 242 g and 191 g respectively).
- Screech-owls are year-round residents and do not migrate.
- The average territory of a screech-owl in the Shuswap was 65 ha (161 acres).
- We found 6 active screech-owl territories along the Shuswap River between Cherryville and Shuswap Falls. Most were active every year, but one was only active in 2006.



Habitat

Screech-owls nest in large cottonwood or birch trees in riparian areas (moist forests along waterways). Once babies have left the nest, the owls use a mix of upland coniferous forests in addition to the riparian areas. It is the management of riparian areas that is of greatest concern with respect to providing suitable habitat for screech-owls along the Shuswap River.

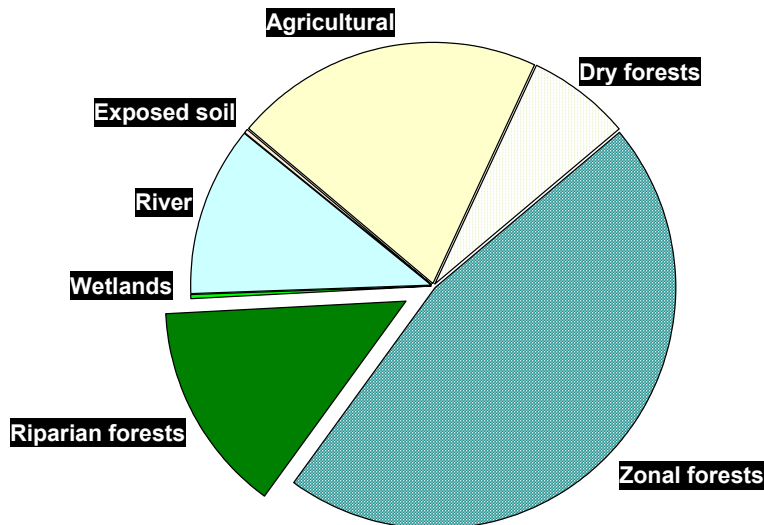


Figure 2. The breakdown in habitat types of a “typical” screech-owl territory. Zonal forests are typical conifer forests with moderate moisture and nutrient levels (versus more open, dry forests and dense, wet riparian forests).

Screech-owls sit and roost in trees all day, not leaving until about a half hour after sunset. The majority of roosting took place in redcedar trees that provided good protection for the owls from harassment by songbirds. Sometimes the owls even roosted in tree cavities. The owls used coniferous trees almost exclusively (94%) when there were no leaves on deciduous trees, whereas they used deciduous trees 23% of the time when leaves were present. Overall, 56% of the trees used as roosts in our study were redcedar trees, 13% were birch, and all other tree species were used less than 10% of the time.

We found 6 nest trees along the Shuswap. All of the nests occurred in cavities in large diameter (i.e., old) trees; the average diameter of nest trees was 79 cm (over 2½ feet). Nest cavities were created in two ways: some were excavated by other birds, such as woodpeckers, whereas others were created by decay of the center of trees from the loss of a limb that creates a natural cavity (we call that a “branch hole cavity”). Of the 6 nests we found, one was an excavated cavity in a birch, 2 were in excavated cavities in cottonwood trees, and 3 were in branch hole cavities in cottonwoods.

Nest were used year after year. We even found nests being used by different pairs of birds after the previous pair either lost the territory or were killed!

Cavities that are good for screech-owls do not form very often and are only common in big, old trees. Retention of natural nest sites are the preferred option for keeping adequate habitat for screech-owls. However, if you feel that your property has few adequate trees to provide nest sites you may want to install nest boxes to improve the chances of having screech-owls nest on your property. Nest boxes are readily used by screech-owls in the South Okanagan. Nest box plans are included in this package.

Breeding Behaviour

Because of the need for riparian forests for nesting, the owls based their territories along rivers. We found that each territory spanned about 1.2 km of river frontage. Little to no overlap occurred among territories.

During February and March (prior to breeding) the male and female owls called to each other in the evening. Listen to the CD included with this package to hear what they sound like. For the rest of the year, it was uncommon to hear the owls calling. The owls bred in late March and early April. Eggs hatched at the beginning of May and babies left the nest around the end of May or first week of June. Most of the nests in the Shuswap produced 3 young each year. Adults continued to feed the babies for several weeks after they left the nest. Young screech-owls probably leave their parent's territory in late summer.

Mortality

One of the reasons that screech-owls are endangered is that they seem to have difficulty surviving from year-to-year. Predation by larger birds was a factor; 2 owls in our study were killed by larger raptors, likely great horned or barred owls. Road kill was another factor; 1 female owl was hit and killed on Sugar Lake Road. The territories of the tagged screech-owls that died were replaced by other screech-owls at an astonishing rate, usually within several months.

Diet

Screech-owls had a diverse diet that included small mammals, birds, fish and insects (especially large, black beetles). The small mammals included mice, voles, shrews, and even a pocket gopher, squirrel and bat! Screech-owls hunted at night, often using dead trees (also called snags) as hunting perches. They did not go out in open fields to hunt, likely due to the risk of being killed by other larger owls. We found that female owls included more mammals in their diet than males, and males included more insects than females.

What can you do to help screech-owls?

1. Retain large deciduous trees in riparian areas (cottonwoods, birch, aspen), both living and dead, for nests.
2. Retain clumps of conifer trees for roosting.
3. Retain trees, including dead trees (snags), around pastures for hunting.
4. Avoid poisoning small mammals. Owls could eat poisoned animals and be poisoned themselves.

5. Consider conservation covenants to protect screech-owl habitat into the future. There is information on covenants in a later section of this package.

What does good screech-owl habitat look like?

The following are examples of trees and habitats that are important for roosting, nesting, and hunting:



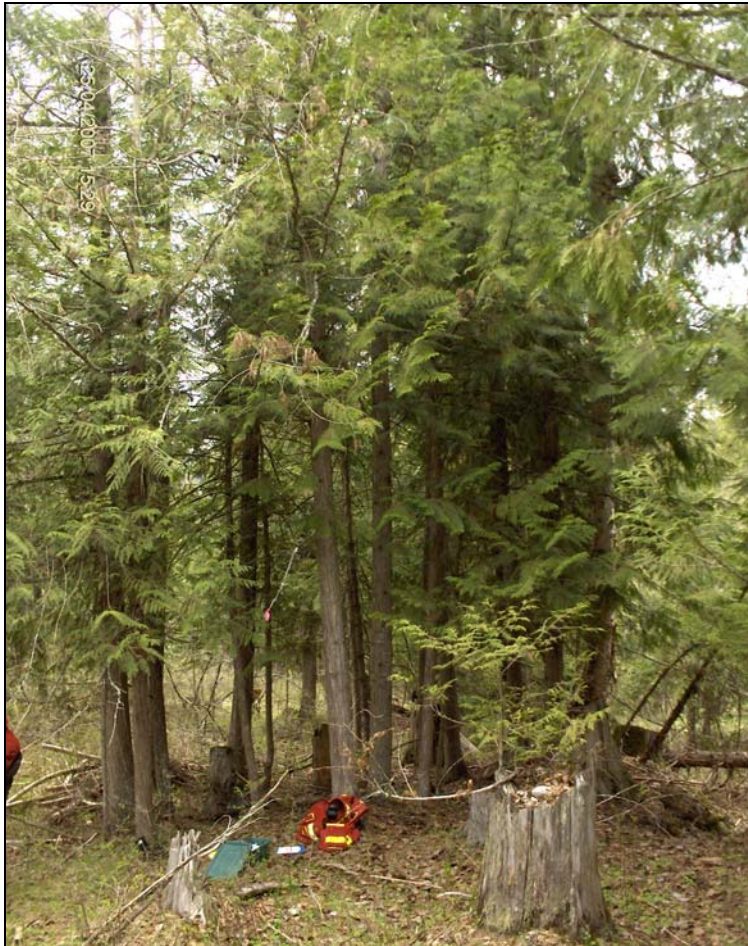
Photograph 1. Riparian forests, such as that shown here, are vitally important for screech-owls along the Shuswap River. If these forests disappear, so too will screech-owls.



Photograph 2. Typical roosting habitat for western screech-owls. Notice the low dense branches of the redcedar tree; these branches are often used for roosting. Screech-owls roost right next to the main stem of the tree.



Photograph 3. During summer, screech-owls often use dense shrubby areas for roosting. These sites aren't used much during winter because there are no leaves on the shrubs.



Photograph 4. Small clumps of dense conifer trees can also be important roost sites for screech-owls.



Photograph 5. This is birch tree with a cavity used as a nest by 2 pairs of owls: one pair in 2006, and a different pair in 2007. This tree was 70 cm (2' 3") wide at the base. The cavity entrance (detail) was 8 m (26') above ground.



Photograph 6. In the lower Shuswap, old large black cottonwood trees are found only in riparian forests. These trees are extremely important for screech-owls, as they are one of the only tree species that produce cavities that they can use for nesting. The photo on the left is a “branch hole” cavity.



Photograph 7. Standing dead trees can be important foraging perches, especially if they are on the edge of a small opening or field.

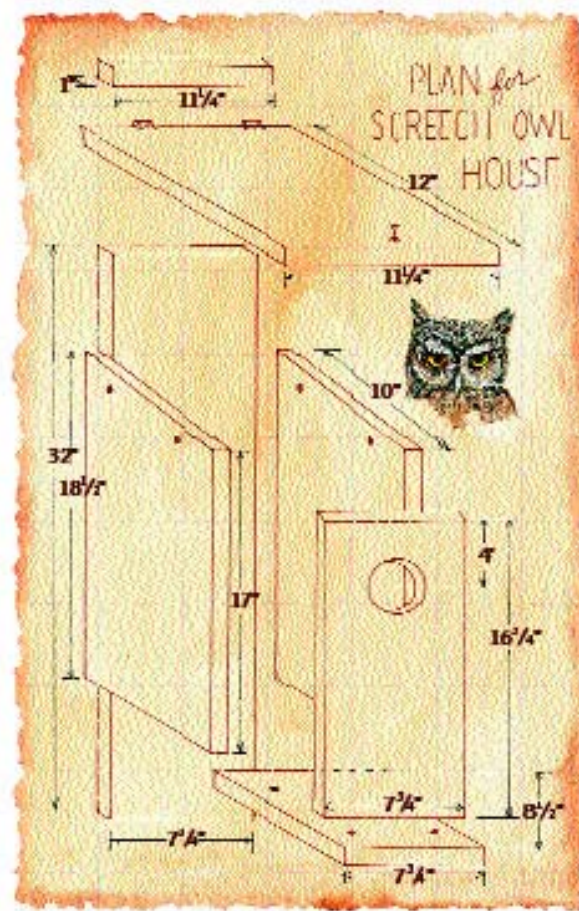
Acknowledgements

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The Splats'in First Nation was instrumental in the discovery of these screech-owls and we thank them for their support of the research project.

Many thanks to Whitevalley Community Resource Centre for their support and assistance.

Screech-owl Nest Box¹



Screech owl boxes have not inspired as much design experimentation as those for bluebirds or purple martins, but we do have some idea of what works. Fred Gehlbach of Baylor University, the world's leading authority on screech owl behaviour, tried some variations on nest boxes as part of his studies on nesting habits. Gehlbach started by measuring natural cavities favoured by the owls. He found the birds tended to use deeper cavities, more than 10 inches deep, with entrance holes not much larger than the minimum needed for their own entry. He also found that while the owls would use cavities with floors only six inches across, young owls were apt to fledge too early from such crowded nests. He had better success using boxes with floors that were eight inches square.

Tools

Ruler or tape measure; pencil; power saw; handsaw; power hand drill with attachments (1/2" bit; 5/64" bit, to pre-drill the screw holes; 3" hole saw; Phillips-head screwdriver); chisel or knife; hammer.

¹ from Audubon website: <http://magazine.audubon.org/backyard/backyard0201.html>

Materials

- 1-foot x 10-foot piece of unpainted wood, such as white pine, 1" thick. (Remember that when you buy a board of this size at the average lumberyard or home store, the 1-foot width will really be 11 1/4" and the 1" thickness will really be about 3/4".) You'll end up with leftover wood.
- 24 Sheetrock screws (2" each), coated or galvanized to prevent rusting
- One No. 6 brass wood screw (1 1/2"), with washer
- Two small brass hinges, with screws
- Several small nails, carpenter's glue, caulking compound

Assembly

(1) Start by remembering this old adage: Measure twice, cut once. Then, with a pencil, mark off all the cuts you'll make, starting from one end of the board, according to the dimensions listed below. After you've made your measurements, cut the piece for the back (32" x 7 3/4"). Next cut the piece for the bottom (8 1/2" x 7 3/4"), then the piece for the front (16 3/4" x 7 3/4").

(2) Cut the sides. First cut a piece that's 10" x 35 1/2". Before you make the next cut, be sure you've measured 17" up one side of the board and 18 1/2" up the other side, and that your cut line connects these two points. You should end up with identical pieces, 18 1/2" in the back, 17" in the front, and 10" from front to back.

(3) Finally, cut the top piece (12" x 11 1/4"--the full width of the board), then a 1" full-width strip (1" x 11 1/4").

(4) Drill two 1/2" ventilation holes about 1" below the top of each side. Drill five 1/2" drainage holes in the bottom (one in the centre, one near each corner).

(5) With the hole saw, drill a 3" entrance hole. The centre of the hole should be 4" below the top of the front piece. The hole should be centred between the sides.

(6) With the chisel or knife, make horizontal scratches on the inside of the front piece, from the bottom up to the entrance hole (so the young owls can climb out).

(7) Measure about 7" up from the bottom of the back piece to mark where the bottoms of the sides will go. Screw the side pieces into the edges of the back piece; use three screws for each side. The top of the side pieces should slope toward the front. (Pre-drill all the holes with the 5/64" bit.)

(8) Screw the bottom of the box in place, setting it about 1/2" above the bottoms of the side pieces. Use three screws to attach the bottom to each side and to the back.

(9) Screw the front piece in place, aligning it so that its front surface is even with the side pieces. Use three screws to attach the front to each side and to the bottom.

(10) Take the top piece and cut the back end at a slight angle so that it fits flush against the back of the box. (This can be a difficult cut, and might be best made with a small handsaw.) Using the two hinges, attach the top to the back. The top should extend out at least 1" on both sides of the box and overhang the front by about 2". Use the brass screw with washer to attach the top of the box to the front; this will hold the top in place but enable you to open the box to clean out the inside.

(11) Finally, take the 1" x 11 1/4" strip and glue and nail it to the back of the box, above the hinges (use small nails to avoid splitting the strip). The strip should be low enough to help keep rainwater out of the box but high enough that you can still lift the lid and reach inside. Caulk where this piece meets the back.

Hanging the box

It's important to place the box correctly. The natural cavities that screech owls choose are typically 12 to 20 feet above the ground and in deep shade. As the female incubates the eggs, the male is apt to spend the day roosting in dense foliage within about 20 feet of the nest. After you've placed an inch or so of dried leaves in the bottom of the nest, hang it at least 10 feet up on the trunk of a large tree. Try to place it away from sidewalks or doors, since the owls vigorously defend their nests against perceived threats. In fact, when the young are near fledging, some unusually spunky adults may swoop down at people or pets who wander too close, even raking them with their claws. So while placing the box in as secluded a spot as possible is good for the owls, it might be better for us, too.

The most important thing to remember when hanging the box: Be careful! Ten feet (or higher) is a long way off the ground, especially if you're carrying an owl box. If you don't want to nail or screw the box to the tree, you can attach a cable or light chain to the box through holes drilled in the back (both top and bottom). The cable or chain should be just loose enough to be worked up over the trunk's irregularities. You might need to tighten the cable or chain when the box is where you want it.

Conservation Covenants

The following information is from 3 brochures produced by the Land Trust Alliance of BC, adapted from original documents created by Ian Attridge of Ontario. The Land Trust Alliance of BC is an umbrella organization for land conservation organizations (they have 50 member organizations). Your local land trust group is the **North Okanagan Parks and Natural Areas Trust (NOPNAT)**. Their contact information is:

Bill Wagner (250) 545-1153 bfwagner@shaw.ca
Peter Tassie (250) 545-7673 ptassie@telus.net
Sheila Harrington (250) 538-0112 sheila@landtrustalliance.bc.ca

Your Land: Conservation Options

Do you want to protect features on your land, yet retain financial and other management objectives?

We work with landowners who are interested in leaving a conservation legacy. This pamphlet outlines a few of the conservation options available to help you preserve certain land values. You may want to protect a shoreline, woodland or stream, or find creative solutions to promote ecologically sensitive agriculture, forestry or development. Together we can help you achieve your plans for your land, while protecting important natural and cultural values.

A decision to protect some aspect of the land you now hold is unique and personal. Some landholders want to protect the land's natural or cultural features before passing it on to the next generation. Others may see conservation as a way to resolve property or potential income tax challenges. Other motivations may include ensuring privacy from neighbours or sorting out the future use of a property now shared by members of an expanding family or community group. Following, we provide a few examples of ways to link conservation choices with financial benefits.

Conservation Choices:

1. Keeping Your Property

Like many landowners, you may want to continue to own your property but still want to consider a number of conservation strategies. Short term agreements include the stewardship agreement, management agreement, or leases or licenses. Many land trusts and conservancies have Stewardship Programs. These include site visits by the land trust and local biologists or naturalists to assist you in conservation planning or in identifying natural or cultural features. Also, they can help you to find out more about non-toxic methods of landscape design and maintenance, or restoring the natural vegetation in your area. You may also be able to qualify for farm or managed forest land property tax designations. In some cases, mixing farm or forest land uses with conservation are entirely feasible, while maintaining your reduced tax status. Another option is the Conservation Covenant. This is a legal agreement between a landholder

and a designated land trust organization. It is registered on title to the land and will remain in effect after the land is sold or transferred, binding future owners of the land to the terms of the covenant. This agreement will ensure that features of the land that you want protected will remain in effect in perpetuity. The conservation organization holding the covenant will record and monitor the state of the land long after the land has changed hands. This is a creative way of leaving a legacy of conservation for the future, and, you can still live on, use or sell the land you have protected.

2. Transferring Your Property

You can protect your land into the future by arranging to transfer the property now, or at a later date. For example you might:

- sell or donate the land to an organization with a conservation mandate,
- reserve a “life estate” when you give or sell the land, meaning that you or a family member can continue to live on the property until your death or theirs,
- sell or donate the land and then lease it (or a portion) back for a certain period, or,
- protect areas or features with a conservation covenant, then transfer it.

One creative strategy is to donate a part of the proceeds of a land sale back to a conservation organization. This provides the donor with a charitable tax receipt, while also decreasing the net purchasing cost. Land exchanges, partial development to fund conservation, and other approaches might also be explored.

If there is no urgency to transfer the property, you could plan to donate the land through a will. The details for such a donation need to be worked out well in advance to ensure that your objectives will be fully realized.

Should you wish to sell your land to a conservation organization, often some time is needed to come up with the funds. Thus, installment payments, a mortgage, or an “option to purchase” can allow us to raise funds over a longer period to meet your purchase price.

Another option is to grant a conservation agency such as ours the “right of first refusal.” This means that we would have first rights to buy the property, if and when you decide to sell.

Of course, should your land not be of particular natural or cultural heritage value, you could still affect conservation by donating land or other cultural items for us to sell, in order to provide funds to acquire more ecologically significant lands. Any gifts of cash or goods are also generally welcome. These will help our ongoing costs of purchase, maintenance and monitoring.

Preserving Natural & Cultural Features of Land with a Conservation Covenant

Conservation covenants (in other areas called easements) are a voluntary tool which allows the current landowner to permanently preserve natural and cultural features of the land, while still retaining ownership and use.

How Conservation Covenants Work

A conservation covenant is a legal agreement made between a current landowner and a designated land trust organization. It is registered on title to the land, and it will remain in effect after the land is sold or transferred, binding future owners of the land to the terms of the covenant.

The conservation covenant helps protect specific features, areas or uses in perpetuity. The landowner still holds title to the land and can continue to live on and use it, restricting or allowing public access, but keeping to the agreed restrictions in the covenant.

The land trust or conservation organization that will hold the covenant can help you design the limits of future use and development. In order to ensure that these long term agreements are kept, two land trust organizations may share the legal responsibility of protecting, monitoring and defending the covenant. An annual site visit and report are often done, creating an on-going record of the land's condition.

Normally, a conservation covenant restricts uses, developments or practices which would damage the natural or cultural features of the land.

- One could prohibit future subdivision, while retaining the rights to build accessory buildings or grow certain crops.
- A covenant on land containing endangered wildlife habitat might prohibit development completely, yet retain existing or replacement dwellings.
- In some cases, the conservation covenant may apply to a portion of the property only, allowing development, building or other uses in the remaining areas.

As agreements, covenants can be tailored to meet your own desires, the land's unique natural and cultural values, and the goals of the conservation organization signing it.

Covenant on Land to be Transferred

A conservation covenant can be enacted through a will, upon donation of land, or it can come into effect as the land is transferred to other family members or sold.

Developers may also negotiate a covenant to protect a portion of a site or specific features of an entire site (e.g., trees or watercourses). Again, the conditions and terms need to be negotiated fully with the organizations who will be responsible for monitoring the conservation covenant over time.

Conservation & Community Values

When you place a conservation covenant on land, you are creating a legacy that will last far into the future. You will be helping your community and future generations by preserving natural or cultural resources that might otherwise be destroyed. In addition, you will be adding to a network of conserved areas that will help maintain the habitats and ecosystems that support wildlife, human health and recreation. Because of your initiative to limit your landholder rights, you will help preserve what you held title to for a brief time here on earth. Local land trusts and the Land Trust Alliance of B.C. can help

you should you want to use a conservation covenant to protect specific values on land you now hold.

Next Steps

Decisions which will be in effect for generations to come need careful consideration. Your choosing to conserve aspects of the land is the first step. Next, you may want to talk with your local conservation organization to explore what most suits your needs and the needs of the community in which the land is located. You will also need to talk with an appraiser, an accountant and a lawyer. Your land trust can help you with these contacts. Finally, you will need to consider how the organization holding the covenant will pay for the long-term monitoring of the land. This can be part of your legacy - leaving extra financial funds, called an endowment, to take care of the costs of maintaining the covenant in the future.

Tax Benefits of your Conservation Donation

If I decide to donate land or a covenant for conservation, what financial benefits will I have?

We work with landowners like you who want to leave a conservation legacy. This may involve a gift of cash, land or a conservation covenant. Donations made to a Land Trust or Conservancy offer a life time of benefit in knowing that you have helped protect the natural or cultural heritage of our province.

Your generous gift to a Land Trust or other Conservation Organization will have tax implications for you as a donor. We can help create a conservation package that suits your needs as well as your personal and financial goals. The following is a basic outline to help you understand some of the tax implications involved.

Donations of Land

The steps in determining how land is valued, and thus taxed, are:

- 1) The land is appraised to determine its current fair market value.
- 2) If the land is capital property, a charitable tax receipt can be issued for any amount between the original cost of the land and the current appraised fair market value.
- 3) Except for the donation of a principle residence, this may result in a capital gain (the difference of the value of the land upon purchase and its current value). If there is a capital gain, normally 50% of this gain must be included as income, but if the gift of land qualifies as an Ecological Gift) there will be no taxable capital gain.
- 4) When land is donated to a registered charity (your local land trust), the charitable tax receipt they issue can be used to offset up to 75% of your income in the 1st year (100% in the case of an Ecological Gift), with any unused portion carried forward for five years. The tax receipt generally will more than offset the amount of the capital gain.

Conservation Covenants

Similar to land donations, the first step is to have the land appraised. With a covenant, the appraisal will determine the value of the land unencumbered, and then the value with the restricted use. The difference between the two is the value of the covenant.

As with a land donation, the donor may have capital gain consequences. However, if the land is not classed as inventory, the conservancy or land trust can issue charitable tax receipt for any amount you choose between the original value of the covenant and the current appraised value of the covenant. This usually removes donors' concerns about taxable capital gains. Again this charitable receipt can be used to offset up to 75% of income (100% in the case of an Ecological Gift) in the first year, with any unused portion carried forward for up to five years.

Other Tax Consequences

- There may be property tax benefits for conservation covenants in B.C. Assessors in B.C. are specifically directed to give "consideration to any terms or conditions contained in a conservation agreement" in determining the actual value of the property.
- There is no land transfer tax applied to the registration of conservation covenants or the donations of lands to a registered charity in B.C.
- Farmers, homeowners and others may be eligible for capital gains exemptions.
- If the gift of land qualifies as an Ecological Gift, you may use the charitable receipt to offset 100% of your income in the first year (as opposed to only 75%). Your land trust or conservancy can help you make the appropriate contact with an official designated by the federal Minister of the Environment who can issue this Certificate.

Additional Exceptions

- Land held by charities may qualify for additional property tax reductions.
- Gifts of securities and cultural items have further tax reductions.
- Donations of land to a charity may also affect GST tax credits, pensions and other non-refundable credits.
- Charitable donations made in the year of death (a bequest), can be used to offset up to 100% of the individual's net income.

Donations of Cash

Of course, you can choose to donate cash or property such as securities or art to a conservation organization directly. Should you do so, you will receive a charitable tax receipt for the full amount. You can use this to offset 75% (or 100% depending on the property donated) of your annual income and carry the balance forward for up to five years.

Be sure to contact your own financial and legal advisors before donating lands or covenants. Each case is very specific and you need to be sure of the implications before proceeding.

Wildlife of the Mid-Shuswap

In this section, we have included information about various rare wildlife species that you may see in the Shuswap Area. Sightings of some of these species ought to be reported to various agencies because they are rare (see table below). Reporting sightings will help track the populations of these rare species!

Species	COSEWIC Status	BC Status	Who to report sighting to
Badger	Endangered	Red	The Badger Hotline 1-888-223-4376
Western screech-owl	Endangered	Red	CDC (see below)
Townsend's big-eared bat	unassessed	Blue	CDC
Flammulated owl	Special Concern	Blue	CDC
American avocet	unassessed	Red	CDC
Swainson's hawk	unassessed	Red	CDC
Lewis' woodpecker	Special Concern	Red	CDC
Short-eared owl	Special Concern	Blue	CDC
Western toad	Special Concern	Yellow	B.C. Frogwatch
Painted turtle	Special Concern	Blue	CDC
Rubber boa	Special Concern	Yellow	Not necessary
Racer (snake)	Special Concern	Blue	CDC
Western skink	Special Concern	Blue	CDC
Alligator lizard	Not at risk	Yellow	Not necessary

There are a number of ways of reporting sightings to the BC Conservation Data Centre (CDC):

- Online: <http://www.env.gov.bc.ca/cdc/contribute.html>
- By email: cdccdata@gov.bc.ca
- On paper: sightings forms are included after this page. Fill out all the information you can and mail it to the CDC (address at end of form). Photos of animals help with proving the identification!

To learn more about any species and it's status go to:

<http://www.env.gov.bc.ca/atrisk/toolintro.html>

or do an internet search on "BC Species and Ecosystem Explorer". There is loads of information on all wildlife species in the province including many background documents.

Other Resources

- If you would like to see photos and hear calls of all owls in North America go to: <http://www.owling.com>
- If you would like to learn more about the BC subspecies of badger: <http://www.badgers.bc.ca>
- If you would like to learn more about amphibians in BC: <http://www.env.gov.bc.ca/wld/frogwatch/>
- If you would like to learn more about reptiles in BC: <http://www.bcreptiles.ca>



B.C. Conservation Data Centre
FIELD OBSERVATION FORM (ANIMALS)

Complete only for Red or Blue listed species. Complete as many fields as able, particularly ones denoting exact location.

EO: Create	_____
Update	_____
EO #:	_____
DONE:	_____

SPECIES: _____

Name of recorder/reporter: _____

Address: _____

Phone#: _____ **e-mail:** _____

Location: *(We use the information you provide to map locations, and to relocate sites on the ground. Please be as precise as possible. Provide written directions below and sketch a map. A photocopy of a 1:50,000 topographic map or other showing the location would be appreciated).*

UTM grid reference: (from blue grid on 1:50,000 NTS map)

NTS MAPSHEET NO.: _____

Please note which North American Datum (NAD) was used (found below the contour interval scale on NTS map): 27 or 83

ZONE: (e.g. 10U) _____ **NORTHING:** _____ **EASTING:** _____ **NAD:** _____

Did you use a GPS unit to determine this UTM point? Y / N **Precision of point:**(+/- metres) _____

Date			Numbers						Comments	Observer
year	month	day	Adult			Immature				
			m	f	u	m	f	u		

Evidence of breeding: none mating observed nest found young being fed out of nest
 singing/displaying male(s) egg-laying observed larva/pupa found
 other: _____

Comments: _____

Habitat: *(include dominant plants if possible; a general description of area):* _____

Elevation: _____ metres feet *(circle one)* **Slope %:** _____ **Aspect:** _____

Comments/Remarks: _____

Area for sketch:

Size (square meters, kilometres or hectares): *(area covered by the population at this location).* _____

Landscape context: *(Is the area fragmented? Generally describe the surrounding area and adjacent land uses including species composition and any other biological or abiotic factors that may affect the population):*

Condition: *(Condition is a measure of the quality of biotic and abiotic factors, within the occurrence, and how they may affect the continued existence of the occurrence. Some factors to consider are: habitat degradation, disturbance and presence of exotic species)*

Notes: *(Land ownership, development plans, management activities or recommendations, if any other comments):*

Known threats: _____

Ownership/Jurisdiction: _____

A private land owner **may request** that the exact location **not** be released to the public. The CDC will only release the location in response to an FOI request.

Does the landowner want the exact location withheld from the public? YES ___ NO ___

Was the landowner contacted about the release of the exact location? YES ___ NO ___

LANDOWNER'S NAME: _____ PHONE: _____ E-MAIL: _____

Please return forms to: CDC, P.O. Box 9358 Station Provincial Government, Victoria BC V8W 9M2
(FAX: 250-387-2733) THANK YOU!



Badger

This species is endangered in British Columbia due to small numbers, continuing loss of habitat, persecution, and road mortality.





Why are Badgers at risk?

The Badger is at risk in British Columbia due to fragmented and threatened habitat, low reproductive success and high mortality. Badger habitat is limited primarily to the dry, southern interior of the province. The key habitats for Badgers – grasslands and open pine or fir forests along the major valleys – have been greatly modified by development of towns, rural subdivisions, ranches, orchards, golf courses and highways. Many former habitats, particularly in the Okanagan area, no longer support Badgers. Reservoir flooding in the East Kootenay area has removed Badger habitat. Forest succession and encroachment into grasslands is reducing available habitat in some regions, although some habitat has been created in areas where productive forests have been cleared for agriculture.

From settlement times until quite recently, Badgers received little or no protection. Many were trapped for their fur or were indiscriminately shot as nuisance animals. Ranchers feared that their cattle or horses would break a leg by stepping in Badger burrows, or that Badger digging would damage irrigation works and interfere with operation of farm machinery. Although damage by Badgers is usually not serious, it has resulted in considerable persecution. Rodent control programs, that poisoned ground squirrels and pocket gophers, probably reduced the food supply for Badgers and resulted in deaths of some that ate poisoned rodents. These historical factors, in combination, are believed to have seriously reduced Badger populations in the province.

Today, trapping and sport hunting of Badgers are not allowed, rodent poisoning is not practised on Crown Lands,

and removal of Badgers that cause property damage is strongly discouraged. Nevertheless, Badgers are probably still illegally killed each year, or caught in traps set legally for Coyotes or Bobcats. In addition, Badgers are now faced with hazards such as getting caught in fences, drowning in irrigation canals or being run over by vehicles or trains. Highway traffic is presently the major cause of Badger mortality in British Columbia. Human activities here may result in relatively few Badger deaths each year, but it must be remembered that the population is already small. Mortality caused directly or indirectly by people, when added to natural losses, could be preventing population increase or causing continued declines in some areas.

Continuing development in Badger habitats across the province for housing, agriculture and other uses is a major concern, particularly in the Okanagan Valley, but also in the Thompson River and Rocky Mountain Trench areas. As land development continues, Badger populations will be further reduced. Very little Badger habitat is protected in parks or reserves.

With its limited distribution, small numbers and ongoing loss of habitat, the Badger is indeed a species at risk in British Columbia.

What is their status?

Badgers are very difficult to count and intensive monitoring of the British Columbia population has only recently begun. Present estimates of their abundance are based on radio-telemetry studies in the East Kootenay and Thompson-Okanagan regions, as well as on random sightings, digging sign, specimen records, such as from traffic kills, and local knowledge of wildlife biologists and other field workers. Badger populations are difficult to census because Badgers are nocturnal and can

have very large home ranges, and because there appears to be no direct correlation between the number of Badger burrows in an area and the number of Badgers.

Analysis of historical information suggests that there are fewer Badgers in British Columbia now than a century ago. A recent review of Badger abundance in British Columbia concluded that the population is less than 200 breeding adults. This small population, spread thinly over several valleys, is extremely vulnerable to regional and

Key Badger habitats have been greatly modified or lost to development.

provincial extirpation due to further human development in the key habitat areas.

The Badger was originally placed on the provincial Blue List of species vulnerable to human activity,

but new information resulting from recent research in the Kootenays and in Thompson-Okanagan resulted in moving this species to the Red List (species being considered for legal designation as Threatened or Endangered). Nationally, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) considers the British Columbia subspecies of Badger to be Endangered. The Ontario subspecies is also considered Endangered by COSEWIC, while the Prairie subspecies is considered Not at Risk.

Since 1967, it has been illegal to trap or shoot Badgers anywhere in British Columbia. It is also illegal to buy or sell Badger pelts, and any Badgers killed accidentally must be reported to a Conservation Officer.

What do they look like?

North American Badgers (*Taxidea taxus*) are among the largest members of the weasel family. They are stout, shaggy animals, with



distinctive black and white facial markings and a short tail. Usually encountered in grassland or open forest habitats, they are not likely to be confused with any other North American mammal. About 6 to 14 kilograms in weight and 65 to 90 centimetres long, these short-legged animals seem to flow along the ground. The fur is short on the back and longer on the sides, giving the Badger a squat, flattened appearance.

The provincial Badger population is less than 200 breeding animals.

Badgers have silver-grey to yellow-brown upperparts, with some intermixing of black and buff. Their undersides are lighter, usually grey, buff or cream. Their feet and lower legs are black. Striking black and white markings on the head include: a conspicuous white stripe along the midline of the head, from the nose to the base of the neck; black fur around the eyes and on the side of the snout; and a triangular black

patch, surrounded by white fur, on the side of the face. These black “badges” – one on each cheek – are the basis for the Badger’s name. Badgers have a very loose, tough skin but can’t, as fable would have it, “turn around in their own skin.”

Adult males are slightly larger and heavier than females, but the markings of both sexes are similar and the sex of Badgers cannot be reliably determined from field sightings.

Badgers are remarkably adapted for digging to obtain prey or to make protective burrows, and they spend a lot of time underground. Such animals are said to be *fossorial*. These adaptations include extremely muscular forelegs, broad front feet with long, curved claws up to 5 cm long, a short, thick neck, a triangular head and membranes to protect the eyes from dirt. The hind feet are smaller than the forefeet and have smaller claws; there are five toes on each foot.

Badger holes, the most prominent sign of this animal, have entrances 20 to

30 cm in diameter and are elliptical in shape, as one would expect from such a flattened animal. Claw marks in the tunnel entrance may be seen along the sides, parallel to the ground, 3 to 5 cm apart. Hair may also be found around the entrance, further identifying the burrow as a Badger’s.

Badger tracks may be found in the excavated soil at the mouth of the burrow. The tracks are extremely “toed-in” and the long front claws generally leave marks. The stride is 15 to 30 cm, with the front track being about 5 cm wide and the hind one slightly less.

Like other carnivores, Badgers have teeth designed for tearing and shearing flesh. Badgers have two pairs of scent glands – one pair on the belly and the other near the anus. The anal glands secrete a strong but relatively inoffensive odour.

What makes them unique?

North American Badgers have several unique or unusual characteristics. They are highly specialized for digging, and have distinctive

facial markings. Badgers have specialized food habits and a remarkable ability to cope with food scarcity in winter.

Burrows play a central role in the ecology of Badgers, serving as sites for daytime resting, food storage and birth and rearing of kits, and as headquarters for hunting forays. Badgers use hundreds of burrows within their home ranges and many burrows are re-used, sometimes by different Badgers. Dens dug by Badgers are used by many other species of grassland wildlife. In British Columbia, these dens were once particularly important for Western Rattlesnakes and for the rare Burrowing Owl.

Badgers eat large numbers of rodents that may damage pastures or cropland and compete with livestock for forage. Studies of captive Badgers have estimated that they need about 2.3 ground squirrels per day to meet their energy needs. Populations of up to five Badgers per square kilometre have been found in good habitat in Idaho. At these levels, they would be expected to severely reduce rodent numbers, but Badger population densities in British Columbia are much lower.

Badgers are largely solitary and nocturnal in their habits. In British Columbia, where suitable habitats have a patchy distribution, home ranges for females average 50 square km, while for males they can reach up to 500 square km. Home ranges of individuals often overlap and there is no evidence of defended territories. In winter, Badgers confine their activities to a small part of their total home range.

How do they reproduce?

Badgers lead a solitary existence, except when females are raising young and for brief encounters between mating pairs. Mating occurs in July or

August. Only yearling or older males will breed, but up to 40 percent of juvenile females will breed, as well as yearling and older females. For females to breed in their first summer, at an age of only four to five months, is unusual in mammals the size of Badgers.

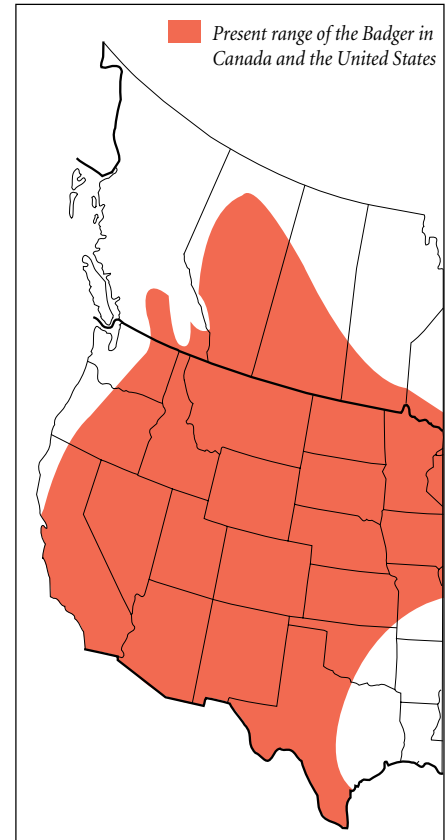
Following conception, fertilized eggs develop to an early stage called blastocysts. Further development is delayed until January or February, when the blastocysts implant on the wall of the uterus. This phenomenon, known as delayed implantation, is fairly common in the weasel family. After implanting, the embryos develop rapidly and the young are born in March or April. Delayed implantation benefits Badgers in at least two ways. Badgers

Home ranges for males can reach up to 500 square kilometres.

need only five or six weeks for fetal development, but can breed in summer when adults are most active and likely to find each other. The high energetic costs of gestation (fetal development) and of raising the young then occurs in late winter and spring, when food is most abundant.

Badger litters vary from one to four kits and average about two. Only one litter is produced each year. Newborn Badgers are nursed by their mother for

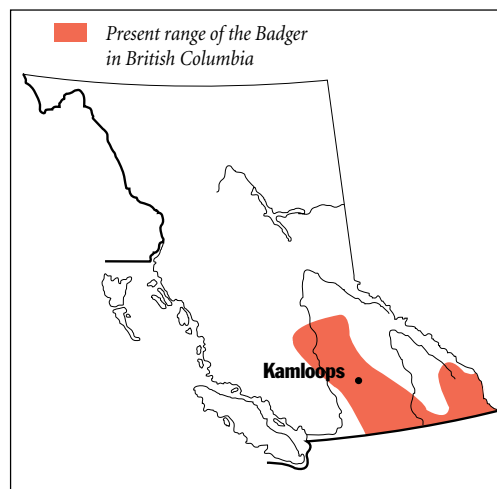
five to six weeks during April and May. Toward the end of the nursing period, mother Badgers bring prey to their young and the active juveniles start to appear above ground. Male Badgers have no role in raising their offspring.



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Females raise their young in dens with a branched main tunnel that allows animals to pass one another. Pockets and side-tunnels are maintained as grass-lined bedding chambers and for disposal of faeces. The mound of soil at the entrance to maternity dens is usually large and contains droppings and shed hair. Females with young frequently change dens, carrying the kits in their teeth if they are too small to follow on their own.

After 10 to 12 weeks of care by their mothers, most juvenile Badgers begin to disperse in search of suitable home ranges of their own. These movements, from late June to August, may take them up to 100 km from their birth area and involve crossing rivers, highways and farmland. This is the period of highest mortality for Badgers, as the naive



juveniles face starvation, highway traffic, predation by Golden Eagles, Cougars or Coyotes and a host of other hazards. The fortunate few that survive can expect to live a maximum of about 14 years.

What do they eat?

In British Columbia, the Northern Pocket Gopher, Columbian Ground Squirrel and Yellow-bellied Marmot are the Badger's main foods. Meadow Voles and Red-backed Voles are also important prey in some locations. Animals that take refuge in burrows – for example, snakes, hares and chipmunks – are also eaten. Like most predators, Badgers are opportunistic in their feeding habits, particularly when hungry.

Badgers mostly forage at night, but are sometimes active above ground in early morning or evening. Their highly developed sense of smell is used to find potential prey. Several strategies for finding food have been described. One is to explore the many old Badger dens in their home range, in which hapless animals may have taken refuge. Badgers also capture ground squirrels by plugging all burrow entrances but one, and then excavating the remaining entrance. When hunting for pocket gophers, Badgers will dig into the tunnel system at several places and use their keen sense of smell to find the general location of the gopher. This avoids wasting energy by digging up the whole burrow system. Coyotes are sometimes observed with Badgers that are digging for prey, suggesting that cooperative hunting might be involved.

Winter is a difficult time for Badgers. Rodents are less abundant than at their summer population peak and the burrowing species are deep in hibernation dens. Badgers compensate for this scarcity by greatly reducing their move-

ments and by staying in burrows for long periods to reduce heat loss. During cold spells, Badgers may enter a state of



THE BADGER HAS DISTINCTIVE BLACK AND WHITE FACIAL MARKINGS.
Mildred McPhee photo

mild torpor, a deep sleep characterized by a slowed heartbeat and reduced body temperature. This torpor is not true hibernation.

Where do they live?

Badgers are widely distributed in North America, from central Mexico north to British Columbia and the prairie provinces, and from California eastward to the Great Lake states and southern Ontario. Within this range, however, they are absent from dense forests, intensively cultivated lands and urban areas. Their centre of abundance is on the grasslands of the Great Plains and Intermountain Basins.

Badger populations in British Columbia have continuity with those in adjacent states of Montana, Idaho and Washington. In this province they occur primarily in the dry southern interior valleys that support grassland, shrub-steppe and open forests of ponderosa pine or Douglas-fir (the Bunchgrass, Ponderosa Pine, and Interior Douglas-fir biogeoclimatic zones). They can, however, travel from valley bottoms through to the alpine, and have been observed in the Montane Spruce, Interior Cedar-Hemlock, Engelmann

Spruce-Subalpine Fir and Alpine Tundra zones. They are most frequently encountered where their favourite prey – ground squirrels, pocket gophers, marmots and voles – are most abundant. Because these prey species have a patchy distribution, Badgers are not evenly spread across their provincial range. Badgers are somewhat tolerant of civilization, as long as prey animals are available. They may be encountered in pastures, on cultivated land and along rural roadsides.

In British Columbia, the majority of Badger sightings and records are from the Okanagan-Similkameen, Thompson River, Nicola Valley and East Kootenay areas. A few have been noted in the South Cariboo and West Kootenay regions. They occur west to Manning Park and Lillooet, and north to Williams Lake and Clearwater. A few have been sighted in the eastern Chilcotin District. In the West Kootenay area, Badgers are restricted to the Lower Columbia and Creston valleys, near the United States border. In the Rocky Mountain Trench, they extend northward to the vicinity of Radium Hot Springs.

What can we do?

Although trapping of Badgers was prohibited in 1967, this did not result in a noticeable recovery. A review of the species' status was carried out. The resulting status report concluded that the Badger was indeed at risk in British Columbia, and it was assigned to the provincial Blue List in 1993. In 1995, the East Kootenay Badger Project was initiated and the Thompson-Okanagan Badger Project began in 1999. Based on results from these research projects and on observations of habitat loss and direct



OPEN GRASSY AREAS WITH DEEP SOILS ARE PREFERRED BADGER HABITAT.
Robert Cannings photo



COLUMBIAN GROUND SQUIRRELS FORM A LARGE PART OF THE BADGER DIET.
Jared Hobbs photo


mortality throughout the province, Badgers were moved to the Red List. The BC Conservation Data Centre continues to compile occurrence records.

Much is being done to help Badger populations survive in British Columbia. Research is under way to help further identify the risks that Badgers face and to determine how human activities can be modified to reduce their impact on Badger populations. Studies of the distribution and abundance of the Badger's main food, Columbian Ground Squirrels, will help to explain why Badgers are present or absent, ascertain how many can be supported and identify areas suitable for their re-introduction. Detailed records of highway kills, accidental trapping and other mortality are being collected to find out how serious human-caused mortality really is.

The public can aid Badger conservation in many ways. The first step is to adopt a more sympathetic attitude toward this interesting animal. Ranchers, farmers and golf-course owners are encouraged to tolerate minor amounts of digging by Badgers and ground squirrels. Badgers occasionally stray into settled areas and seek refuge under cars or other objects. Observations of shooting, trapping or harassment of Badgers should be reported. The public is urged to report sightings

of Badgers to the nearest office of the Ministry of Water, Land and Air Protection. As these records accumulate, they provide a better understanding of Badger distribution, abundance and habitat use.

Providing adequate habitat and reducing human-caused mortality are the keys to Badger survival in British

Columbia. This involves control of urban expansion into grasslands, establishment of protected areas, responsible stewardship of ranges used for cattle grazing and mitigation of highway developments. Conservation of Badger populations in British Columbia cannot be achieved without strong public support. 

FOR MORE INFORMATION ON THE BADGER, CONTACT:

Biodiversity Branch
Ministry of Water, Land and Air Protection
PO Box 9374, Stn. Prov. Govt.
Victoria, British Columbia, V8W 9M4
<http://wlapwww.gov.bc.ca/wld>

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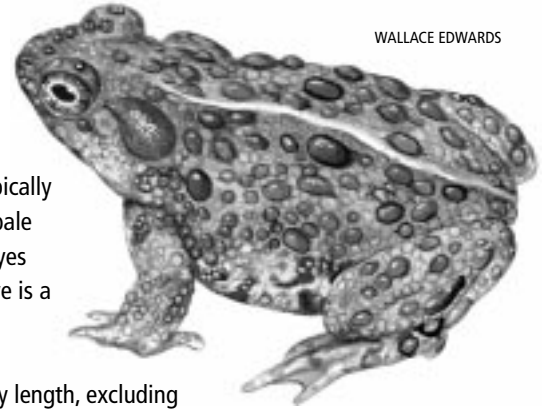
factsheet

8	Western Toad	LENGTH: 5.5 TO 14.5 CM
	<i>Bufo boreas</i>	

YELLOW-LISTED SPECIES OF CONSERVATION CONCERN ARE SPECIES THAT ARE APPARENTLY SECURE BUT THAT HAVE EITHER A RESTRICTED DISTRIBUTION, OR PERCEIVED FUTURE THREATS, OR THAT ARE ASSOCIATED WITH A HABITAT ELEMENT THAT IS RARE OR BECOMING RARE.

At a Glance

Adult Western Toads have stocky bodies with short legs, and tend to walk rather than hop. Their thick skin appears dry and bumpy, and can range in colour from pale green to grey, dark brown, and red. They typically have pale-coloured bellies mottled with black, and a pale stripe down their backs. Their beautiful gold-flecked eyes have distinctive horizontal oval pupils. Behind each eye is a prominent oblong or kidney-shaped swelling called a parotoid gland.



WALLACE EDWARDS

Adults range from 5.5 to 14.5 centimetres in body length, excluding the hind legs. Males are generally smaller than females and have dark pads on their thumbs that help them cling to the female during mating. Their skin is also usually less rough and blotched than females' skin.

Western Toad eggs look like small black pearls laid single file in long strings in the water. Tadpoles are black or charcoal coloured, with a dark, rounded fin along the length of their tail. Tadpoles metamorphose into toadlets as small as 6 millimetres long that resemble miniature adults.

Home Sweet Home

Western Toads use three different types of habitat: breeding habitats, terrestrial summer range, and winter hibernation sites. Preferred breeding sites are permanent or temporary water bodies that have shallow sandy bottoms. After breeding, adult Western Toads disperse into terrestrial habitats such as forests and grasslands. They may roam far from standing water, but they prefer damp conditions. Western Toads spend much of their time underground: though they are capable of digging their own burrows in loose soils, they generally shelter in small mammal burrows, beneath logs, and within rock crevices. They hibernate in burrows below the frostline, up to 1.3 metres underground.

This is the Life

Adult Western Toads migrate to communal breeding sites in early spring. The males search the wetland for available females. Males clasp females from behind and fertilize the eggs as the female deposits them in the water. Male toads produce a quiet, twittering 'release call' if they are accidentally grasped by another male. They make this call at any time of year if they are grasped around the body, but most often during the breeding season. In some areas, male toads may also call to alert females to their presence.

Once laid, the eggs quickly develop into tadpoles that hatch and swarm in groups of hundreds or thousands of individuals through the warmest, shallowest water available. By the end of the summer, the tadpoles transform into toadlets and leave the water. Dense aggregations of toadlets are often found hidden along the shore of breeding sites, and clustered in piles when the weather turns cool. These toadlets grow to maturity in two to three years, and may live ten years or more.

After spring breeding, Western Toads spend the summer and fall foraging in warm, low lying areas. They are primarily nocturnal, but are active during the day at higher elevations and latitudes. As the weather gets cold in fall and winter, Western Toads retreat into hibernation to await spring.

What's on the Menu

Western Toads are wonderfully adept at capturing a wide variety of insects and invertebrates. Over 95 percent of their adult diet consists of flying insects, ants, beetles, sowbugs, crayfish, spiders, centipedes, slugs, and earthworms. They will also take larger items if given a chance. Tadpoles are herbivores, feeding on aquatic plants, detritus and algae.



Present range of the Western Toad in British Columbia



no kidding!

The “warts” on the **Western Toad** are not warts at all, but glands that produce a bitter, sticky, white fluid when the toad feels threatened. The fluid can cause an animal’s eyes or mouth to tingle or feel numb. This makes **Western Toads** unpleasant to eat, but will not give you warts!

Western Toads can identify predators by recognising the chemical cues they emit. Incredibly, tadpoles injured by predators release chemicals that warn others of impending danger. Some evidence even suggests that chemical cues enable **Western Toad** tadpoles to recognise their siblings!

Female **Western Toads** produce an average of 12,000 eggs, or as many as 16,500 eggs, in a single clutch! More than 99% of these won’t survive to adulthood. Those that do may live for several years, as their skin secretions are highly distasteful to would-be predators. In captivity individuals have survived for up to 36 years!



Although Western Toads are less tasty than other amphibian species, they are on the menu for a host of other animals. In B.C., garter snakes are a major predator of metamorphosed toads. Toads are also taken by birds, mammals and even other amphibians; adult Columbia Spotted Frogs have been seen feasting on newly metamorphosed toadlets. Western Toad tadpoles are vulnerable to birds, fishes and predaceous insect larvae.

Where and When

Western Toads are found west of the Rocky Mountains, from Mexico to southern Alaska. They are found in semi-arid and wet forested regions of B.C., except in the north-east. They can be found at elevations from sea level to at least 2250 m.

Western Toads are active between January and October, depending on latitude and elevation. Breeding and egg deposition can occur between April and July, often after rains when local snow and ice have melted. Eggs hatch in 3 to 12 days, depending on water temperature. Tadpole development, also dependent on water temperature, takes six to eight weeks. Hibernation lasts from November through to April.

How They’re Doing

Western Toads are relatively common in most of B.C., although population declines are suspected in the southwestern part of the province.

In the United States, Western Toad populations have suffered significant losses. They have disappeared throughout broad areas of their historic range, and are now a candidate for endangered species listing in the U.S. The centre of the world’s distribution of Western Toads has shifted from the U.S. to B.C.

The cause for such declines is still uncertain, but a combination of threats is suspected. One of the greatest impacts on Western Toad populations in B.C. is habitat destruction. Development in and around wetlands can destroy or isolate populations. Migrating toads are killed by traffic on roads. Pollution, the introduction of aquatic predators (e.g., stocking lakes with fish), and the spread of diseases are also harmful. Large-scale concerns such as global warming and ozone depletion can affect Western Toads by changing temperatures, affecting water levels, and increasing ultraviolet radiation.

Western Toads are on the provincial Yellow List, and are considered a species of conservation concern.

How We’re Helping

We are aiming to learn more about the distribution and ecology of Western Toads in B.C. Identifying breeding sites and assessing terrestrial habitat requirements is particularly important in order to protect this species. Monitoring programs will help track Western Toad populations over the long term.

Western Toads are protected under the British Columbia *Wildlife Act*.

How You Can Help

Learn about Western Toad ecology and share your knowledge of these fascinating creatures with others. Be an advocate for amphibians — protect toads and their habitat in your neighbourhood. Contributing Western Toad sighting information to BC Frogwatch and monitoring breeding sites are wonderful ways to support Western Toad conservation.

You can find out more about BC Frogwatch, the Biodiversity Branch and the Conservation Data Centre at

<http://wlapwww.gov.bc.ca/wld>

BC Frogwatch

Ministry of Water, Land and Air Protection
P.O. Box 9374 Stn Prov Govt
Victoria, B.C. V8W 9M4
email: bcfrogwatch@victoria1.gov.bc.ca

Conservation Data Centre

Ministry of Sustainable Resource Management
P.O. Box 9993 Stn Prov Govt
Victoria, B.C. V8W 9R7

Biodiversity Branch

Ministry of Water, Land and Air Protection
P.O. Box 9374 Stn Prov Govt
Victoria, B.C. V8W 9M4



BRITISH
COLUMBIA

Ministry of Water, Land and Air Protection





Plastron:
Karl
Larsen



Western Painted Turtle

Scientific name: *Chrysemys picta bellii*

The Western Painted Turtle is named after the bright yellow stripes on its head, neck, tail and legs, and the glowing red on its plastron (shell covering the belly) and under-edge of its carapace (shell covering the back). Occasionally, the carapace also has a light yellow pattern or worm-like markings. The red and yellow patterns contrast with the olive-green of the skin, and the dark colouring of the upper carapace.

Painted Turtles have webbed hind feet, and slender claws on their front feet. Males have much longer claws than females. Painted turtles can grow to over a foot in length, with the carapace measuring up to 25 cm long - roughly the size of a dinner plate!

The Painted Turtle is the only native pond turtle left in B.C. It can be confused with the introduced Red-Eared Slider. To tell the two species apart, look for the telltale red "ear" mark on the Slider. Painted turtles do not have any red markings on the neck or head.

Making a living

Most adult Painted Turtles spend the winter hibernating in the mud at the bottom of ponds and lakes. Once temperatures warm up and the ice leaves the water, Painted Turtle courtship begins.

Courtship is relatively short, usually lasting between 5 and 15 minutes. It begins with a chase, during which many males swim after a single mature female. The first male to reach the female swims in front of her, facing her with front legs stretched out. Occasionally, he strokes her head with his long claws. This apparently entices the female to follow him. Once the female is willing, the two sink to the bottom of the pond to mate. Interestingly, Painted Turtle females do not always wait for the males to initiate mating: occasionally, a female turtle will pursue the suitor of her choice!

In June or July, female turtles lay 6 to 18 oval eggs, about 3 cm long or the length of a two-dollar coin, in a carefully prepared nest. Nests are built between dusk and dawn. Females are very watchful for predators, and scan the shore several times before venturing on land. They look for open, south-facing sites with loose soil and without a lot of plants, roots, and rocks. These sites can be up to 150 m away from the water, and females may have to cross roads to reach a good site.

Once satisfied with the site, a female begins by digging with her front legs. She quickly switches to her more powerful hind legs, creating a flask-shaped hole about a foot deep. Females often urinate on the soil while they are digging, which may soften the soil. Once the eggs are laid, the female fills the nest with soil, compacting it with her feet and plastron, and then covering it with vegetation and debris.

If predators do not find the nest, the hatchlings (baby turtles) break out of their eggs around September. Even though their shallow nests can reach -5° C, most hatchlings stay in the nest until the following spring. Survival is quite low due to freezing and predation of both eggs and hatchlings.

Female Painted Turtles reproduce about every second year, and when they do reproduce, they lay only one clutch (batch of eggs) in a summer. This means that relatively few juveniles are produced every year. Luckily, the few juveniles that survive to maturity experience much higher survival.

To avoid the predators that do persist (such as raccoons and skunks), Painted Turtles like to bask on vegetation mats and logs completely surrounded by water. On a warm summer afternoon, Painted Turtles can be found stacked a few turtles deep at particularly good basking sites.

What's for dinner?

The Western Painted Turtle is an opportunistic omnivore, enjoying a wide variety of aquatic delicacies. This includes insects, snails, earthworms, frogs, tadpoles, algae, aquatic plants, and carrion (dead animal matter). As juveniles, Painted Turtles are more carnivorous. As they mature, they tend towards herbivory, although this seems to depend on what is available to them. Regardless, Painted Turtles always swallow food under water, as they seem to have difficulty swallowing dry food.

Painted Turtles in northern climates eat more protein than their southern counterparts. This helps them grow more quickly, providing more energy and resources to survive the cold winters.

Places and spaces

The Western Painted Turtle is the most northerly occurring turtle in North America. They can survive under water in ponds that are 2° C and covered with half a metre of ice!

In B.C., Painted Turtles are found in pockets throughout the southern interior, as far north as Golden. This includes the Okanagan Valley, Kamloops Lake, Shuswap Lake, and the Creston and Nelson Area. They are less common on the coast. Painted Turtles are found in low numbers in parts of the Fraser Valley from Vancouver to Hope, southeast Vancouver Island, and Sechelt-Powell River area. Pet turtles dumped by their owners may have started these coastal populations.

Painted Turtles prefer the margins and shallows of lakes and ponds, ditches and sluggish streams with muddy bottoms and lots of aquatic plants. These areas provide important habitat for feeding, basking, shelter from predators, and hibernation. Painted Turtles also require nearby upland nesting areas without vegetation.

Past, present, and...future?

At present, the Western Painted Turtle is on the provincial blue list. This means they are considered vulnerable to habitat loss, and susceptible to human and natural disturbances. Habitat is being lost because of pollution and waterway interference due to damming, agriculture, and urbanization of waterfronts.

The Western Painted Turtle is at the northern limit of range in B.C. These populations are unique compared to southern populations because turtles here grow faster, grow bigger, mature slower, and reproduce less often, but make more eggs. They deserve protection, both as unique (and beautiful) components of their aquatic ecosystems, and as B.C.'s only remaining native pond turtle.

If you see a Painted Turtle, the best thing to do is to keep your distance. Be aware when in turtle habitat so that you don't trample nest sites. And never take wild turtles home as pets. Painted Turtles often starve to death in captivity. Often their plight is not apparent because their outer shell conceals their real condition. Love 'em and leave 'em – that's the best policy!



Rubber Boa

Scientific name: *Charina bottae*

Rarely does a name suit so well! Between 35 and 80 cm long and fairly thick-bodied, the Rubber Boa resembles a rubbery tube with a slight taper at each end – similar in shape to what you’d roll out of a ball of clay. Its loose skin and many small, smooth scutes (scales) combine to give the snake its rubbery appearance. Adult Rubber Boas are dark olive green to brown in colour, and their bellies are pale yellow to orangish yellow. As juveniles however, their small size and pinkish colour are strikingly similar to that of an earthworm! However, the Rubber Boa is much more fascinating than its simple exterior suggests.

Also known as the “Two Headed Snake”, it can be difficult to tell a boa’s head from its tail. Rubber Boas have little to no neck and their eyes are tiny. When being attacked, the Rubber Boa contributes to the confusion by curling in a ball and hiding its head beneath its body. The tail, equipped with a small hard cap, is then presented as a decoy, and the snake often will jab its tail about as if striking. This way, the snake avoids any harm to its vital head region. If the predator remains undeterred, Rubber Boas can release a smelly musk from their vent.

However, that's as much as this sluggish, secretive snake can muster – Rubber Boas never bite, and are happier hiding beneath a damp log than waging battle.

A true boa constrictor, the Rubber Boa belongs to a famous family of snakes. This family includes, among others, Reticulated Pythons and Anacondas! As evidence of this relationship, the Rubber Boa has tiny vestigial (remnant) limbs on either side of its vent. These tiny 'spurs' are more obvious on males than females. These vestigial limbs are found on boa constrictors all over the world.

Making a living

Like all of B.C.'s snakes, Rubber Boas spend the winter hibernating in underground dens (hibernacula). While boas will hibernate communally with other boas, unlike many other snakes, Rubber Boas do not appear to share their dens with snakes of other species

Mating occurs in spring after emergence from the hibernacula. Young develop within their mother's body. When completely developed, the young are born live. While Rubber Boas can be active at relatively low temperatures, pregnant females need more sunshine and warmth than usual to ensure the healthy development of their young. Pregnant females carry their young until mid-August when 1 to 8 earthworm-like neonates (newborns) are born.

Rubber Boas usually are crepuscular (active at dawn and dusk) and nocturnal, and they function well at these cooler temperatures. Perhaps due to their slow, sluggish life-style, female Rubber Boas may reproduce only every 4 years. On the plus side, however, they are a long-lived snake, living up to 30 years.

What's for dinner?

Rubber Boas eat fairly infrequently, even compared to other snakes. When they do eat, however, Rubber Boas use two main tactics to gather their usual meal of mice or shrews. When preying on adult rodents, boas constrict their prey, wrapping their body around the prey until its heart stops and it can't breathe. When preying on baby rodents, boas use their tail as a club to keep the mother rodent out of the nest while they swallow the nestlings. In fact, many Rubber Boas are heavily scarred on their tails from the bites of mother mice.

Rubber Boas are not limited to hunting at ground level. These snakes are able swimmers, climbers and burrowers, enabling them to diversify their diet. Other items that boas eat include bird eggs, nestling birds, nestling rabbits, small lizards, other snakes, salamanders, small chipmunks, and bats.

Places and spaces

Rubber Boas are found from southern B.C. to as far north as Williams Lake. Within this region, boas can be found in woodlands, grasslands, coniferous

forests, dry pine forests, Juniper woods, and riparian areas. Within these regions, however, Rubber Boas tend to avoid dry, hot areas enjoyed by many other snake species, preferring instead humid mountainous areas. In fact, all three known boa hibernacula were found in wooded areas.

Rubber Boas use a variety of features within the landscape for protection and for hunting. These items include abandoned rodent burrows, rock crevices, rotting stumps, logs, bark, litter around development, and decomposing sawdust piles. Because they like to burrow, they appear to prefer sandy or loamy soils.

Rubber Boas are able to use their environment very effectively to maintain a comfortable body temperature. Scientists found that boas can select rocks of a certain thickness to rest beneath in order to thermoregulate more efficiently.

Past, present, and...future?

Rubber Boas are vulnerable to many of the same threats faced by other snake species. While basking along roads in the evening, boas are killed by cars. Habitat continually is lost to urbanization and agriculture. And because of their mild nature, individuals are illegally collected from the wild. Snakes removed from the wild often die because of the highly specialized care they require. If you see a snake, look at it, admire it, but leave it alone!

Their low reproductive rate and the patchy distribution of habitat could reduce Rubber Boa populations to disconnected pockets of individuals. This in turn could make the species vulnerable to a loss of genetic diversity, and eventually to the loss of entire populations. For these reasons, the Rubber Boa is listed as a species of special concern federally. If you see a Rubber Boa, contact your local branch of the Ministry of Water, Land and Air Protection.

Photo: B. Radke



Western Skink

Scientific name: *Eumeces skiltonianus*

Western Skinks are an exquisitely coloured lizard with a body form similar to that of the Northwestern Alligator Lizard. Skinks have a long, narrow pointed head, long body, and short legs. They grow to a maximum of 20 cm in total length. Skinks are most striking as juveniles. Decked out in smooth, shiny scales, the brown back and grey sides contrast with the 4 creamy stripes running from head to tail, 2 along the back and 1 along each side. Most noticeable, however, is the bright blue tail, which normally is longer than the body. With age, these markings fade. However, some Skinks (especially males in breeding season) develop reddish patches on the chin and sides of the head seasonally.

If feeling threatened, a Western Skink usually wiggles its way under a nearby rock or shrub using its snake-like body movement. They never venture far from shelter. If grabbed, either by a predator or a human, a Skink will bite and 'release' (autotomize) its tail. The tail will thrash and twitch for a few minutes after being dropped, which is especially distracting when the tail is the bright blue tail of a juvenile. After autotomy, Skinks slowly regenerate their tails (often as big or bigger than the original); however, the new tail is rarely, if ever, blue.

Making a living

During winter, Western Skinks hibernate in communal dens (hibernacula). Skinks don't appear to be particular about whom they bed down with: there are records of Western Skinks hibernating not only with other skinks, but also with Northwestern Alligator Lizards, Rubber Boas, and possibly Rattlesnakes.

Mating occurs in spring, upon emergence from the hibernaculum. Skinks, like Alligator Lizards, do not travel far from their hibernacula. They tend to mate and feed within a small radius of the den. Skinks are oviparous, meaning they lay eggs and the young develop outside of their mother's body. Females dig nests under cover objects, where they lay an average of 2 to 6 eggs in July or August. Female Skinks then do something unusual for a lizard – they provide care for their eggs! Female Skinks often behave territorially in the area of their nests, defending their eggs aggressively.

During the summer, both male and female Skinks will excavate burrows with their snouts. When not hunting or basking, Western Skinks stay under cover, either in their burrows, or under debris such as leaf litter. This helps them avoid predators such as birds, mammals, and other reptiles.

What's for dinner?

Skinks are diurnal predators, and will stalk their prey with great concentration and speed. Western Skinks mainly dine on insects such as caterpillars, moths, beetles, grasshoppers, and crickets, as well as spiders.

Places and spaces

Western Skinks are at the northern most extent of their range in south-central B.C. Their known range extends east to Kootenay Lake and west to Princeton. One record exists on Vancouver Island, but whether the Western Skink still, if ever, existed there is questionable. Because of the uncertainty about its range and population size, please report any sightings to your local branch of the Ministry of Water, Land, and Air Protection!

Skinks inhabit many of the same habitats as the Northwestern Alligator Lizard. They may be found in Bunchgrass, Ponderosa Pine, Interior Douglas-fir, and occasionally Engelmann Spruce -Subalpine Fir and Cedar-Hemlock ecosystems.

Within these habitat types, Western Skinks need abundant plant cover, as well as rocks, logs, stumps, and bark for foraging and cover, sunny openings for basking, and south facing slopes and rocks for nesting and hibernacula.

Past, present, and...future?

Little is known about this species' population size or structure, but in general, where Skinks and Alligator Lizards coexist, Skinks appear to be the less abundant species. Skinks are threatened by increasing habitat loss due to human activities, especially residential construction and rock removal. In addition, collectors sometimes illegally take Western Skinks from the wild. Western Skinks are wildlife, not pets - while their patterns are very attractive, Skinks are protected under the provincial wildlife act and cannot be handled, collected, or traded.

Because of these threats, its apparently low population size, and the general lack of population data, Western Skinks are blue-listed provincially. In addition, in 2002, the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC) classified the Western Skink as a species of special concern.



Northwestern Alligator Lizard

Scientific name: *Elgaria coerulea principis*

The Northwestern Alligator Lizard is a short-legged, long-bodied lizard, with a triangular head (bearing little resemblance to an actual alligator!). Growing to a maximum of 20 cm in total length, their size and colouration make them quite cryptic. Adults usually are brown in colour with a pale belly. Occasionally they sport dark blotches or a broad bronzy stripe down the centre of the back. Upon close examination, you might see a fold of skin running down each side. This allows the body to expand when the lizard is breathing, full of food, or in the case of females, full of eggs. Juveniles often are more metallic looking, with black sides and a bronze back.

Alligator Lizards are very secretive; their first defence is to flee and hide. If caught, a lizard may release a smelly mix of feces and musk, bite, or even 'release' (autotomize) its tail. The dropped tail acts as a decoy, distracting the potential predator. Over time, the lizard will regenerate a shorter, fatter tail. As the tail is an important fat reserve, tail autotomy usually is a tactic of last resort. As evidenced by the number of lizards with regenerated tails, however, it also is a successful tactic.

Making a living

Alligator Lizards spend the winter hibernating in underground dens (hibernacula). Upon emergence from the dens in spring, the mating chase begins. Male lizards forgo any displays. Instead, an interested male simply chases down a likely female, bites her head in his large jaws, and mates with her - sometimes for many hours!

In B.C., Northwestern Alligator Lizards appear to remain near their hibernacula year-round. After mating, the young develop inside their mother's body. Come mid-August to mid-September, the pregnant females give birth to between 4 and 6 live young. Carrying the young all summer allows females to protect their developing young and provide them the best possible heat and humidity. However, it also restricts how much females can eat and requires them to bask more often, exposing them to passing predators. Female Alligator Lizards mate every 2 years on average, as they require a year after breeding to eat, grow, and regain their stores of body fat.

During the summer, most Alligator Lizards can be found basking in sunny areas or soaking up heat under warm rocks. These lizards usually are found in groups; however, there is little interaction between individuals. They often share their habitat - at some cost - with two species of snake, the Common Garter Snake and Western Terrestrial (Wandering) Garter Snake. These snakes, as well as most other snake species, shrikes, Red-tailed Hawks, and house cats predate upon Northwestern Alligator Lizards.

What's for dinner?

Adult Northwestern Alligator Lizards munch on large insects such as beetles, caterpillars, and grasshoppers, as well as spiders, snails, scorpions, and millipedes. Obviously prey that bite and sting do not deter them! Juvenile lizards eat many of the same prey items, simply choosing these items in a smaller size.

Places and spaces

Northwestern Alligator Lizards are found in most of southern B.C., including Vancouver Island and the Gulf Islands. They cope well with cooler, wetter climates. This allows them to live in many different habitat types, including montane forests, dry woodlands, grasslands, and riparian zones such as the banks of streams, creeks and ocean beaches.

Alligator Lizards commonly are associated with Douglas-fir and Hemlock forests, both on the coast and in the interior. Within these forest types, lizards use features such as rocky outcrops and talus slopes (for hibernating and for basking), and grassy openings scattered with debris such as logs and rocks. Lizards need the sunny openings to bask in – they cannot do without them. Luckily for them, these openings often are created through disturbances such as logging. This species often benefits from some level of forest disturbance, making it one of the more resilient reptile species in B.C.!

Past, present, and...future?

This species is at the northern limit of its range, and likely is limited from living further north by the cold winters. Peripheral populations such as these are considered extremely important, however, as often they carry different genes than their more central relatives. This contributes to the diversity of the species.

Because of their dependence on rocks as cover objects and over-wintering sites, Alligator Lizards can be affected by rock removal for road construction or landscaping. They also are disturbed easily, and may hide for hours after encountering a predator (or a curious human). In addition, these lizards appear to be quite sedentary, meaning that individuals do not move between populations very often.

Fortunately, while we don't know a lot about the population structure or size of the Northwestern Alligator Lizard in B.C., biologists feel that the distribution and resilience of the species are working in its favour. Provincially, the species is yellow-listed, meaning it appears to be secure and not at risk of extinction. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) also has designated this subspecies as not at risk.