The Stewardship Series

NATURESCAPE
BRITISH COLUMBIA

Caring for Wildlife Habitat at Home

Provincial Guide

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NATURESCAPE
BRITISH COLUMBIA
Caring for wildlife habitat at home

Naturescape British Columbia

The Provincial Guide

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About Naturescape British Columbia

Naturescape British Columbia promotes caring for wildlife habitat at home.

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Table of Contents

Preface

The small part of our rugged beautiful province favoured for human habitation draws in rapidly increasing numbers of people. This small area must accommodate our homes, our towns and cities, industry, transportation and utility corridors, many of our opportunities for recreation, for agriculture and for many other activities; also it is home for a large majority of other species — the plants and animals native to our land.

No one can seriously doubt that rapidly advancing science and technology, a growing and changing society and new workaday activities increasingly separate us from the natural world of air, water, soil, plant and animal, or, moreover, that our actions are diminishing and modifying the natural world. A dilemma occurs, for science at the same time tells us with growing urgency that we are totally dependent on the natural world we are divorcing and that, for our own survival, the natural world must be sustained.

There is hope that this dilemma can be met by planning and education — by maximizing our use of land and by understanding the web of life it supports. Legislation, laws, zoning for industry, agriculture, high density housing, parks and greenways may be a collective wisdom to address our situation. Nevertheless, these endeavours will not be successful unless we respond as individuals. In the long run, we as individuals must become good stewards of our own spaces and husband the natural world.

Naturescape British Columbia is one of the very few endeavours to help us individually become good stewards and to meet head-first our modern dilemma — to be knowledgeable about our own space, our backyards, our nearby commons and waters and to do something about our dilemma. If we become good stewards of neighbourhoods, we become good stewards of Earth.

Vernon C. Brink
Naturalist

Introduction

The Naturescape British Columbia program is about restoring, preserving, and enhancing wildlife habitat in our urban and rural landscapes throughout the province. It is a program for people who want to connect more closely with nature in their daily lives.

Caring for wildlife habitat at home leads to an appreciation of the interconnectedness of all living things. It leads to a recognition of the natural environment as that which ultimately sustains us. Through the process we begin to share our space with other species which have adapted to or been displaced by the human phenomenon of urbanization. The process also involves the consideration of our neighbours, and the realization that more natural landscaping can indeed be aesthetically appealing and blend well with the overall look of the neighbourhood.

Your Naturescape British Columbia Provincial Guide explains how to plan your projects; it describes the various types of elements, from plants to bird feeders, you can use in creating habitat, and it gives tips on how to maintain your results.

To provide the most complete and accurate information, the Naturescape British Columbia guides and booklets will be periodically reviewed and modified. The biological diversity of British Columbia results in local conditions, information, and activities that may affect how you care for wildlife habitat at home. New information is always most welcome.

Biodiversity statistics

- The different habitats in British Columbia support over 130 mammal species, 450 different types of birds, 15 amphibian species, 15 species of reptiles, 400 fish species, and 50,000 to 70,000 invertebrate species, of which 35,000 are insects. Vascular plant species in the province number in excess of 2,800. Bryophytes (mosses and liverworts) account for another 1,000 species. There are over 1,500 different species of lichens, 500 species of attached algae, and well over 10,000 species of fungi.
- As our biological exploration and inventory of the province progresses, it is safe to assume that many more species will be added to our lists.

Biodiversity

For any given area, the greater the diversity of ecosystems, each containing a rich variety of species, each of which, in turn, has extensive genetic variation, the greater the overall biodiversity of that area.

Biodiversity: What It Means And Why It Matters

We live in the most biologically diverse province, or territory, in all of Canada. How fortunate we are to have such a rich variety of life forms and natural habitats in British Columbia.

Biodiversity is the diversity or variety of living organisms. It is life in all its forms and the habitat and natural processes which support that life. It is the complex network of living things.

Diversity occurs at three different levels of biological organization:

- Genetic diversity refers to the variation in genetic makeup of individuals within each species. For example, unless you have an identical twin, your genetic component is different than all others.
- Species diversity refers to the number of different species within a given ecosystem. Raccoon, western tiger swallowtail butterfly, shaggy mane mushroom, dogwood tree, and lady bug are examples of different species that most people may recognize. But what about rattlesnake plantain, pine sap, Northern Saw-whet Owl, Rough-skinned Newt, Yuma Bat, and Northern Bog Lemming? They are also part of British Columbia's biodiversity.
- Ecosystem diversity refers to the extent of dissimilar ecosystems, in terms of type and function, within a given area, be it province, country, continent, or the entire Earth. Forest, grassland, wetland, river, and inter-tidal marine are examples that are familiar to most people. Less familiar are Garry oak savanna, bunchgrass, Ponderosa pine parkland, alpine tundra, and peat bog ecosystems.

Biodiversity is essential to the health of the planet. Loss of richness of the natural environment results in the loss of complete, fully functional systems. Without all the essential interconnected parts and processes — such as the plants, wildlife which use those plants, predator-prey relationships, processes of seed dispersal, natural aeration of the soil, and so on — things go wrong or, at best, function imperfectly.

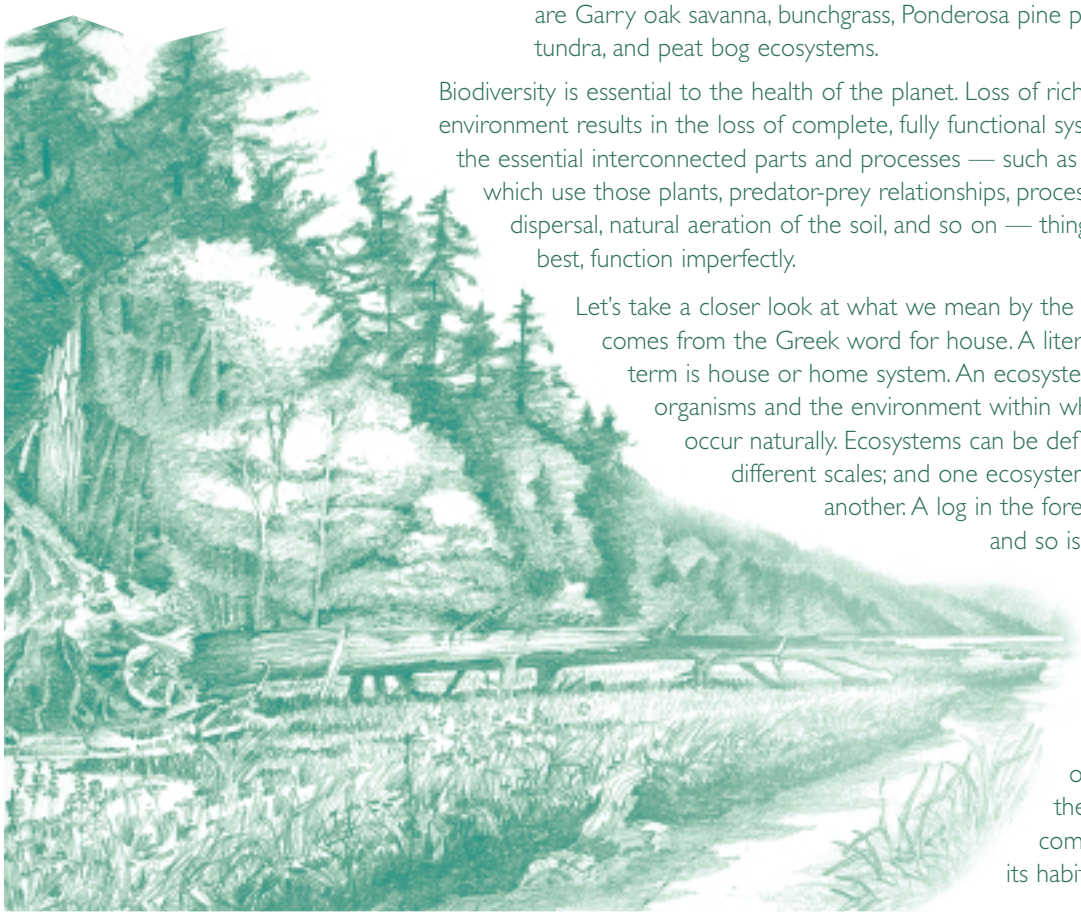


ILLUSTRATION: RICK THOMAS

Let's take a closer look at what we mean by the term ecosystem. *Eco* comes from the Greek word for house. A literal definition of the term is house or home system. An ecosystem includes all the organisms and the environment within which they live or occur naturally. Ecosystems can be defined at many different scales; and one ecosystem can exist inside another. A log in the forest is an ecosystem, and so is the much larger forest that contains the log. Within an ecosystem are a myriad different habitats occupied by the various organisms that live there. Without a complete system with all its habitats, the needs of

wildlife cannot be fully met. Ecosystems support all life, moderate the climate, filter the water and air, conserve soil and nutrients, and control potential imbalances.

Where habitat is significantly altered or lost, the balance of plants, prey, predators, parasites, and all the associated processes is disrupted. Put simply, displaced wildlife struggle to find their basic needs for food, water, shelter, and a safe place to raise their young.

The loss or degradation of habitat, the fragmentation of natural habitat into segments too small to be sustainable, the invasion of exotic species, such as purple loosestrife and free-roaming domestic cats, and environmental changes, such as those due to climate change, all endanger the health and success of plant and wildlife species.

Each species has its own ecological niche, which encompasses its preferred physical shelter and nesting areas, and its interactive foraging and behavioural roles with other species in the system. The set of habitat requirements for each individual species is unique.

Western Tanager

You might think, what does it matter what happens on small private lands such as my balcony, yard, or acreage when only six percent of the land base in British Columbia is private land? How does the preservation, restoration, or enhancement of wildlife habitat on that six percent make a difference to populations of migratory songbirds or any other species?

In fact, it matters a lot. The majority of that private land is concentrated in valley bottoms, along river courses and shorelines, and on river deltas. It is these environments which contain the highest biodiversity in the province. It is these areas of exceptional richness in life forms, habitats, and associated natural processes that are increasingly threatened by urban sprawl and higher density housing in rural communities.

The changes are obvious: the removal of long-established trees in a neighbourhood, the subdivision of rural lots, or the construction of new housing developments — all reduce the amount of natural habitat. When habitats are destroyed, degraded, or fragmented, ecosystems break down and plants and animals — large and small, one after the other — become vulnerable, threatened, endangered, or ultimately extinct.

But steps can be taken to reduce the damage caused by urbanization. Remaining segments of various habitats can be preserved. Damaged habitats can be restored. Lost habitat can be re-created over time. This is why your participation in the Naturescape British Columbia program is so important.

Imagine the transformation of urban and populated rural areas as private yards and community areas are naturalized by you, neighbours, friends, and community groups. Habitat yards will link together and areas of wildlife habitat in adjacent neighbourhoods will become connected. Over the years, a patchwork quilt of wildlife habitat will extend across entire communities.

Competition for habitat

If a displaced animal finds other similar habitat nearby, it will compete for food and shelter with animals of the same species already there. The newcomer may win the competition and cause displacement, or death, of the resident animal or, more likely, it will lose the competition and be displaced a second time. If a displaced animal cannot find vacant space in a suitable habitat, it dies.

Songbirds in decline

Some species of migratory songbirds, which breed in North America and winter in tropical forests, are declining in number. This includes many birds that nest in British Columbia. They face several perils: deforestation of their tropical winter ranges; fragmentation of their summer breeding habitat; and indescriminate use of pesticides and herbicides. Some long-distance migratory birds arrive early and leave late. Others arrive in their breeding areas late and depart early, resulting in a shorter time for breeding and fewer nesting attempts. Fragmentation of summer breeding habitat may leave these birds more vulnerable to competition for living space, nest predation, and parasitism (one bird laying its eggs in the nest of another species). It means fewer pairs are nesting and fewer young are being raised — there may not be enough young to replace the adults that die from many different causes.

Red List, Blue List

Species that are designated, or considered for designation, as endangered or threatened are placed on the Red List in British Columbia. Those that are considered vulnerable or sensitive are placed on the Blue List.

Three stewardship principles for private landowners:

- Restore, maintain, and enhance the natural habitat on your property.
- Care for and co-exist with the species you have attracted to your property.
- Improve your living environment by recycling and composting.

The Naturescape Context

Imagine that you and your neighbours and all neighbourhoods in the broader urban or rural expanse cared for wildlife habitat at home. Imagine also that, as a result of all those efforts by individuals and community groups, the diversity of plant and wildlife species was restored to your living environment. Instead of being designed for human use only, your community would now consist of a variety of natural habitats, shared by people and wildlife alike.

This is the vision of Naturescape British Columbia — a vision made possible through the efforts of individuals like yourself. Through how-to educational materials and ongoing communications support, the program aims to help small, private land owners in urban and rural areas improve and restore wildlife habitat at home.

Awareness

Have you ever stepped onto your balcony or patio or into your yard and imagined what was once there, before your apartment building or your house was built — before even the neighbourhood existed? Was it grassland or woodland? What kinds of plants and animals lived there? If you have a natural park or untouched wild area nearby, you will find many clues by observing its plant and animal inhabitants.

Through urbanization we have banished, either deliberately or inadvertently, the abundant plant and animal life that lived there before our arrival. We have created a specialized environment of houses, apartment buildings, stores, sidewalks, streets, boulevards, telephone poles, sewer systems, and community centres. It is a living environment which serves us well, but offers little to wildlife. Many species are gone or their numbers are much reduced.

Restoring natural habitat in your yard or on your balcony does not end once your project or sequence of projects is finished. It takes time for the new clusters of plantings to establish themselves. Each year they will become more and more useful to various wildlife species. Your awareness of wildlife behaviour and needs will increase over time as you observe and monitor the life forms and processes occurring in your wildlife habitat.

Violet-green Swallow – a species that has adapted well to the urban environment

Responsibility

Having restored or created wildlife habitat, you are then responsible for its maintenance. You are responsible for the health of the plants you have introduced to your yard. You are responsible for monitoring soil fertility and learning how to avoid system imbalances, which lead to some insect species taking a heavy toll on certain plants. (Remember that many of the insect species that we regard as pests are creatures we introduced — creatures that have learned to depend on us for a place to live.)

You are responsible for the wildlife, which you have invited to your property through the creation of more natural habitat. Careful attention to your habitat design, an understanding of predator-prey relationships, an understanding of animal behaviour, and respect for the needs and wildness of these animals are all important factors to success and enjoyment.

You owe your neighbours the courtesy of maintaining aesthetically pleasing, rather than weedy, natural habitat. Just because it is wild does not mean it has to be messy. Again, careful planning is important. It will determine the type of habitat and plants that best fit your situation. Ongoing maintenance of brush piles and thickets and cluster plantings of trees and bushes will ensure a healthy and vibrant, yet tidy, wildlife habitat.

Caring for wildlife habitat at home

Caring for wildlife habitat at home is about nurturing and protecting. It is about balance and harmony. It is co-existence and interconnectedness of ourselves and our ultimate environment, the natural world.

By restoring more natural habitat you will attract a variety of wildlife species. Stewardship of your outdoor space involves caring, nurturing, and protecting what you create. It is important to monitor the well being of your charges, both animal and plant species. Note the use of food, water, shelter, and potential nesting sites provided by your habitat projects. As insects will often be the quickest to respond to the provision of habitat, observe such things as which plants attract butterflies. And remember, wildlife which frequent your natural habitat rely on its existence more and more each year.

White-breasted Nuthatch

Caring for wildlife habitat at home involves a sense of balance. Your commitment to share your outdoor space with other species leads to harmony between your family's needs and wildlife's needs for habitat. Wildlife that have adapted to a more urban existence accommodate humans every day of their lives. Restoring natural habitat to urban and rural areas is a way for us to return the favour.

You and your family and friends need food, water, shelter, and a safe place to raise your children. Similarly, wildlife need food, water, shelter, and a safe place to deposit eggs or raise their young. Stewardship of your property means co-existing with other species. It is an enriching experience to share your outdoor space with nature on a daily basis. Co-existence of dissimilar species happens all the time in all different types of natural habitat found on Earth. By learning more about the natural world, we come to recognize that we, too, are part of the web of life, and what we do to it, we ultimately do to ourselves.

A garden comparison

Traditional Gardens	Wildlife Habitat Gardens
• More formal	• More fuzzy
• Precisely arranged	• Plants blend into each other
• Ornamental plants	• Native plants
• Plants valued for looks	• Plants valued for function
• Require more maintenance	• Require less maintenance

Wildlife Habitat Explained

A multitude of individual wildlife habitats exist within an ecosystem. These provide the combinations of elements necessary for the survival of each individual species. Plants are a fundamental source of food, shelter, and nesting sites for many animals and therefore a key feature of most wildlife habitats.

When creating or enhancing habitat on your own property, consider the types of habitat, their associated wildlife forms, the physical geography, and local conditions in your area. What type of habitat will work for your property — is it woodland, forest edge, wildflower meadow, or pond and marsh?

Wildlife habitat areas can be tidy, attractive, and blend easily into adjacent, more traditional gardens. More indigenous or native plants are favoured for habitat projects because they provide natural shelter and food for native wildlife. Plantings are closer together, pruning is less rigid, lawn area is less extensive, and ground cover mulches are left in place. Some insect damage may be evident, but often is considered a blessing, as leaf-eating caterpillars come before butterflies. Rather than emphasizing only the cultivation of plants, animal life is nurtured and enjoyed in a wildlife habitat garden. The setting is constantly changing.

It is impossible to transform an entire property into instant wildlife habitat. Rather than undertake a major project, introduce small changes over time. Even corners count. In fact, a large brush pile created in a corner might be just the place to start.

Shelter can be provided in many ways:

- Thickets of trees (both evergreen and deciduous)
- Dense shrubs
- Hedges
- Dead trees (snags)
- Woodpiles
- Mossy logs
- Brush piles
- Dry stone walls and rock piles
- Nest boxes
- Long grass/weeds or a wildflower meadow
- Leaf litter and dead branches

Shelter

Safe shelter takes many forms, including undisturbed places where wildlife can escape danger, rest, find shelter from weather, and raise their young. Think layers. Ground-foraging birds need safe shelter in lower bushes, shrubs, and hedges; birds which forage essentially on the wing need trees of various heights for safe shelter. Think thicket. Densely planted, undisturbed areas of mixed vegetation are ideal. If possible, designate a special area of your yard exclusively for sensitive wildlife, and place buffers of dense vegetation between wildlife areas and busy locations such as roads, driveways, and play areas.

To be truly effective, shelter for wildlife should also provide protection from pesticides, protection from cats and dogs, and protection from disturbance.

Food

Plant indigenous plants instead of ornamentals. This helps the survival of native species and conserves water. Indigenous plants, and a few specific ornamentals, provide sources of food for wildlife in the form of nectar, seeds, berries, and associated insects. For example, in woodlands on the coast, the early spring blossoms of the red-flowering currant provide the first nectar for returning Rufous Hummingbirds, and the berries produced later provide food for other birds, especially thrushes.

Each wildlife species requires certain types of food, and often has a specific biological niche in which to find it. Some birds, such as Rufous-sided Towhees and Song Sparrows, live close to the ground and search for insects and seeds in leafy litter. Others, such as Western Meadow Larks and some sparrows, feed in unmown grass. Some species spend their time in shrubs and bushes, one to four metres above the ground. Others, such as nuthatches and creepers, do not venture far beyond the trunks and branches of mature trees, where they search for insects in craggy bark. Still others forage in the high treetop canopy. It is therefore important to choose plants of various heights and textures when planning habitat projects. A diversity of well-chosen plants provides a variety of food throughout the year. Nectar, seeds or fruits are obvious food sources; in fact, all parts of plants are used in some way by wildlife.

Diverse vegetation also attracts a variety of insects. However, there is no cause for alarm. Insects are vital to the food chain of any wildlife habitat and only a small percentage has the potential to harm our plants in a serious way. Most insects live out their brief life cycles processing vegetation, eating other insects, and providing food for other wildlife. These natural cycles are vital to healthy ecosystems. In a wildlife habitat garden, choose biological controls over pesticides, and use only organic fertilizers.

Bird feeders are a delightful enhancement to any wildlife habitat garden. Not all birds eat the same thing and some birds prefer to visit different styles of feeders. Experiment with different seed mixes offered in different ways to attract a wider variety of bird species to your yard.

Water

Clean, fresh water is often difficult for wildlife to find. It is important year-round for drinking and bathing, and is essential to many amphibians and beneficial insects for completing their life cycle.

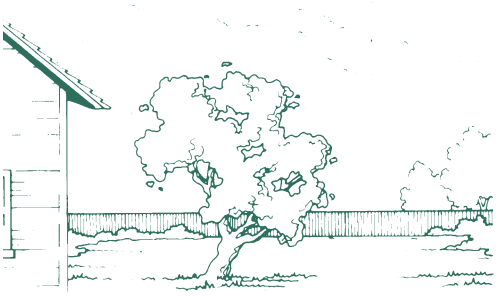
Water transforms an average wildlife habitat into an extraordinary one. Water may be offered in free-standing or hanging bird baths and in ponds and streams, either natural or constructed. Moving water is particularly attractive — dripping, spraying, bubbling, or flowing — and should be recirculated to reduce consumption. Locate water beyond the reach of lurking cats, with protective cover two or three metres away.

Mourning dove at bird bath

Caring For Wildlife Habitat At Home

Components of Wildlife Habitat

Whether starting anew or incorporating habitat into an existing garden, consider the following components: diversity, layering, edges, and native plants.



Diversity

Plan for a good mix of vegetation:

- Evergreen and deciduous
- Young and old
- Tall and short
- Nectar plants
- Seeds, nuts, berries
- Grasses and sedges
- Mosses and lichens

Diversity or variety of plants creates richer habitat

Layering

Plants in natural areas grow in many layers. This variation in height enhances habitat diversity. To create layers, place tallest trees at the edge of your property. In front of these, place the smaller deciduous trees, then tall shrubs, lower shrubs, and finally the ground cover. Locate shade-tolerant shrubs and ground covers underneath taller plants.

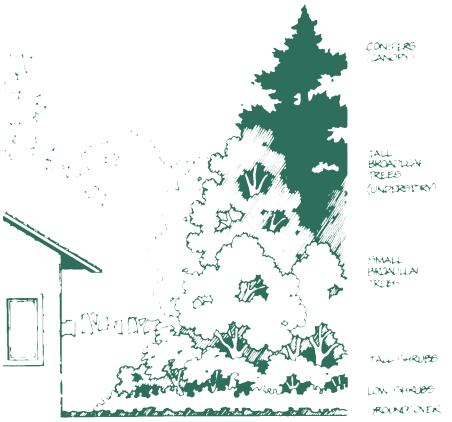
Edges

Edges occur where one type of wildlife habitat meets another, such as where trees and shrubs meet a meadow or stream. Edges are beneficial and support a great variety of wildlife.

The traditional English mixed hedgerows, with long edges and protected wildlife pathways, support dozens of species of plants and animals. Creating a mixed hedgerow at garden edges and on rural properties provides a wonderful benefit to wildlife. On country properties, even leaving a band of unmown grass along fence-lines can greatly enhance habitat by providing shelter, food, and corridors for travel. Thickets of trees and shrubbery planted in connection with corridors is a further enhancement, and broad thickets along streams will protect both terrestrial and aquatic wildlife. The more extensive and diverse these interconnections are, the more they benefit wildlife.

Layering of vegetation is especially useful for birds

Edges between lawns and borders should mimic natural edges by containing many layers of vegetation with curved and irregular borders — much like the shape of a natural forest edge or the course of a natural stream.



Edges, where one type of habitat meets another

Indigenous or Native Plants

The best habitat for native wildlife includes plants that occur naturally in the region. Native plants are better adapted to local soils and climate. They are also better able to satisfy wildlife needs by providing the right kinds of food, shelter and nesting sites. Indigenous plants usually need less water, pruning, fertilizing and other maintenance than exotic or imported plants.

While some native plant species are readily available, others may be difficult to find. Garden centres and retail nurseries stock plants according to consumer demand. If you want native plants to become more available year to year, make your wishes known.

Do not collect plants from the wild. Interference with wild plant populations is harmful, and the destruction of natural habitat to create backyard habitat is hardly appropriate. The only exceptions are sites slated for development, such as highways, new residential housing, and shopping centres. Check with the project supervisor first.

When purchasing native plants, determine that they are nursery-propagated rather than collected in the wild. Besides, nursery-propagated stock grows more successfully than transplanted wild plants.

Some plants such as the trillium take several years to mature from seed, so nursery production may be scarce. When it is impossible to use native plants in the short-term, choose cultivars and hybrid plants that are best suited for wildlife.

If you care for woodland, stream, or wetland habitat on your property, your best course of action is to do nothing at all. Manicuring, cleaning up, creating pathways, and clearing underbrush harms existing habitat and destroys the younger growth necessary to form future habitat. It also makes the area vulnerable to predators. The only potentially beneficial interference with natural areas is the removal of human-made garbage or the addition of native plants to complement existing vegetation.

Douglas-fir

Bigleaf maple

The many uses of wildlife trees

- Homes for woodpeckers to accommodate their needs for territorial drumming, nesting, and roosting. Many insects live and reproduce in decaying wood and provide food for woodpeckers. Though woodpeckers have powerful bills and neck muscles, most excavate cavities in trees with soft, decaying centres. Unlike most other cavity-nesting birds, woodpeckers, other than flickers, rarely use birdhouses.
- Small holes made by foraging woodpeckers become nesting sites for beneficial solitary bees and wasps.
- Old woodpecker holes become homes for chickadees, swallows, nuthatches, wrens, bluebirds, owls, and other secondary cavity-nesting birds, such as swifts, who are rarely able to excavate their own nest sites.
- Hunting perches for flycatchers, warblers, Red-tailed and Rough-legged Hawks, Bald Eagles, Great Horned Owls, and other raptors.
- Perches and songposts for a wide variety of birds. Many small birds sing from songposts to attract mates and proclaim nesting territorial boundaries.
- Homes in large natural cavities, formed by decay, for a variety of mammals, including bats, Northern Flying Squirrels, chipmunks, Martens, Raccoons, Porcupines, and other species.

Wildlife Shelter
Wildlife Trees - More Valuable with Age

A snag, wrapped by a vine, provides valuable habitat for birds

Decaying or dead trees are wildlife havens. They are used by mammals, birds, amphibians, and insects as places for feeding, nesting, resting, roosting, perching, grooming, displaying, courting, hunting, and hibernating. A tree can take decades or even hundreds of years to grow, die, and decay. At each stage it provides valuable habitat for wildlife. More than 90 species of birds and mammals in British Columbia depend upon wildlife trees for habitat at some time during their lives.

Unfortunately, at the time a tree becomes most useful to wildlife, it is often cut down for aesthetic or safety reasons. Sometimes this is unavoidable. However, in many cases it could be trimmed to a height of three or four metres to become a snag or tall stump, with a few perching branches left on or added later. To further enhance habitat, plant vines at the base and soon they will wrap their way to the top. Wisteria, Virginia creeper, clematis, honeysuckle, and trumpet vine are good choices. A combination of two or three is even better.

If you don't have a snag of your own, it may be possible to rescue a tree that has fallen in a storm and erect it as an artificial wildlife tree.

Life in a Log

Life in a log can be abundant

Logs and heavier branches from a fallen tree make excellent wildlife habitat, so think twice before removing them in the interests of "cleaning up." The log becomes damp and spongy as it decays. Mosses, lichen, mushrooms, and other fungi appear; beetles, centipedes, ants, spiders, and sowbugs burrow into the soft bark and moist wood to lay their eggs. Soon it becomes a haven for toads, salamanders, shrews, and many other creatures, thanks to the insects provided by this special little ecosystem.

Another way to diversify habitat is build a log pile. At the base of the structure, spread bark chips as a mulch. Cut logs to varying lengths and arrange creatively — mostly on end, with a few lying lengthwise. To provide hiding spots amongst the logs, place clay flower pots on their sides or use bricks, rocks, or clay drain tiles. Cover the area with leaves and small twigs and disturb as little as possible. If necessary, add material to the log pile from time to time.

Building a Brush Pile

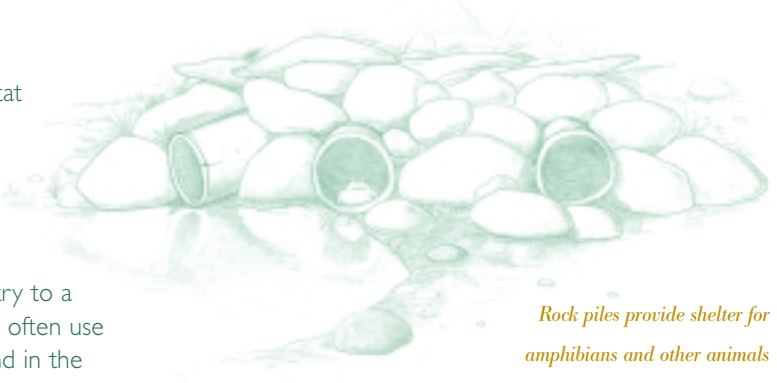
Rather than haul branches away, use them for an instant sanctuary in a garden where thickets are scarce. If neighbours question its attractiveness, give it artistic status by calling it a songbird sculpture. Placed near a feeding station, it provides safety from predators and shelter from the wind.

Brush piles offer shelter for birds

- A foundation of rocks or logs will prevent a brush pile from decomposing too quickly.
- Pile branches beaver-lodge style, two or three metres high and wide.
- Although vines can be grown over the pile to green its appearance, you will probably want to add to the pile as it shrinks over time.
- Don't disturb or make additions at nesting time. You may have ground-nesting birds using this safe place to raise their young.

Dry Stone Walls and Rock Piles

Dry stone walls are another fine type of habitat — the bigger the better. The nooks and crannies provide undisturbed places for many creatures. There are so few places within a yard or garden that are never disturbed — this could be one of them. Bumble bees, for instance, look for a small entry to a larger cavity in which to make their nest. They often use old mouse nests, but these are not easy to find in the average garden.



Rock piles provide shelter for amphibians and other animals

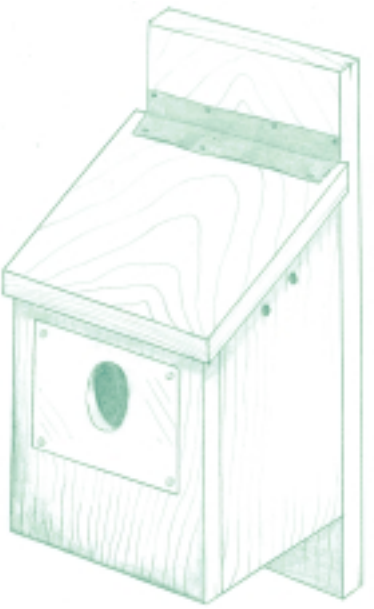
Sunbathing reptiles enjoy rock piles. If located near the edge of a pond, the rock pile is useful to amphibians in several ways: as shelter from predators; as shelter against desiccation from the sun; and as a hunting area to catch insects. A rock pile is simply a pile of stones and rocks of different sizes and shapes, arranged in a way that creates openings for cover or nesting. Lengths of clay drain tile could be placed in the base to make tunnels. Add some flat rocks on top for sunbathers.

Nest Boxes for Birds

When spring approaches, the loss of habitat needed by cavity-nesting birds is painfully apparent. There are just not enough trees with cavities to go around, particularly in residential areas. To compensate for this loss, offer nest boxes, designed and placed for the birds native to your area. Bluebirds are attracted to boxes in many areas of the Interior. Purple Martin "condominiums" attract tenants near estuaries and saltmarshes, especially on the southeast coast of Vancouver Island.

Species most likely to be attracted to a nest box are chickadees, wrens, bluebirds, Tree Swallows, Violet-green Swallows and, if you are very fortunate, flickers, screech-owls, Barn Owls, Wood Ducks, Downy Woodpeckers, and American Kestrels.

Entrance hole and cavity size must be designed to attract the birds you want to nest and discourage the birds you wish to keep away, such as European Starlings and House Sparrows. Too large a hole will definitely invite starling occupancy. Smaller holes can be made oval or as horizontal slots to discourage House



A sample nest box for birds… use "hook and eye" to secure top

Recommended natural nesting materials for birds

Birds may sometimes have trouble finding enough natural nesting materials. A supply of supplementary nesting materials, offered in a basket or mesh bag hung in a conspicuous place in the garden is very helpful. Include any of the following items:

- Short lengths of string and yarn (no longer than 6 cm, to avoid the risk of entangling a bird)
- Fleece
- Dried grass
- Bulrushes and cattails
- Small feathers and down
- Spider webs, material from the nests of paper wasps, mosses, and lichen are important materials for many nests. Hopefully, these will be available naturally in many habitat gardens.

Avoid dryer lint which swells with water and forces baby birds from the nest.

Sparrows too chubby to fit through a narrow opening. European Starlings and House Sparrows nest early. Covering the nest hole or keeping the box inside until after they have nested may reserve the homes for other species.

American Robins and Barn Swallows shun nest boxes, but they will use a small shelf placed under eaves.

The chart and diagrams following provide a guide to who requires what. Some further suggestions are:

Materials:

- Rough cedar is the ideal wood for a nest box. For a natural log effect, use wood with bark still attached.
- Do not use wood that has been treated with chemical preservative, creosote, or lead-based paint.
- Do not use metal, tin cans, milk cartons, or plastic jugs for nest boxes. They lack sufficient insulation to keep young birds cool on hot days and warm on cold days.

Construction:

- Use screws to assemble the house.
- Overlap sides and extend below the floor to prevent water seeping in.
- Provide a removable roof or side wall for cleaning the box in the autumn.
- Create a few small ventilation holes near the top of the box, just below the roof overhang. A few holes drilled in the floor near the walls will let moisture drain out.
- None of the cavity-nesting birds requires a perch beneath the entry. In fact, a perch creates major problems by providing easy access for predators to reach in and nab eggs or baby birds.
- Choose an inconspicuous box over one that is brightly coloured. Never paint the inside of the box.

Placement:

- Place your box at the height above ground as recommended on the chart.
- Locate boxes in low traffic areas to minimize disturbance.
- Guard against predators; baffle the tree or post if necessary.
- Face the entrance hole away from the prevailing wind.
- Hang with a slight forward tilt to keep rain from blowing into the entry.

Preferences:

- Swallows prefer open locations. Chickadees, wrens, and woodpeckers prefer shaded seclusion.

Maintenance:

- Before winter remove the old nest and pour boiling water through the box to destroy parasites. Make any necessary repairs.
- Re-hang the box for the winter. It might be used as a roost box in cold weather.

Nest Box Specifics

To build the following boxes, all you need is a hand saw, hammer, nails, and a drill with some drill bits. The plans below are made to use regular wood from a lumberyard. We recommend rough cedar (smooth 1 side) 1x2, 1x4, 1x6, 1x8, 1x10, 1x12, and 2x4 (real dimension is smaller than these numbers, eg. 1x12 is actually 3/4"x11 1/4). Cut the lumber as measured below. Assembly instructions are on the next page.

Species	Front (cm/in) A	Back (cm/in) B	Floor (cm/in) C	Side (cm/in) D	Side (cm/in) E	Roof (cm/in) F	Hanger (cm/in) G
Chickadees & Nuthatches [Design 1]	1 x 4 — 3.2cm/1.25"diam. — 18cm/7" — 23cm/9"	25cm/10"	10cm/4"	1 x 6 — 23cm/9"	25cm/10"	20cm/8"	1 x 2 — 23cm/9"
Swallows & Wrens [Design 1]	1 x 6 — 3.2cm/1.25"diam. — 12.5cm/5" — 18cm/7"	25cm/8"	14cm/5.75"	1 x 8 — 18cm/7"	20cm/8"	23cm/9"	1 x 2 — 23cm/9"
Bluebirds [Design 1]	1 x 6 — 4cm/1.25"x6.5cm/2.5" — 12.5cm/5" — 20cm/8"	23cm/9"	14cm/5.75"	1 x 8 — 20cm/8"	23cm/9"	23cm/9"	1 x 2 — 25cm/10"
Small Owls & Kestrel [Design 2]	1 x 10 — 7.5cm/3"diam. — 28cm/11" — 38cm/15"	40cm/16"		38cm/15"	40cm/16"	33cm/13"	2 x 4 — 45cm/18"
Small Ducks [Design 2]	1 x 12 — 3.2cm/1.25"diam. — 12.5cm/5" — 50cm/20"	55cm/22"	24cm/9.75"	1 x 10 — 50cm/20"	55cm/22"	33cm/13"	2 x 4 — 60cm/24"

Box Location: Suburban or rural locations with mixed forest stands. **Height:** 1.5-20m up on the trunk of a tree with branches for cover. **Nest Materials:** Moss and stiff hair (horse or dog). For nuthatches fill the box with sawdust even with bottom of entrance hole (chainsaw chips work well) - also works for chickadees.

Box Location: Suburban or rural locations with mixture of trees and open areas. **Height:** 1.5-10m on poles, trees, or the side of a building. **Nest Materials:** Feathers, dry grasses and small twigs. Purple Martins nest in coastal areas of the Georgia Depression. For nestbox plans consult the Wildlife in British Columbia at Risk Purple Martin brochure available from the Ministry of Environment, Lands and Parks.

Box Location: Open, sunlit fields. **Height:** 1.5-3m on fence-posts or trees. **Nest Materials:** Dry grasses. Box designs are continually being improved; check with your local naturalist clubs and birding magazines.

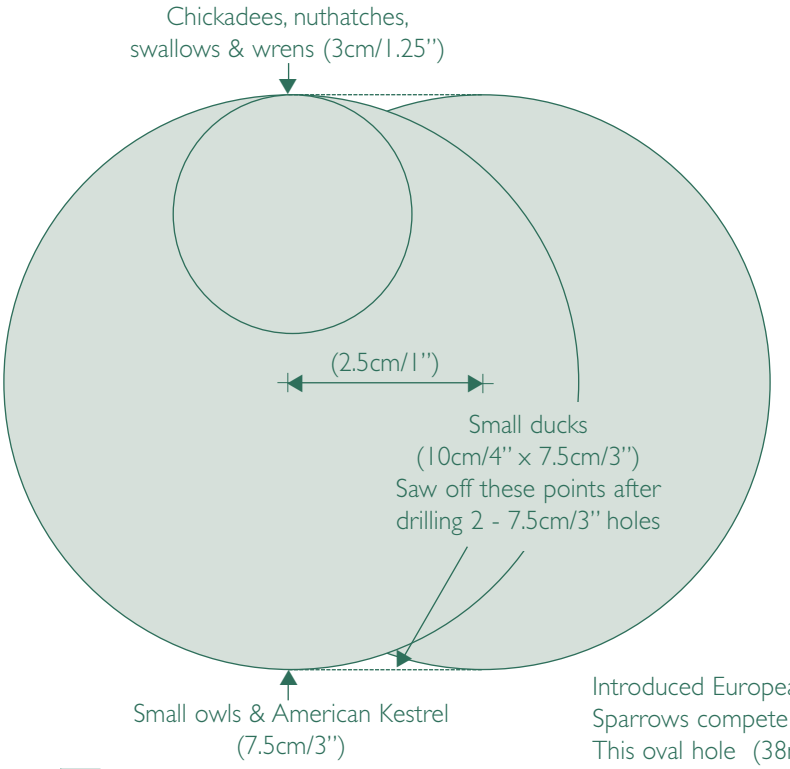
Box Location: Suburban or rural locations on a forest edge bordering a field or wetland area. **Height:** 3-10m up on a tree (north-facing if possible). **Nest Materials:** 5-7cm of coarse sawdust in the bottom of the box with horizontal saw grooves (or stapled chicken wire) below entrance hole to help young birds climb out.

Box Location: Must be within 1 km of large pond or lake. **Height:** 1.5-20m up a tree or pole near or over water. **Nest Materials:** 5-7cm of coarse sawdust in the bottom of the box with horizontal saw grooves (or stapled chicken wire) below entrance hole to help young birds climb out. Use this box and the hole-sizes on the next page for Barred Owl (mixed forest) and Barn Owl (open field/barns).

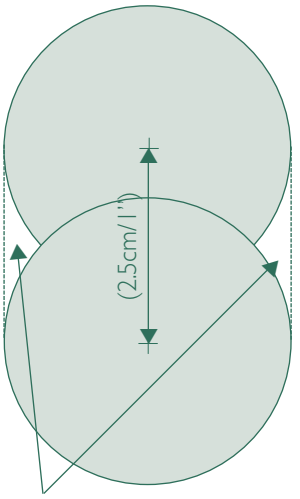
Designed by Darren Copley & Andrew MacDonald

Entrance Hole Cut-outs

Photocopy this page, then trace desired pattern onto wood with carbon paper. Alternate method: use appropriate hole-saw and jig-saw to join, if needed.

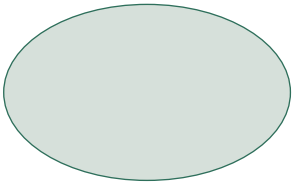


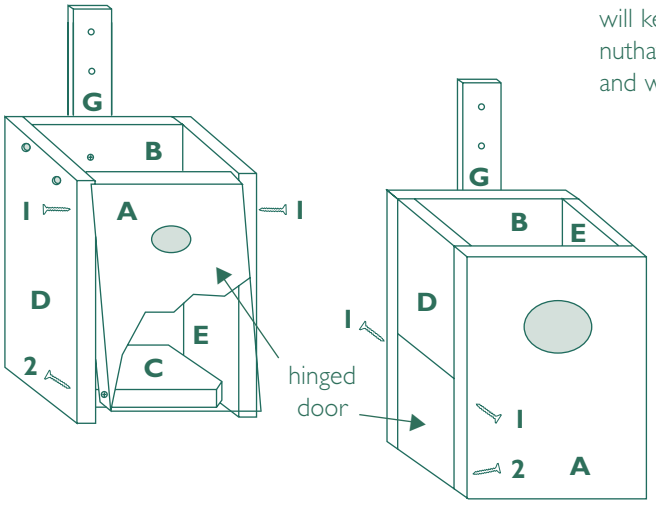
Bluebirds
(4cm/1.5" x 6cm/2.5")



Saw off these points after drilling
2 - 4cm/1.5" holes

Introduced European Starlings and House Sparrows compete with native cavity-users. This oval hole (38mm/1.5" x 23mm/15/15") will keep them out, while letting chickadees, nuthatches, swallows (except Tree Swallows), and wrens in.





Design 1

1. Attach [G] to [B]
2. Attach [C] to [B]
3. Attach [D] to [B & C]
4. Attach [E] to [B & C]
5. Attach [A] to box, using only top mails [1] as shown for hinges
6. Attach [F] (not shown) to top of box
7. Drill oversized holes (angled downward) to accept locking nails [2]

Design 2

1. Attach [G] to [B]
2. Attach [C] to [B]
3. Attach [E] to [B & C]
4. Attach [A] to [C & E]
5. Cut [D] in half and attach top half to [A & B]
6. Attach bottom of [D] next, using only top nails [1] as shown for hinges
7. Follow steps 6 & 7 of Design 1

Nestbox Tips

- To find out which cavity nesting birds breed in your eco-province, consult your local natural history club or the Birds of British Columbia.

- For detailed dimensions of a variety of bat box designs, consult the Bat House Builder's Handbook available from Bat Conservation International.

- Barn Swallows and American Robins will use a 15cm/6" piece of 1x8 attached to the side of a building or tree.

- Use a 15cm/6" square opening in the small duck size box for both Barn and Barred Owls. For Barn Owls, place the opening neat the bottom.

- These nest box designs are for species most likely to use artificial structures. You may also attract woodpeckers (fill box with sawdust) and small mammals such as squirrels.

- Finally, placing and maintaining these nest structures does not eliminate the need for preserving wildlife habitat.

Bat Houses

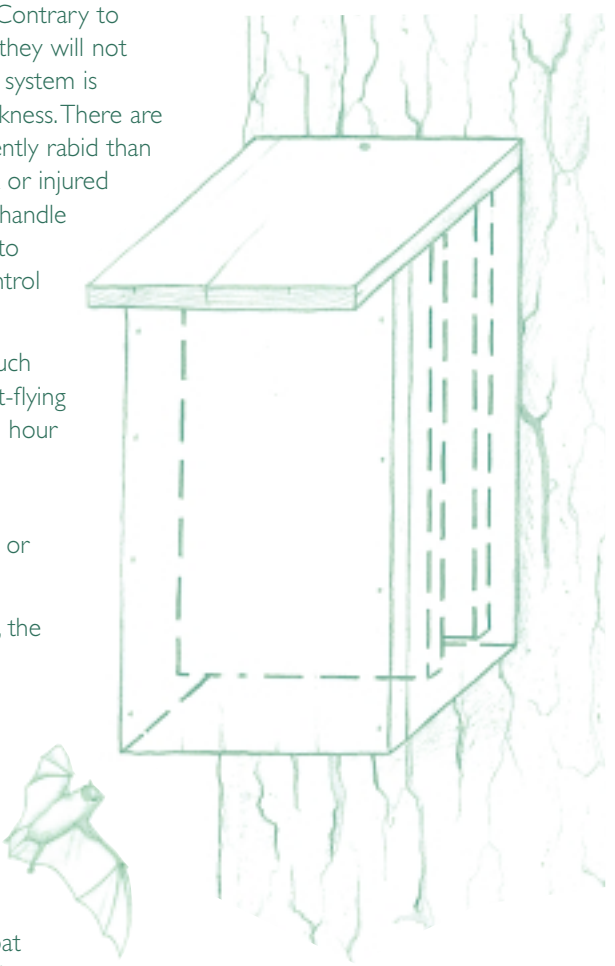
Bats are probably one of the most misunderstood mammals. Contrary to popular belief, bats are not aggressive, they are not blind, and they will not deliberately entangle themselves in hair. Their sonar navigation system is incredibly accurate, enabling them to avoid all obstacles in darkness. There are no vampire bats in British Columbia. They are no more frequently rabid than other mammals. Any bat found on the ground is probably sick or injured and it is best to call your local S.P.C.A. or Humane Society to handle it. Rather than feeling threatened by bats, it is usually possible to comfortably coexist and take advantage of their mosquito control prowess.

Few people realize that the smaller bats of temperate areas such as British Columbia are the most important predators of night-flying insects. A little brown bat consumes up to 600 mosquitoes an hour in its preferred habitat near water.

Of the 16 species of bats in the province, eight are listed as threatened or endangered. All are protected from being killed or harassed under the Provincial *Wildlife Act.*

Most species of bats in the province depend upon loose bark, the foliage of trees, or hollow trees for daytime roosting and maternity roosting. Some migrate to remote caves for winter hibernation. Sometimes they are found in attics, under eaves, shakes and cedar siding, or in outbuildings.

Experiments with erecting bat houses for daytime roosting and nursery roosting have been successful in some areas, but not much is known about their effectiveness in British Columbia. If you would like to take part in a bat research project, erect a house, and monitor what happens. Place the bat house 3 to 4.5 m above ground with good clearance below. The side of a house works well. For further information, contact Bat Conservation International, P.O. Box 162603, Austin, Texas 78716.



The open bottom of a bat house provides easy access to shelter

Create a Toad Home

Toads feed on large numbers of insects and other invertebrates, including slugs, sowbugs, earwigs, earthworms, and cutworms. They hide in cool, dark places during the day and come out to hunt at night. They don't care for manicured lawns.

To make a toad home:

- Use a clay plant pot about 10 cm deep by 20 cm in diameter.
- Cut a small arch in the rim of the pot as an entrance hole.
- Place the pot upside down, amongst vegetation, in a secluded and shady spot near a water source – near a rock wall or rock pile would be ideal.
- Moss tucked around the edges would add to its appeal, as would a nearby hollow log.

A toad home

Observations at feeders

Each species of bird has very specialized food requirements.

- Some birds are better able to crack larger seeds than others. Steller's Jays and chickadees, for example, peck open large striped sunflower seeds very skilfully. Evening Grosbeaks quickly shell them in their beaks.
- Dark-eyed Juncos cannot manage the large sunflower seeds, but will eat the smaller black oil sunflower seeds instead, and millet, which others may ignore.
- The small bills of Pine Siskins and American Goldfinches enable them to extract niger seed from the tiny openings of niger feeders.
- Birds feed at different levels in the garden. Some species stay close to the ground, and others will perch readily on hanging feeders.
- Some of the more boisterous birds, such as jays and grosbeaks, can be segregated from the smaller birds by offering an open, screen-bottomed, wooden tray with striped sunflower seeds and unshelled peanuts. You may, in fact, hear loud complaints from the jays if they don't find their peanuts once they have come to expect them. The jays may take the peanuts away and hide them, but they remember where to retrieve them.
- American Robins won't come to seed feeders, but may eventually take chopped apples when the ground is frozen and earthworms and insects are unavailable.
- Other insect-eating birds, such as woodpeckers and Bushtits, are attracted to suet feeders. Use beef suet or rendered beef fat only. Do not use bacon fat because of the salt and additives.
- Squirrels may invite themselves to your bird feeders. While some people find this frustrating, squirrels can be a delight to watch. Perhaps it is best to accept that you have bird and squirrel feeders, and enjoy the variety. Squirrels, like jays, will likely go first to a screened tray. Perhaps you can add a little dried corn just for them. If you want a birds-only feeding area, keep squirrels away by attaching baffles to the feeder.

Food for Wildlife

Wild Bird Feeding

Less natural food will be provided by a newly-started wildlife habitat than one that has developed over several years. In the interim, you can increase the number of bird visits by providing a bird feeder and a bird bath. Once established, feeder and bath must be scrupulously maintained because birds now rely upon them as a daily source of fresh food and water. If you go away on holiday, arrange with a friend or neighbour to keep them clean and well-supplied.

Some people provide food only during the winter months, but year-round feeding offers opportunities to see summer birds as well. An added delight is seeing the parent birds bring their fledged young to your feeders.

The best location for a feeder is a quiet spot, sheltered from strong winds, preferably under cover, and convenient for filling. Avoid concentrating too many feeders in a small area, as this causes stress in birds and also exposes them to increased chances of contracting diseases.

Some dense shrubbery two or three metres away will allow a quick retreat from predators. Cats are a major problem at feeders, however, and special protection from them may be required. The section on *Coexisting with Wildlife* has tips on minimizing predation by cats.

A large variety of bird feeding equipment is available, with different types of feeders suited to different types and sizes of birds and different seed. Selective feeders, which are smaller and have short or no perches, invite smaller and more agile birds, such as chickadees and nuthatches. (They are especially useful if you find larger birds taking over the feeder area.) Nonselective feeders are larger and have ample perching area, thereby inviting all birds regardless of size and dexterity. Be sure that any feeders you use can be easily cleaned and have no sharp edges.

Set up a weekly cleaning routine for your feeders to remove any food that is moist and beginning to decay. To prevent the spread of disease, sanitize the feeder by scrubbing with a 10% bleach solution. Rinse well and dry thoroughly before reusing. Never use commercial cleaners like Lysol and Pinesol because they are toxic to birds.

Birds inevitably scatter seed while feeding. Keep the ground beneath feeders clean to prevent the ingestion of decaying seed by ground-foraging birds and other wildlife, and to prevent attracting rats. A layer of hay can be spread under feeders, raked up periodically, and then composted.

Note the kinds of birds that frequent your neighbourhood and nearby parks. This will help you choose what types of seed mixes are most likely to attract birds to your outdoor space. Experimentation and observation will ultimately determine what works best.

Black oil sunflower seeds are a good choice for your first feeder. Offered in a hanging feeder, they are widely accepted by a variety of species. The next choice is a mixture of millet and a few black oil sunflowers offered in a safe place close to the ground. Dark-eyed Juncos, Song Sparrows, House Finches, Purple Finches, Rufous-sided Towhees, and Fox Sparrows are probable visitors here. Add some suet close to the trunk of a tree and you have a feeding station suited to a wide assortment of birds.

Avoid feeding bread and other baked goods at feeders, or to any birds for that matter. Bread lacks the range of nutrients required by birds. Stay with seeds and suet with their known nutritional value.

Be sure to keep seed and suet feeders regularly stocked — particularly in cold or wet weather, when the birds come to depend upon them. This known source of food can be a vital meal on a frigid or snowy morning. If you provide seeds for ground-foraging birds, remember to clear an open space after a snowfall to allow them access to food. If you have some shrubbery, scatter fresh seed under it so that the birds can feed in shelter.

When establishing a new feeder or moving an old one, consider the importance of clear escape routes to nearby dense foliage such as hedges, thickets, and coniferous trees. Birds need to escape quickly from hawks and other large bird predators. Young fledglings that are first brought to the feeders by their parents are particularly vulnerable because their flight is awkward and they are still learning how to respond to new dangers.

Squirrels make use of feeders too

A population of local birds can be built up quickly at feeders that are near escape cover. Migrant birds will then be attracted to the sounds of these regular feeder birds and frequent the feeders as they pass through to their nesting areas. In contrast, birds may tend to avoid very open feeding stations, because of their increased vulnerability to avian predators.

Birds are fascinating creatures. Keep binoculars and a field guide handy and record your observations in a journal. As you get to know them better, you will be able to adjust your feeders to their particular needs. A useful journal entry is the arrival and departure times of migratory birds each year.

Birds enjoying a feeder

Hummingbird Gardens

Planting for Hummingbirds

The arrival of hummingbirds coincides with the blossoms of our earliest woodland flowers. Their favourite sources of nectar are red-flowering currants, salmonberries, elderberries, honeysuckle, bleeding hearts, columbines, and foxgloves. As woodlands are cleared for urban development, forestry and agriculture, these natural sources of nectar are destroyed. You can help hummers by creating woodland glades and planting clusters or groupings of these favoured indigenous plants. Many of these plants are doubly useful because they provide berries later in the season for other birds.

Hummers are most easily attracted to red and pink tubular flowers such as cardinal flower, fuchsia, trumpet vine, scarlet runner beans, bee balm, coral bells, phlox, and fireweed. Plant groupings of these flowers, rather than scattering them about the garden. Hummingbirds also feed a lot on insects, not just nectar.

Recording bird activities

Use a ledger or computer to list birds that you have sighted or that you expect to see in or from your property. Divide the list in 31 columns for days of the month. Enter the number of each species seen on each day that you spend watching your feeder area. With this information, you will gradually build up a picture of seasonal migratory patterns of local species.

Hummingbird Feeders

A feeder placed in a shady location is another way to attract hummingbirds. Select a feeder with red on it. The recommended feeding solution is one part sugar to four parts water, boiled for about four minutes. A thicker solution using more sugar may cause a fatal hardening of the liver. Refrigerate unused solution to prevent fermentation. Do not add honey, red food colouring, or other chemicals. Honey can cause a fungal disease of the tongue. Hummers will starve if artificial sweeteners are substituted for sugar.

Hummingbird at feeder

To begin, place only a few ounces of liquid in the feeder rather than fill it. After you have acquired some regular visitors, add more liquid to meet the demand. As hummingbirds tend to be very territorial at a feeder, consider hanging several small feeders scattered about rather than a single large one.

Provide fresh sugar solution and thoroughly clean the feeder every three days using a bottle brush, hot water, and a little vinegar. Do not use soap or detergent. Cleanliness is very important since, without safeguards, the solution can ferment, bacteria can grow readily, and disease may spread. If you lack time for these precautions, don't start feeding.

Hummingbird Nesting

If you are very fortunate, your visitors may take up residence in your garden. The females look after all nest-building duties, and care for the young alone.

Feeding time at a hummingbird nest

Their nests are exquisitely tiny, wonderfully camouflaged, and rarely noticed, even when on the lower limbs of trees or in garden shrubbery. Nest materials are as delicate as the bird itself and may include spider-webbing, cottonwood seed tufts, paper from the nest of a paper wasp, feathers, dried grass and bits of lichen. The nest is flexible, moulding to the shape of the incubating mother bird, and later expands to accommodate the two chicks normally raised.

Young hummers practise "flying" within their nest. They hang onto its rim and hum their wings without allowing themselves to become airborne. Practice, and the strength it builds, makes them good flyers when they take their first flight. Their main problem seems to be in learning how to perch after the flight.

Some young migratory hummers will return to the area of their birth the following spring. They live an average of one to three years, with the longest known lifespan being 12 years. Their threats and predators are varied, with human activities and related habitat loss being the most serious. Potential predators include domestic cats, small hawks, falcons, orioles, flycatchers, wasps, frogs and even preying mantis. Spider webs can sometimes enmesh the little birds, even though the webbing is carefully used in nest construction.

Despite all these challenges, these tiny birds manage to return to your wildlife habitat each year — a special little miracle we are privileged to share.

Flowering Plants to Attract Hummingbirds

Plant		Bloom Times (listed in order)
Trees		
Robinia sp.	Locust	March
Malus sp.	Flowering Crabapple	April - May
Crataegus sp.	Hawthorn	April - May
Aesculus carnea	Red Horse Chestnut	April - May
Shrubs		
Sambucus racemosa	Red Elderberry	March - April
Lonicera involucrata	Twinberry	March - July
Ribes sanguineum	Red-flowering Currant	March - April
Rubus spectabilis	Salmonberry	March - April
Chaenomeles japonica	Flowering Quince	April - May
Kolkwitzia amabilis	Beauty Bush	May - June
Weigela sp.	Weigela	May - June
Hibiscus syriacus	Rose of Sharon	July - August
Fuchsia magellanica, riccartonii	Hardy Fuchsia	July - October
Vines		
Clematis sp.	Clematis	April - August
Ipomea coccinea	Morning Glory	June - August
Campsis radicans	Trumpet Creeper	June - September
Lonicera sp.	Honeysuckle	June - October
Phaseolus coccineus	Scarlet Runner Bean	July
Flowers		
Annuals		
Hesperis matronalis	Sweet Rocket	May - June
Petunia sp.	Petunia	May - October
Fuchsia sp.	Fuchsia	June - October
Impatiens capensis	Jewelweed	June - October
Salvia splendens	Scarlet Sage	July - September
Cleome spinosa	Spider Flower	July - September
Zinnia sp.	Zinnia	July - October
Dahlia merckii	Dahlia	August - October
Kniphofia sp.	Red Hot Poker	July - October
Perennials and Biennials		
Dicentra formosa and *spectabilis*	Bleeding Heart	May - June
Aquilegia sp.	Columbine	May - June
Delphinium sp.	Delphinium	June - July
Digitalis purpurea	Foxglove	June - July
Penstemon barbatus	Scarlet Penstemon	June - July
Asclepias tuberosa	Butterfly Weed	June - July
Liatris sp.	Blazing Star	June - August
Heuchera sanguinea	Coral Bell	June - October
Epilobium angustifolium	Fireweed	July -August
Gladiolus cardinalis	Gladiolus	July - September
Monarda sp.	Bee Balm	July - September
Phlox sp.	Tall Phlox	July - September
Lobelia cardinalis	Cardinal Flower	July - September

Butterfly Gardens

Western Tiger Swallowtail

Because butterflies and hummingbirds share many nectar flowers, efforts to attract one may have the bonus of attracting the other. Both visit blossoms of the flowering currant and elderberry (which later provide berries for birds and small mammals), bee balm (*Monarda* sp), wild columbine, and phlox. Other butterfly favourites are alyssum, aster, aubretia, chrysanthemum, cosmos, daylily, dianthus, globe thistle, lavender, lilac, marigold, shasta daisy, sunflower, yarrow, zinnia, and many culinary herbs such as mint, lemon balm, sage, rosemary, oregano, and thyme.

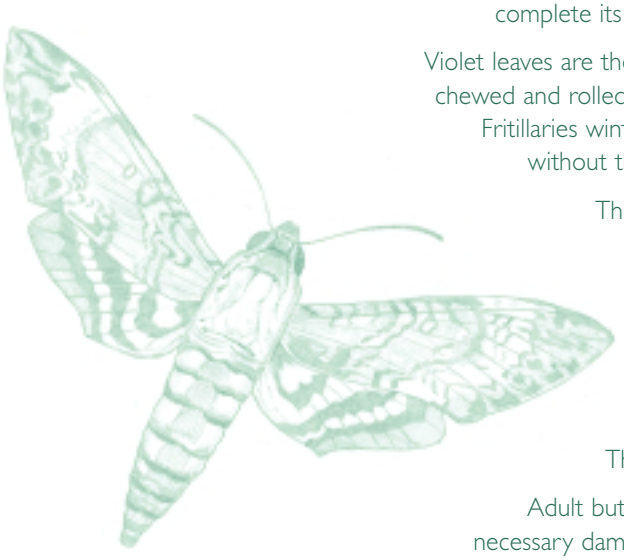
Butterflies and moths go through the remarkable process of metamorphosis in their life cycle — from egg, to larva, to pupa, and, finally, to adult. The larval stage may not be as attractive as the beautiful adult flitting from flower to flower, but to have butterflies is to have caterpillars first. And some songbirds rely on the larvae of butterflies and moths to feed their young.

Each species of butterfly lays its eggs on specific plants on which its caterpillars must feed. Eggs are usually laid singly on the underside of leaves or sometimes on the very tip. Caterpillars defend themselves against predators by being hard to see or unpleasant to eat. Pupae are also masters of disguise. They can resemble leaf buds, a thorn jutting out from a twig, a curled drying leaf, a bird dropping, or even a bit of bark. Try not to be too neat in tidying your garden. Caterpillars and pupae seek safety and shelter in leaf litter and natural debris.

The caterpillar of the Anise Swallowtail butterfly feeds on members of the carrot family such as parsley, fennel, carrot, dill, and Queen Anne's lace. Other swallowtail larvae require the leaves of aspen, poplar, willow, and alder. Swallowtail larvae are solitary caterpillars, rather than "social" caterpillars which appear in large groups. The larvae can be rather alarming in appearance. They develop through four moults as they eat, grow, and expand out of their skin to an eventual size of 4 cm. These larvae are smooth, and brightly patterned in green, yellow, black, and white. If you find one on your habitat vegetation, consider it a gift, not a threat. Soon it will complete its metamorphosis and become a beautiful butterfly.

"Bug zappers" can do more harm than good

The ultraviolet "bug zappers" may have little effect on the local mosquito population, which they are intended to control. They do, unfortunately, attract and destroy many of our larger moths.



Hawk moth

Violet leaves are the larval food for fritillary butterflies. If you notice them being chewed and rolled around caterpillars, refrain from removing the damaged leaves. Fritillaries winter as tiny caterpillars, so allow the leaves to die back naturally without trimming.

The red admiral and tortoise shell butterflies require nettles for their larval food. If you can tolerate a corner with a few of these, you will be providing essential habitat.

Although very good nectar or larval food sources, some nettles, grasses, milkweeds, and thistles are invasive. Plant them in tubs to contain the roots and remove flower heads after blooming to prevent spread of their seeds by the wind. The flowers can be used in dried flower arrangements.

Adult butterflies need moisture and trace minerals. You can provide the necessary damp soil by creating a shallow excavation or sinking a small container of mud or sand to ground level. Locate in a sunny spot out of the wind. Add a few flat rocks around the edge for the butterflies to sun themselves. Because butterflies are very vulnerable to cats, a protected location is important.

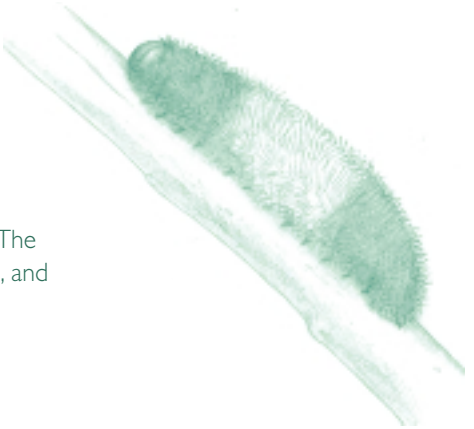
Insects such as mud-daubers and wasps may also find this moist soil useful, as might robins at nest-building time.

Night-flying moths are fascinating visitors to the evening garden and should be encouraged. These are not the moths that favour woollen garments and carpets. In fact, of the 6,000 species of moths in North America, only two have such appetites. Like butterflies, most moths take nectar from flowers. Those visiting gardens like white and pastel flowers and evening blooming plants such as evening primrose, four o'clocks, and nicotiana. At dusk, daylilies and petunias are favourites. The caterpillar of some moths may be more familiar than the adult. Orange and black-striped woolly bears and fuzzy yellow bears become rather inconspicuous tiger moths.

Isabella Tiger Moth

The bubble diagram on page 26 provides ideas for planning a butterfly garden. Place the plants according to sun/shade requirements, and arrange in groups of several plants of each variety. Planting in groups or clusters is important because it takes time for butterflies to discover new nectar plants and food sources. Intersperse early with late-blooming varieties to avoid flowerless times. Include a selection of local native species of plants that provide for the butterfly throughout its life cycle. Many native plants that attract butterflies are available through nurseries.

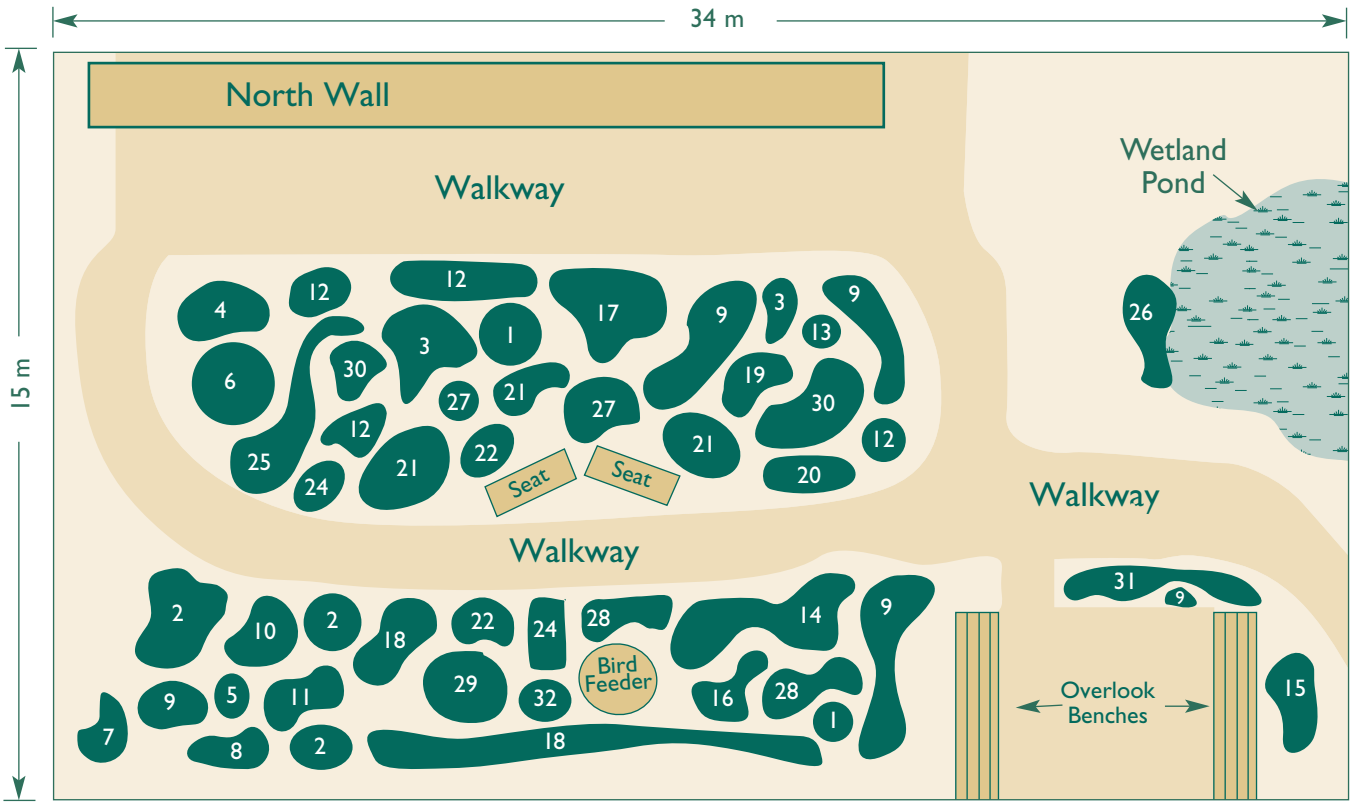
Water thoroughly for the first year, and avoid using herbicides and pesticides. The first year of a new garden may not yield spectacular results. Planning, patience, and persistence are the keys to success.



Woolly Bear Caterpillar

Bubble Diagram Butterfly Garden

(Numbers on diagram correspond to plant list below.)

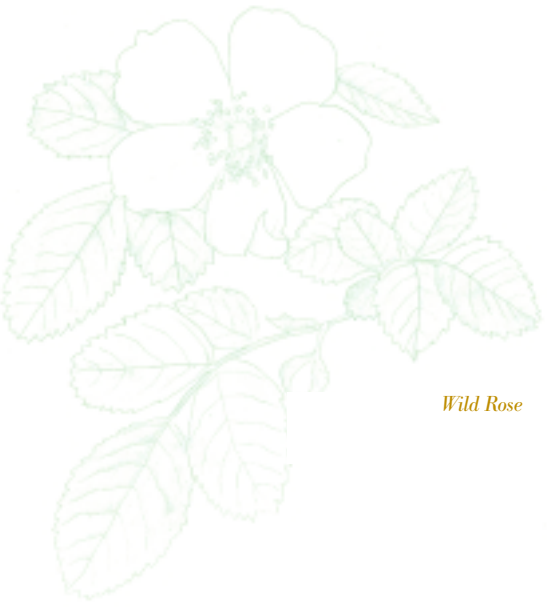


Plant List Trees and Shrubs		Timing	Exposure	Height (m)	Bloom colours
1. *Acer circinatum*	Vine Maple	Spring	Partial shade	4.5-6.0	Purple/white
2. *Ceanothus velutinus*	Wild Blue Lilac	Spring	Full sun	1.8-2.5	Blue
3. *Gaultheria shallon*	Salal	Late spring	Partial shade	0.1-0.6	White/pink
4 *Mahonia nervosa*	Low Oregon Grape	Early summer	Full sun	0.6-1.2	White
5. *Rubus parviflorus*	Thimbleberry	Early summer	Partial shade	2.4-3.6	White
6 *Picea sitchensis*	Sitka Spruce	Spring	Partial shade	15-21	White
7 *Philadelphus lewisii*	Mock Orange	Summer	Full sun	1.8-3.0	White
8 *Ribes sanguineum*	Red Flowering Currant	Late spring	Full sun	1.2-1.8	Reddish pink
9 *Rosa nutkana*	Native rose	Early spring	Full sun	1.2±	White/pink
10. *Sambucus racemosa*	Red Elderberry	Summer	Full sun	2.4-3.0	Yellow
11. *Symphoricarpos albus*	Snowberry	Late summer	Parial shade	1.8±	Pink
12. *Vaccinium ovatum*	Evergreen Huckleberry	Early spring	Partial shade	0.9-1.5	White/pink
13. *Vaccinium parvifolium*	Red Huckleberry	Late spring	Full sun	3.6±	Pink/white

Plant List Flowers and Herbs		Timing	Exposure	Height (cm)	Bloom colours
14. *Achillea* sp.	Yarrow (p)	Spring/autumn	Partial shade	0.6±	White, yellow, pink
15. *Aquilegia* sp.	Columbine (p)	Summer	Full sun	0.3±	Variety
16. *Aster* sp.	Native Asters (p)	Summer/autumn	Full sun	0.3-0.8±	Pink, purple, yellow and white
17. *Echinacea* sp.	Bright star (p)	Summer	Partial shade	0.5±	White, pink
18. *Echinops ritro*	Globe Thistle (p)	Late summer	Full sun	0.8-1.2	Purple
19. *Foeniculum* sp.	Fennel (p)	Summer	Full sun	0.5±	Yellow
20. *Lavendula augustifilio*	Lavender (p)	Early summer	Full sun	0.4-1.2	Purple
21. *Melissa officinalis*	Lemon Balm (p)	Spring	Full sun	0.6±	White
22. *Mentha* sp.	Peppermint/Spearmint (p)	Summer	Partial shade	0.3-0.6	Purple
23. *Monarda didyma*	Bee Balm(p)	Summer	Full sun	0.4-0.9	Red. pink
24. *Origanum marjorana*	Sweet Marjoram (p)	Spring	Full sun	0.6±	White
25. *Petroselinmum* sp.	Parsley (a), (b)	Early summer	Full sun	0.05-0.5	White
26. *Prunella vulgaris*	Self Heal (p)	Midsummer	Partial shade	0.1±	Purple
27. *Rosemarinus officinalis*	Upright Rosemary (p)	Late spring	Full sun	0.6-1.5	Blue
28. *Salvia* sp.	Sage (p)	Summer/autumn	Full sun	0.4-0.9	Variety
29. *Solidago* sp.	Goldenrod (p)	Summer/autumn	Partial shade	1.2±	Yellow
30. *Thymus* spp.	Thyme (p)	Summer	Full sun	0.06-0.3	Mauve
31. *Tussilago farfara*	Coltsfoot (p)	Late summer	Partial shade	0.3±	White, pink
32. *Rudbeckia* sp.	Cone Flower (p)	Summer	Full sun	0.6-0.9±	Yellow

Key: (a) = annual; (p) = perennial; (b) = biennial

Attracting butterflies



Wild Rose

Bird bath tips

- A shallow dish at ground level provides water for birds, small mammals, and insects.
- A traditional pedestal bird bath adds charm to the garden, and is more visible than a shallow dish. Concrete is preferable to plastic because it is less slippery. Wildlife prefer gently sloping sides and a water depth of three or four cm.
- Baths can also be hung from a branch.
- Locate the bath in an open area, out of reach of cats, but within two or three metres of protective cover and a perching area, such as dense shrubbery, or brush piles.
- Cleanliness is important. Change the water frequently (which may mean daily). Keep a brush handy and give the bath a good scrub with each water change.
- Never add chemicals of any kind to the water.
- Fresh water in winter is important, too. Bird bath heaters are available for colder areas. During the infrequent freezing days on the coast, a plastic plant pot saucer set into a concrete bath allows the ice to be popped out easily each morning and replaced with fresh water.

Water for Wildlife

Wildlife need a source of clean water for drinking and bathing. This can be provided in a shallow dish, a traditional bird bath, a tiny pond, a larger wildlife pond complete with recirculating stream and waterfall, or a natural water source for those fortunate enough to have one.

Bird baths

Bathing is part of the intricate grooming behaviour of birds; it keeps their feathers clean, waterproof, and in good working condition. Small birds flutter in the foliage of trees and shrubs after a rain. Others use morning dew. Larger birds like robins and towhees bathe in the spray of a sprinkler, and hummingbirds hover for mid-air showers.

After bathing, most birds seek out a nearby perch on which to preen, running their bills through their feathers to spread oil from a gland located at the base of the tail. These naturally-oiled feathers provide crucial insulation during cold and wet weather.

Some birds also bathe in dust, shifting and shaking it through their feathers. Such behaviour is thought to improve feather alignment and discourage parasites. To create a dust bath, excavate an area to about 15 cm and build up the sides with brick or rock. Fill with a dust mix composed of equal parts sand, soil, and sifted wood ash. A dust bath one metre square will serve several birds at once.

Birds enjoying a bath

Amphibian Pool

Toads, frogs, and most salamanders require water to complete their life cycle, but suitable water is often difficult to find. Goldfish ponds are hazardous because fish eat amphibian eggs, and spring mudholes often dry up before the aquatic stage of the amphibian's life is complete.

Fortunately, a tiny amphibian pool can be made to order. Algae growth, a food source, and cover are very important to larval amphibians. (Most are herbivorous and do not become carnivorous until they approach adulthood.)

- Check local by-laws for restrictions on building this type of pool.
- Choose a secluded site in semi-shade and within reach of a hose.
- Excavate a depression about 1.5 m long, 1 m wide, and 20 cm deep with at least one side sloping gently to the edge.
- The pool can be lined with cement or a heavy EPDM pond liner.
- Place 10 cm of soil in the bottom.
- Cover the soil with sand or tiny pebbles.
- Run water gently into the pond, to avoid disturbing soil at the bottom.
- Plant with suitable shallow water/bog plants such as marsh marigolds, blue water iris, and miniature cattails. These may be planted in pots and set into the soil at the bottom for ease of maintenance later.
- Add a few interesting larger rocks and a small log.
- Plant grasses and sheltering plants around the edges.

- Keep water level constant.
- If fishing herons and raccoons are about, place a chicken wire screen over the pond, especially in spring and early summer, to protect eggs and tadpoles. Staple the wire to a wooden frame to prevent entanglement and injury to predators.

A hands-off policy will benefit both you and amphibians. They may have toxic skin secretions that are transferred to your hands. In turn, they may absorb, through their permeable skin, chemicals from your hands that are harmful to them, such as suntan oil or insect repellent. Also, amphibians are often in danger of desiccation and handling them increases this risk.

An amphibian pool

A Wildlife Pond

Adding a pond to your wildlife habitat will greatly increase wildlife activity, but it probably takes more planning, work, and capital than any other wildlife project. Some basic considerations and guidelines follow. Many inspiring books devoted to water in the garden are listed in the **Naturescape Resource Booklet**. Before commencing, check local by-laws and regulations regarding ponds, and inquire regarding the location of buried gas and hydro lines.

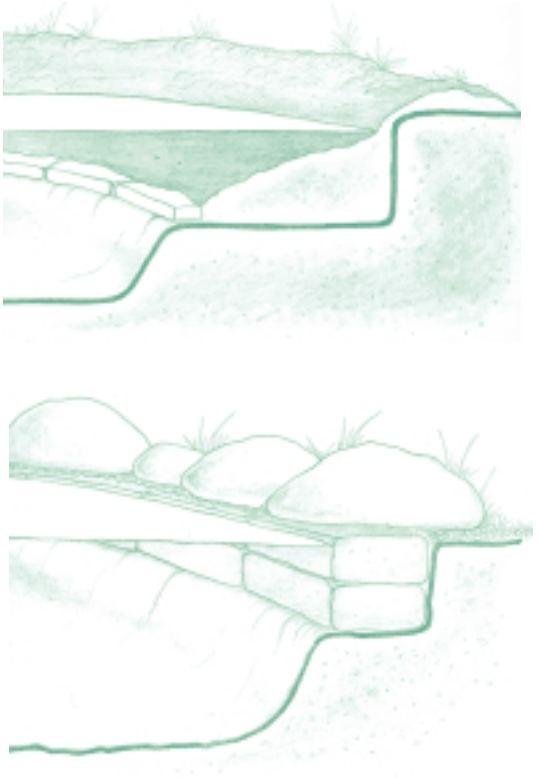
The Site

- Choose a location that does not disrupt existing valuable habitat — particularly intact wetlands.
- If you decide not to line the pond, use a low area where water will collect naturally, but avoid direct surface runoff from roads, parking lots and heavily fertilized areas.
- If you are using your household water supply, keep the site within reach of a hose.
- If you are using a pump, plan for installation of a weatherproof electrical outlet.
- Consider where natural drainage will go, and how the pond might flood in heavy rain. Also plan how you will drain the pond if needed, and where the water will go.
- Locate the pond away from large trees to avoid excessive shade and fallen leaves and needles. Decaying vegetation in the water depletes oxygen.
- A pond requires five hours of sunlight a day during the growing season. Otherwise plantings will be limited, and water lilies will not bloom.
- Experiment with the size, shape, and location by laying out a hose to represent the pond edge.

Clouded salamander

Size and shape

- Your pond need not be deeper than half a metre, but if you are planning to stock fish, a deeper zone in the centre will allow the fish to avoid predators and give them a better chance to over-winter. (In areas with very cold winters, fish must be removed for the winter.)



Two ways of lining a pond…the bottom is the best way

- For a suburban yard, a free-form, two by three metre pond with varying depths is fine.
- Any pond will look more natural by varying the shape of the edge and contouring the bottom. This will also allow for a richer mix of plant and animal communities.
- Gently sloping banks are essential for bird and other wildlife use, and are safest for small children.
- Be sure the edge of the pond is level all around.
- A rock or log island in the centre is useful to wildlife and is attractive.

Lining the Pond

Materials for lining a small pond include:

- Flexible synthetic rubber (EPDM) or PVC liners
- Prefabricated plastic or fibreglass shells
- Concrete
- Bentonite clay

Probably the simplest are the EPDM liners or the prefabricated shells, available at landscape supply and garden centres.

Water Supply

- A pond must have an adequate water supply to fill initially and to replace water lost by evaporation. In some areas there may be adequate rainfall to keep it topped up, but you will probably be supplying water from a controlled water supply.
- If your water contains chlorine, it should be aerated when filling and allowed to stand for a week before adding plants or fish.
- If your water contains chloramine, it will be toxic to fish and other aquatic life. Use filtered water or collected rainwater instead.
- Concrete contains chemicals toxic to plants, fish, and other aquatic life. Scrub first with muriatic acid and rinse thoroughly. Concrete continues to leach lime for up to a year, so it is important to monitor water pH levels. Water testing kits are available from pond suppliers.
- A good way to introduce pond life is to add a bucket or two of water from a natural pond.

Planting

- For large ponds with flexible liners, plant in pots rather than place soil in the bottom of the pond. Should the liner be damaged at some later time, it will be much easier to remove pots than several inches of loose soil. Line the pot with a permeable fabric to prevent soil leaching through, and after planting, cover the soil with 25 mm of sand or pea gravel. Be sure there is nothing sharp on the bottom of the pot that could wear a hole in the liner. An extra piece of liner placed under it provides added protection.
- Follow the recommendations of pond books and nursery experts when making decisions about pond plants. Each type of plant requires a specific location in relation to the surface of the water — some with their crowns just above the surface, others many centimetres below.
- Be sure to include oxygenating plants to improve water quality.

Enhancements

- For frog, turtle, and salamander habitat, add logs and rocks that extend above the water surface. Birds often stand on these islands to drink. Dragonflies may deposit their eggs on these islands or on pond vegetation. Have at least one log extending to the shore as an escape route or entrance ramp.
- Include shelters at the bottom of the deepest part of the pond into which fish can retreat. Drain tiles or flower pots turned on their sides work well, as do underwater rock piles.
- Locate dense vegetation near the pond's edge, a decomposing log or two, and perhaps a rock pile to provide places of shelter for emerging amphibians.

Water in Motion

- Moving water is an excellent way to attract wildlife, and is easily produced by circulating the water with a submersible electric pump. An artificial stream spilling into the pond will attract species of birds that shun still water. Add some flat rocks into the stream to create tiny ponds. A fine spray or mist is also an attraction — particularly to hummingbirds.

Caring for Streams and Wetlands

Most of the hundreds of streams that once flowed through today's urban areas are now culverted and paved over. Wetlands, too, have been filled and entire water systems have been channelled and rerouted. If you examine old maps at your local museum or municipality, you will probably discover that wetlands and streams once existed in your neighbourhood — even in your own yard.

If you are lucky, a free-running stream or marshy area still exists near your home. Degraded streams that look like ditches, and even disturbed wet areas, support life.

Often overlooked are wetlands, which perform a critical role in purifying water by acting as a sieve to catch sediment and pollutants. A pungent odour indicates a valuable chemical process is underway, which converts harmful pollutants into harmless by-products — one that would cost us a great deal to replicate by artificial means.

With your help, streams can be rehabilitated and degraded wetland habitats made richer with a broader and more balanced variety of plant and animal life.

Unravelling some myths about urban streams and wetlands

- Grass to a stream's edge may look pretty, but can be deadly for fish. Trees and shrubs provide shade that moderate water temperatures. They stabilize banks and prevent erosion. They are also home to insects which drop into the water and provide food for feeding fish.

  Stewardship Action: Where appropriate, plant native trees and shrubs on streambanks.

- Stream maintenance and clean-up should not include removing woody debris. Logs, boulders and other natural debris make homes for aquatic insects and allow for pools where fish can rest.

  Stewardship Action: Where appropriate, maintain logs and boulders in streambeds.

- Paved driveways and concrete areas in your yard contribute to stream erosion, no matter how far you are from a free-running stream. Rain or melted snow runs over concrete and asphalt very quickly, entering storm sewers. Water pours from storm sewers into streams and lakes causing water levels to rise unnaturally, eroding streambanks and clouding streams with fine sand.

  Stewardship Action: Use rain barrels to act as water catchment areas to minimize run off. Consider permeable paving tiles for any new driveway or patio construction.

- If your property fronts a waterway, then you probably have a wetland strip at the water's edge. This marshy area plays a valuable role as a haven for young fish and other aquatic life, as well as stabilizing your property. Erosive wave action, heightened by motorized leisure craft, can destroy the strip.

  Stewardship Action: Encourage boaters to reduce wave action.

- If you have a wetland on your property, make sure it is fronted by a buffer zone to protect it from activities in your yard. Buffers should be at least 2 m and preferably 10 m or more, and can be extended by planting native vegetation.

  Stewardship Action: Where appropriate, plant a buffer zone. Use native plants.

- Consult local fisheries authorities for specific information about the conditions on your property.

Caring for Native Fish

If you have a free-running stream or wetland on your land or in your neighbourhood, do not stock it with any fish without checking with the appropriate authorities. The provincial Ministry of Environment, Lands and Parks is responsible for stocking freshwater fish in British Columbia, while the federal government is responsible for salmon species. Introducing non-native exotic aquatic life could cause irreparable damage to the native species in a stream or wetland.

Water miser tips

- Plant as many indigenous plants as possible in your wildlife habitat. They generally require less water than exotics.
- Keep soil surfaces covered with mulch. This is important for maintaining a constant level of moisture in the soil, and for moderating soil temperatures.
- Water borders and vegetable gardens with a soaker hose or drip irrigation. Much less water evaporates this way, and the water is targeted to the plants that need it most. As a bonus, songbirds love the water droplets on a soaker hose.
- Decrease water consumption by watering early in the morning, and deeply. Frequent and shallow watering results in shallow root systems that do not withstand drought.
- To water by hand, attach rain barrels to downspouts to collect roof run-off water — but only if your roof has not been chemically treated. Plastic barrels designed with a downspout diverter, overflow mechanism, and spigot are now commercially available or you can make one from an old wooden barrel.
- If using an open barrel, ensure the top is fitted with a taut and snugly attached wire mesh to prevent small animals from climbing in and drowning.

Ways to promote xeriscape

- Plan and design ahead, creating hydrozones (areas containing plants whose water needs are all similar) and utilizing microclimates.
- Remove weeds, analyze soil, and amend the soil to increase water-holding-capacity if necessary for the type of plants you are going to plant.
- Have a purpose for each area of grass, and replace unused grass areas with other plants; take advantage of low-water-use alternative turfs.
- Irrigate efficiently with as little water as possible, using efficient human management of an efficiently designed system.
- Plant xeric plants, which utilize water efficiently. Group high-water-use favourites together in an area of high visual impact.
- Mulch to reduce water evaporation from soil. There are living mulches (ground covers), organic mulches, and inorganic mulches.
- Maintain in a manner aimed at conserving water; maintenance is often reduced to "puttering" in a well-designed xeriscape landscape.

Water Conservation

Did you know that a 1.6 cm garden hose running for 20 minutes will use 380 litres of water? Or that a 280 m^2 lawn of turf grass needs about 100 m^3 of water during an active growing season of 13 weeks or the equivalent of 1,100 litres per day during that 13-week period? Creating more natural habitat in your yard will decrease the expanse of thirsty lawn and help conserve water.

Xeriscape Concepts

Xeriscape is defined as water conservation through creative landscaping. The term is derived from the Greek word *xeros* meaning dry and the Anglo-Saxon word *schap* meaning scape. In practice and appearance, the result is a dry vista landscaped with lush-looking, colorful xeric (low-water-requiring) plants.

The xeriscape concept was developed in 1981 by a task force comprising the Denver Water Department, the Association of Landscape Contractors of Colorado, and Colorado State University. The result was the founding of local xeriscape councils from Georgia to Hawaii devoted to making water conservation a key component of landscaping.

The many benefits of xeriscape are:

- Urban wildlife habitat and corridors are created and enhanced.
- Environmentally and economically, the most conserving and most sustainable landscape is created.
- Water use is reduced (plus the electricity needed to pump it), as is the use of pesticides, herbicides, fungicides, fertilizers, and gasoline fuel.
- Boring lawnscapes are turned into an interesting variety of landscape styles.
- Human energy and time required to maintain the landscape are reduced.
- Up to 50% of urban water is used on landscapes; xeriscape can reduce this by up to 50%, yielding a potential net saving of 25% of urban water used.

Cut Your Lawn — In Half

- Lawns are the largest consumers of landscape water, pesticides, and fertilizers in our urban/suburban areas. Increase shrubbery borders and habitat areas and replace grass with ground covers. Instead of fighting moss in shady areas, remove the grass and create a glade of ferns, woodland flowers, mosses, and lichen. Add a stepping stone pathway.
- For remaining lawn areas, think tapestry rather than velvet, and eliminate herbicide use. Remove dandelions by hand before they seed, and learn to enjoy the clover: it increases the nitrogen content of the soil and improves the health of your lawn.
- Increase the mowing height of your lawn to six or eight cm. Mow often and leave the clippings in place. When chemicals are excluded from the the lawn, the life in the soil will decompose the clippings and recycle their nutrients back to the grass.

- Consider leaving parts of your lawn unmown. The back yard is probably the best place to start. Continue to mow around the edges so that the project is seen as clearly intentional. Dig out small planting areas to introduce meadow plants such as daisies, black-eyed susans, asters, sweet rocket, foxglove, goldenrod, or native grasses. Instead of using tiny seedlings, start with established plants strong enough to fight their way through the grass roots. If you can keep some patches clear of grass, seed pockets of sunflowers. The chickadees will love them. Leave the tall stems in place through the winter. They make great perches. Sunflowers often seed themselves around feeders. Let a few grow there too as perches.
- A wildflower meadow is a delightful mixture of poppies, sunflowers, daisies and other beauties, but it must be seeded on bare soil and tended very carefully to control weeds until it is well established. Also, consider that your meadow will look brown and rather untidy in the winter months because the plants must be allowed to form seed, remain in place to reseed, and become a source of food for wildlife. Research well before starting this project and remember that many commercial wildflower mixes are not native species.
- Many types of wildlife flourish in an unmown red clover meadow.
- Having reduced the size of your lawn, consider using a hand mower rather than a gasoline-powered model. It's a great way to increase physical fitness and decrease air and noise pollution.

The safe way to collect rain water

Nurturing Your Wildlife Habitat Over the Years

Your naturescape will take time to mature, and it may be a year or two before wildlife increases significantly in species and number. Your wildlife habitat will also evolve over time, just as it does in nature where one type of plant succeeds another. Shade increases as the canopy of trees expands. Plants that were once in sunshine begin to reach out from shaded areas, and shade-tolerant plants arrive to displace them.

In nature, when a branch falls or a tree topples, life begins anew. Mosses, fungi, and lichens grow, and small creatures move in as decomposition and renewal proceed. Vegetation is returned to the soil, with multitudes of life forms involved in the process. Thus the natural fertility of the forest floor is maintained. Much of this can be duplicated in your yard.

An understanding of the complexity and interconnections of nature, from a level beneath our feet and to the skies above, is one of the rewards of caring for wildlife habitat at home. Far from being an inert substance, soil is an entire ecosystem of complex organisms, which live out their life cycles below ground. Many are microscopic and present in vast numbers. These and the more visible earthworms and insects are the processors of our soil. If life in the soil is nurtured, natural soil fertility is maintained, and plants are vigorous and more resistant to disease. Natural systems of insect control are strong, making pesticides unnecessary.

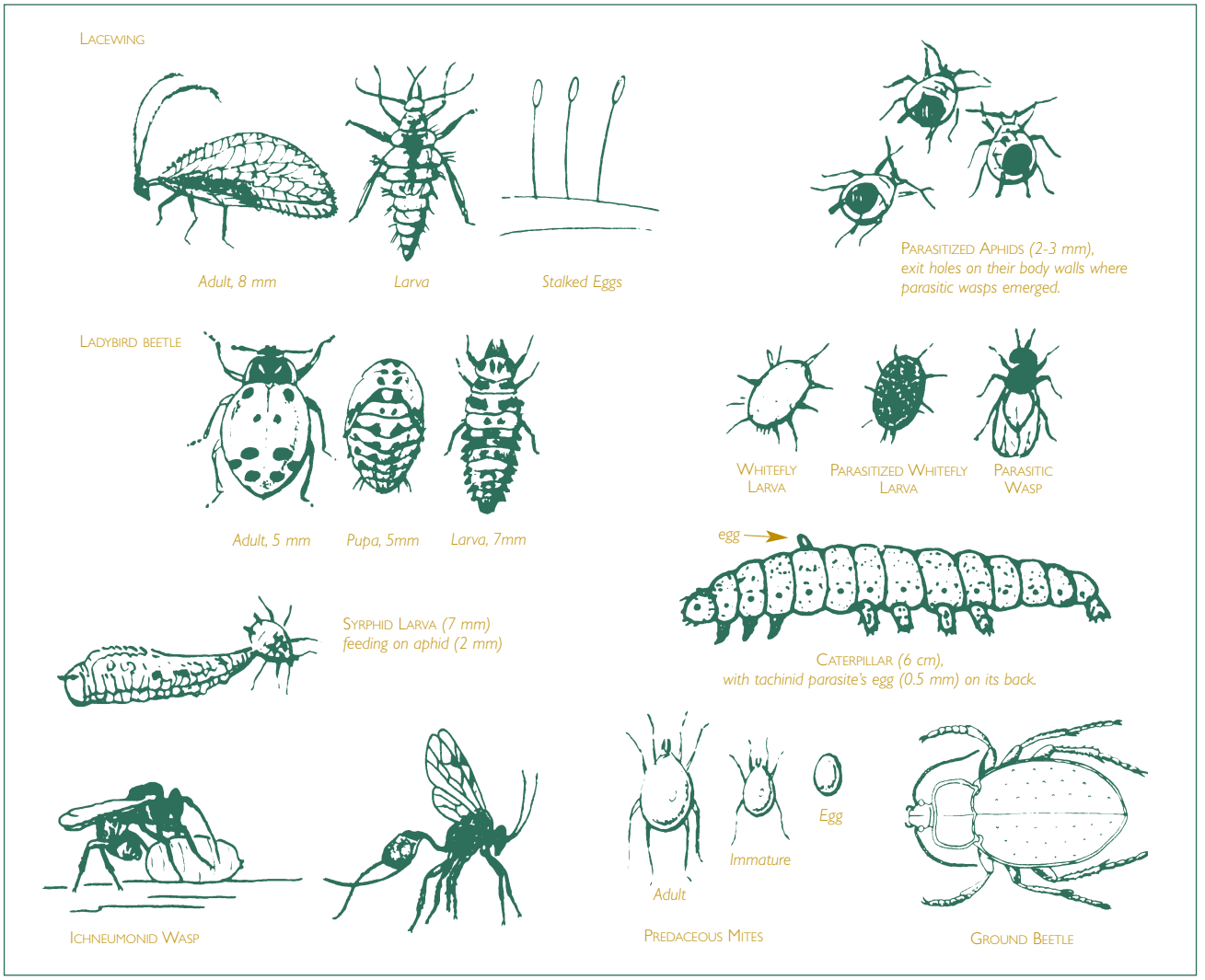
Beneficial Predators and Parasites

It is important to recognize friend and foe, and note when natural controls are taking place. A colony of aphids, for instance, may have natural predators or parasites keeping them in check.

Predators prey upon and eat other creatures. Examples in the insect world are ladybird beetles and their larvae, lacewings and their larvae, syrphid fly larvae, ground beetles and their larvae, and yellowjacket wasps. Spiders and predatory mites are also beneficial. Spiders feed almost entirely on insects. Predacious mites feed on other, usually harmful, mites. Songbirds, amphibians, and some mammals are also natural predators of insects.

Parasites live on or in another creature, debilitating and/or finally killing it. Braconid wasps, ichneumonid wasps, and tachinid flies are examples. There are egg parasites, larval parasites, and some that parasitize adult stages of insects. There are even parasites on the parasites.

Inappropriate pesticide use will destroy natural predators and parasites. Most of us recognize the little red ladybug, but we may not realize that its rather ferocious-looking, alligator-like larval form has an even more voracious appetite for aphids than the adult. See examples of the various forms below.



Illustrations: Ernie Chu

Some examples of beneficial insects

Ways to Ensure Natural Soil Fertility and Keep an Ecological Balance

Mulches protect plants in the winter, prevent frost heaving, conserve moisture, and regulate soil temperature throughout the year. In nature, soil does not remain bare for long. Cover protects soil from erosion and provides organic matter that sustains the many life forms contained within.

- Allow fallen leaves to remain under trees and in shrubbery borders. The one exception is diseased leaves, which should be removed. Other mulching materials include five to eight cm of compost, well-rotted manures, shredded prunings (those not required for a brush pile), wood chips, grass clippings (if not left on the lawn), and needles from evergreens. Don't pile mulches too tightly around the stems or trunks of plants, and don't smother dormant perennial plants. Pull the mulch back from them as the weather warms in spring.
- Do not use black plastic sheeting overlain by bark mulch; it harms life in the soil by cutting off air. If weed growth is a concern, spread several layers of newspaper beneath the mulch.
- Fertilize with compost and natural fertilizers, such as manure, lime, bloodmeal, and bonemeal.
- Refrain from using pesticides, which can also kill beneficial soil organisms.
- Allow decaying trees and branches to replenish the soil. Many special woodland plants cannot thrive without an association with decaying wood. Decaying wood also provides habitat for centipedes, salamanders, and toads.
- Many new housing developments leave the soil dead; sometimes harsh gardening methods do the same. To re-establish life in the soil, return as much organic material as possible by composting and mulching.

Benefits of compost

- Provides a balanced source of nutrients to enhance the soil in a steady and gentle way.
- Improves soil texture and its water-retaining properties.
- Increases populations of earthworms and other useful creatures.
- Keeps valuable, recyclable materials out of land fills.
- Antibiotics may be secreted by compost that can make plants more disease-resistant.

Composting

Land fills throughout the province are running out of space. You can alleviate the problem by reducing the amount of material you send or take to the local land fill. Recycle everything that you can, especially your kitchen wastes and garden clippings. Sending plant materials that have grown on your property to the land fill amounts to extracting your soil. Save and recycle the nutrients within these materials by using natural materials for mulches and establishing and managing a compost pile.

Proper composting of vegetative wastes is a key component in nurturing your wildlife habitat garden. Composting speeds the processes of nature, whereby all organic material is returned to the soil to add fertility and life for succeeding generations of living organisms. Just as leaves fall to the forest floor each autumn, eventually to be turned into soft, fluffy, leafmold humus, so too may our household and garden wastes be processed.

Earthworm

Composting makes use of many and diverse soil processors — microscopic bacteria, fungi, mites, centipedes, sowbugs, slugs, beetles, and earthworms — to transform vegetative material to humus. Countless organisms live out their life cycles in the process, and the nutrients from their bodies add trace minerals to

Materials that make good compost

- Kitchen vegetative wastes, such as vegetable trimmings, apple cores, orange peels, banana skins, coffee grounds, and left-over vegetable cooking water. Avoid using dairy product and meat wastes, which will rot, smell, and attract animals. Also, avoid using anything synthetic that will not break down.
- Leaves in layers no more than 25 cm, grass clippings in layers no thicker than eight or 10 cm, and prunings no more than five mm thick.
- Weeds – unless they are a noxious sort laden with seeds. (The composting process should heat up enough to break down seeds, but there is no point in taking a chance.)
- Thin layers of wood ashes and sawdust, and shredded, uncolored paper products, such as towels, napkins, brown bags, and newspaper.
- Avoid adding seriously diseased material such as rust on roses.

those recycled through the vegetative matter. When you add compost to your soil, you add life to it, as well as many mineral nutrients.

To make compost, you simply arrange different organic materials in layers to encourage quick decomposition.

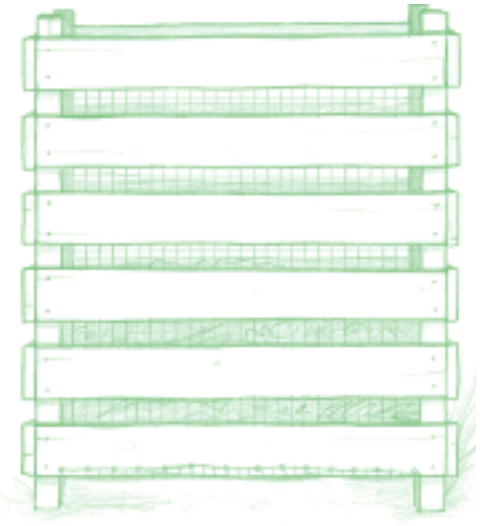
- The first layer comprises 10 or 12 cm of the material being disposed. This is best placed in direct contact with the ground to allow soil organisms to work their way up into it.
- The second layer requires some type of high-protein material, such as four cm of manure, fresh grass clippings, or a sprinkling of fishmeal, bloodmeal, or a thin layer of dried manure.
- The third layer is two cm of rich earth or completed compost, topped with a light dusting of dolomite limestone. The lime will deter wildlife visitors, especially rodents.
- Continue the layering, keeping the pile loosely covered with black plastic to retain moisture.
- To further prevent wildlife being attracted to your compost, keep a layer of soil on top, and weight the covering with bricks. Line the sides of the box with galvanized wire mesh.
- Air circulation is required, so it is important to have openings on the sides.
- The compost is ready when it is dark and crumbly, bearing no resemblance to the original materials. It will have a fresh earthy fragrance.

Ground Beetle

Earthworm composting systems are available that convert kitchen wastes in a small container on a porch or in a garage. Most garden centres can provide information on these small composters.

Compost can be worked into the soil at planting time, added as a mulch at any time, and included in all planting holes.

Soils rich in compost and covered with a mulch will remain soft and fluffy as the activity of earthworms and other soil inhabitants cycle the vegetative material deep into the soil. The mulch protection retains moisture and insulates these living soil processors from heat and cold, enabling them to go about their activities for much of the year.



A build-your-own compost bin design

Designing Your Naturescape Wildlife Habitat

Landscaping for wildlife is more than simply adding plants with berries. You must also consider other aspects of the environment such as water, soil, climate, and sun, and understand how these work together to support a living community.

Keeping in mind the requirements of food, water, shelter, diversity, layering, edges, and indigenous plants, evaluate your existing yard and prepare a plan.

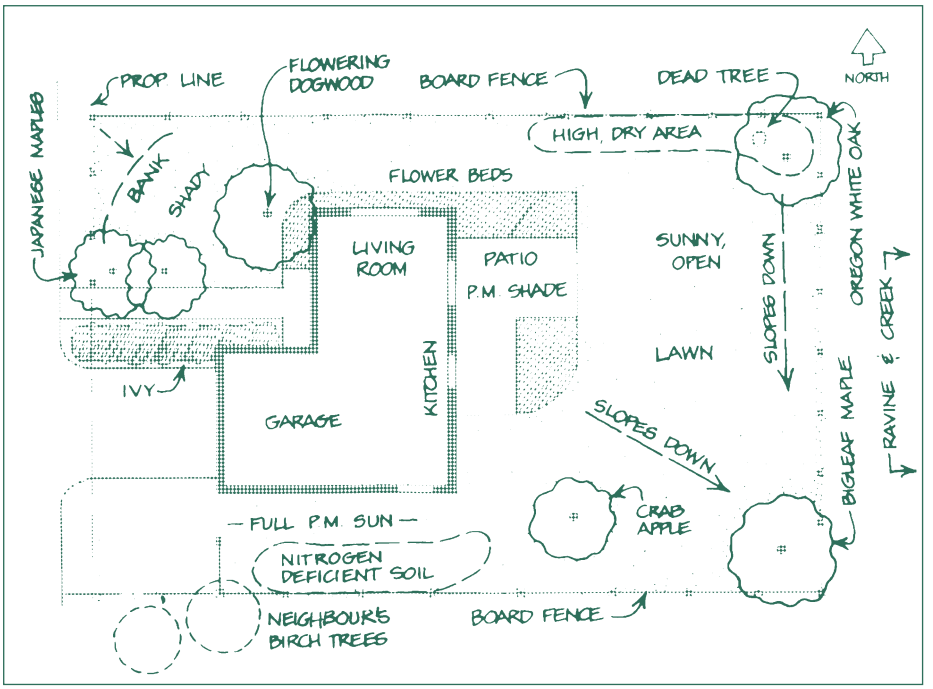
Don't feel intimidated if this is your first landscape design. Most people underestimate their design skills. And what you do not know, you can learn.

A site plan establishes priorities and guides the development of your wildlife habitat over the years. Many of us design by trial and error, like moving furniture when trying to find just the right arrangement for the living room. Trees are harder to move, however, and a plan will prevent costly mistakes and wasted time. Planning also helps to identify ecological relationships in your yard that might not be obvious at first.

How to Inventory and Map Your Existing Garden

Preparing a base map will help you evaluate your yard and design your habitat site plan. You will be adding different ideas and possibilities to your base map, so make several photocopies. The following steps will help you map your own property.

- Determine the dimensions of your property. Choose a scale for your map — how big you want the map to be and how much detail you want to show. A map drawn at a scale where one centimetre on paper equals one metre on the property will be larger and show more of the small features than a map drawn at a scale where one centimetre equals two metres. Mark the scale and a north-pointing arrow on your map.



A base map and inventory of existing conditions

Your base map will be easier to make and read if you use grid paper, a ruler or architect's scale, coloured pencils and markers of varying widths, and templates for drawing circles, squares, and other shapes.

- On your base map, indicate dimensions and show the location of your house and other buildings, including outside doors and windows, decks, patios, sidewalks, driveways, utilities, and other structures listed on the Inventory Checklist (page 38). Show underground pipes, sprinklers, utilities, etc.
- Show locations and approximate spread of existing trees, shrubs, lawn, and other vegetation features. Note any plants that affect energy conservation and

comfort in your home (summer shade, winter sun, shelter from wind, etc.). Show any diseased or problem plants.

- Mark the locations of special wildlife features. These include tree cavities, nesting areas, favourite perches, drinking and feeding areas, and travel corridors.
- Outline areas of full sun and full shade. Record drainage patterns, wet areas (maybe this is where you could put a pond or bog garden), ponds and streams, slopes, and wind patterns.
- Show neighbouring trees, buildings, roads, and other features on adjacent property that affect your yard.
- Examine your soil and note areas where soils may be different.
- Show existing grades, including any areas of steep slope, and the direction of existing drainage.

Evaluating Existing Conditions

Once you have made an inventory you can evaluate its present and potential effectiveness as wildlife habitat. As you think about your design, look at your yard as a potential home for both you and wildlife.

Inventory Checklist

The following features should be considered when designing your wildlife habitat garden. Mark the location of existing items on your base map.

A. Structures and hard surfaces

_____ House and other buildings
  _____ Doors and windows, especially those with views
  _____ Porches/ decks, patios
_____ Sidewalks, driveways, paths
_____ Overhead and underground utilities
_____ Fences
_____ Children's play areas and play structures

B. Vegetation

_____ Existing trees and shrubs; note spread
_____ Lawn areas
_____ Garden area
_____ Trellis/arbor
_____ Flower boxes and beds

C. Wildlife features

_____ Burrows
_____ Tree cavities
_____ Dead or partly dead trees (snags)
_____ Nesting areas
_____ Perching areas
_____ Drinking/feeding areas
_____ Refuge areas
_____ Travel corridors
_____ Existing bird feeders, bird baths, bird houses
_____ Hazards to wildlife

D. Environmental conditions

_____ Sunny areas, shaded areas
_____ Wet areas, dry areas
_____ Streams, ponds, and wetlands
_____ Slopes
_____ Prevailing winds, summer and winter
_____ Source of noise

E. Adjacent conditions

_____ Neighbouring trees
_____ Neighbouring buildings, roadways

F. Soil conditions (optional)

_____ Soil composition
_____ Acidity
_____ Nutrients

Note: Test each area that may have different soil conditions.

A useful tool for evaluating your yard is a bubble diagram — a preliminary sketch drawn on photocopies of the base map. Sketch only broad areas of interest and potential. Avoid details, which will probably change later anyway. Draw circles around areas as if they were "blobs" of space, ignoring details of shape. Use heavy arrows to show views and heavy lines to show "walls" of vegetation or structures.

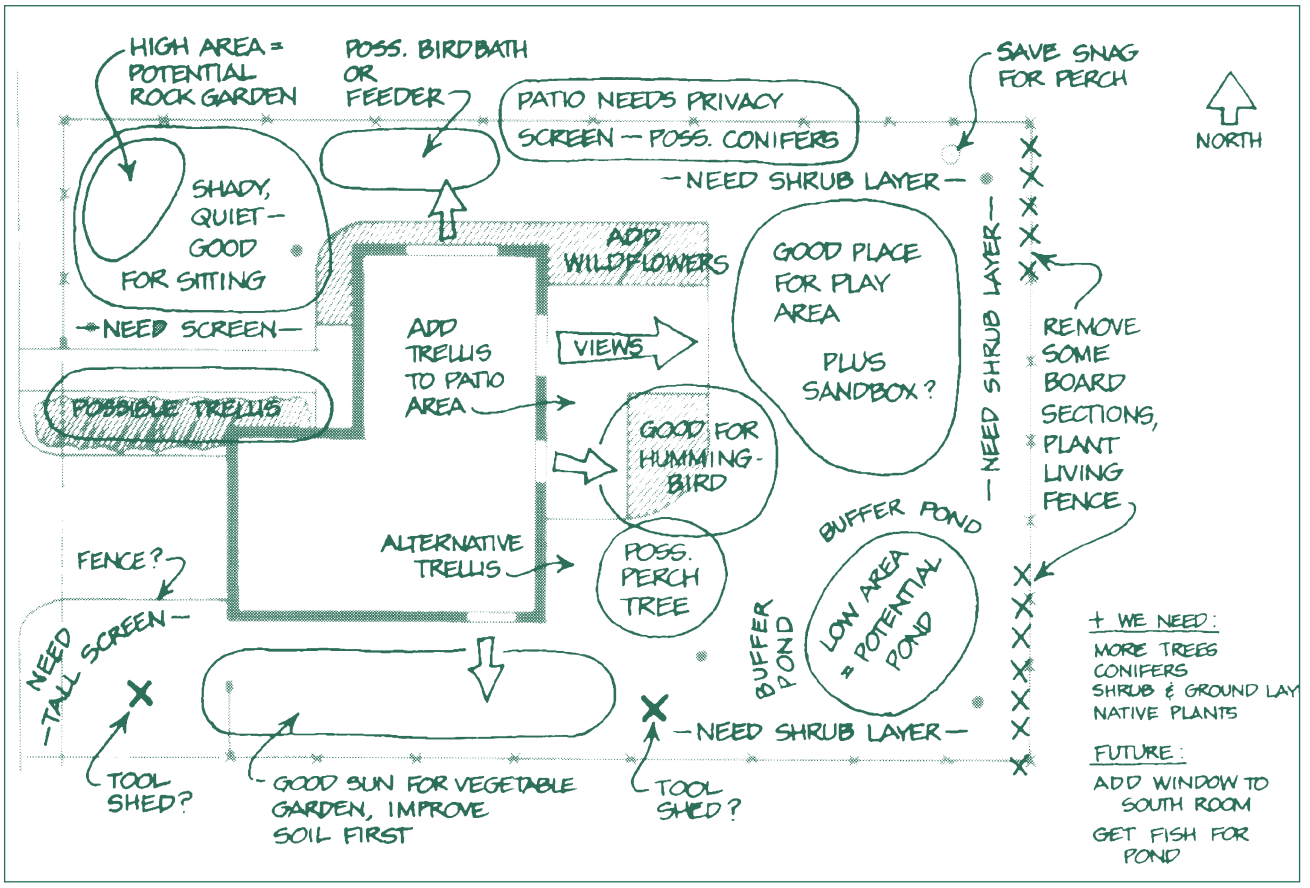
The following questions, arranged by category, will help you evaluate your yard.

Structures, hard surfaces, and people areas

What are your space requirements for access, entertainment, outdoor play, storage, and security? What areas are unsuitable for attracting wildlife because of too much disturbance? Where might tree roots interfere with septic or sewer systems? Will mature tree branches interfere with utility lines?

Vegetation

Does your present landscape provide food, cover, and safe travel corridors for wildlife? How many of your plants are native to your area? Are there unused lawn areas that could be replanted with native trees and shrubs? What areas have low diversity and need a shrub layer or better mix of plants? Where can edges be increased by modifying planting borders? Are there solitary trees that could have shrubs and groundcover put under them? Where would a screen of plantings improve outdoor privacy? Could a portion of a vegetable garden be "given" to wildlife? Where are the most important wildlife trees? Where could you plant specialty gardens for hummingbirds and butterflies?



Evaluate existing conditions and future possibilities

Wildlife features

Are there places where wildlife concentrates now? How could these be improved or preserved and maintained? Are there dead trees or limbs that can be safely preserved for perching or nesting? If a tree must be removed, could you leave a three or four metre stump? Where are good spots for a feeder, a bird house, a bird bath? Do you have a corner where you could build a brush or rock pile for ground-dwelling wildlife?

Environmental conditions

Where are the sun and shade areas? Do you need shade from the hot summer sun, and do you need to preserve valuable winter solar radiation? Where do cool summer breezes come from, and where might you want buffers from cold winter winds? Could steep slopes be enhanced for wildlife with a rock outcrop? Would a low, wet area be a good place for a pond? Does an existing stream or pond have adequate shrub cover?

Adjacent conditions

Will a neighbouring building shade your planned vegetable garden? Will a busy road pose a danger to any animals you want to attract? Will your new pond kill the roots of a neighbouring tree? Will your neighbours cooperate in your landscaping efforts, or do they plan to clear vegetation? Will your habitat cause any problems for a neighbour?

Soil conditions

Are there problem soils (e.g., infertile, water-logged)? Could you use those problem conditions to create special habitats? Can soils be modified with organic matter or minerals?

Visual/spatial qualities

Where are the desirable and undesirable views from different parts of the yard, deck, or windows? How can these be saved or changed with plantings? What are your outdoor spaces like — open/enclosed, small/large, varied/uniform, formal/natural, smooth/rough, colourful/plain, comfortable/uncomfortable? What feelings does your yard inspire and what feelings do you want? How could different plantings enhance these feelings? Have you created spaces, which have a unified feeling within themselves, and which are not overly cluttered. Example: The serenity of a patio that is enclosed by vegetation, surfaced with antique brick, and enhanced by terra cotta or wooden planters, differs from the mood evoked by an open area with concrete surfaces and bright accessories.

Functions/activities

How much yard work do you want to do? Where are good areas for outdoor play, entertainment, and relaxation? What are the best pathways for moving around in the yard? Where do you want outdoor privacy? Is there a bare, noisy area that would be better for a driveway or entertainment area than for wildlife habitat plantings?

Grading

How much yard space is necessary to take up slope? How steep will the slopes be? Can slope armouring or walls provide habitat? How will drainage be designed and erosion avoided?

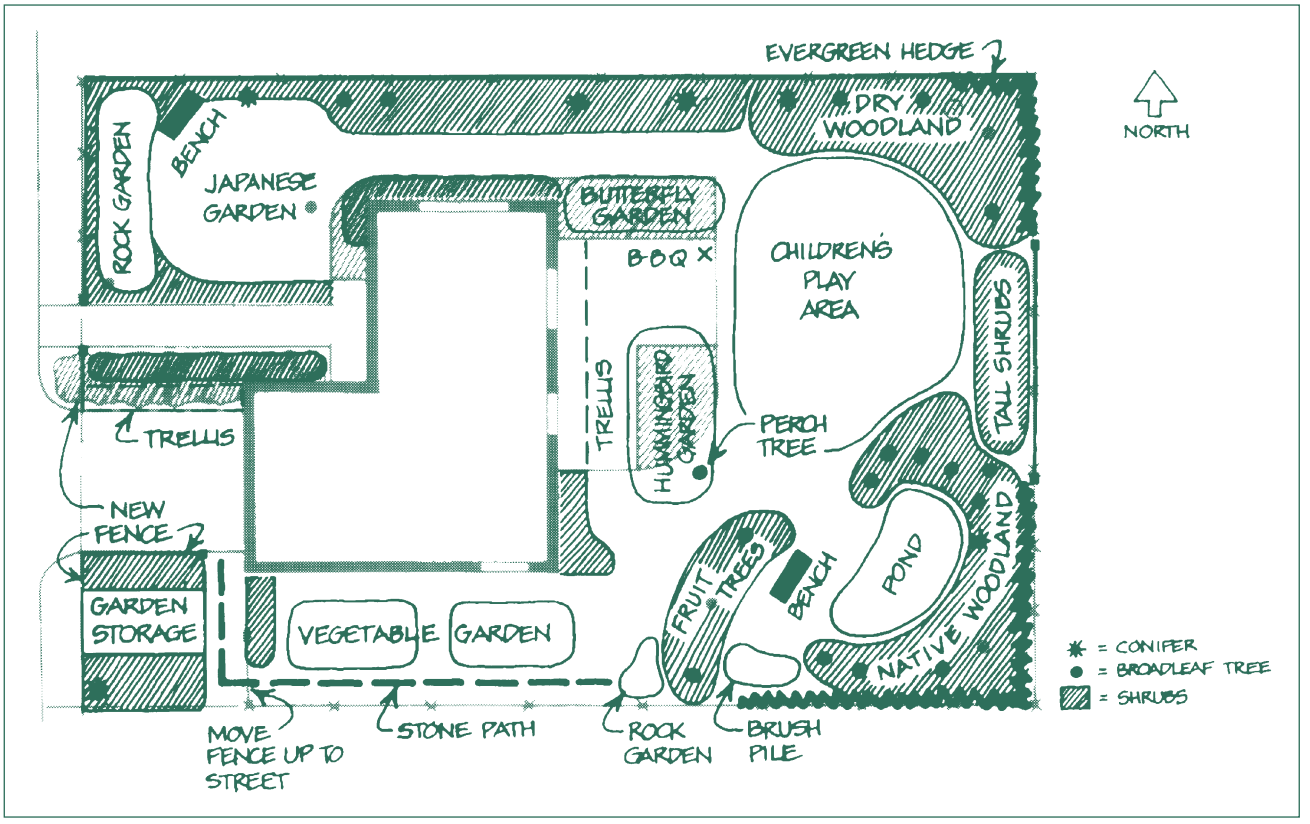
Designing a Naturescape Plan

While having the right habitat features is very important, the success of your project depends largely on how these features are related to each other. For instance, the wildlife nesting area that you created in a patch of woods is unlikely to be used if it is criss-crossed by busy paths, and few creatures will venture into your quiet viewing area if it is surrounded by a basketball court and driveway.

Design Ideas

Begin designing a site plan by drawing your ideas with bubble diagrams on photocopies of your base map. Don't worry at first about how workable your ideas are. Get them down on paper, and fine-tune later.

Decide where spaces and features will go, and experiment with reshaping, reducing, enlarging, relocating, or adding features to fit your needs and goals. Draw bubbles around areas where you want activities, such as children's play, entertainment, or wildlife viewing. Use circles, x's or other symbols for features such as a bird bath or bench. Draw arrows where you want views, dotted lines for potential pathways, and hatch marks in areas of steep slope.



Experiment with different designs using bubble diagrams. Testing ideas on paper is easier than rearranging plants in your yard

Note the general types of plants such as conifers, low deciduous shrubs, or tall evergreen hedge. Note some of your ideas and objectives, such as a low area for a potential pond, keep the view of the pond from the living room, or relocate the barbecue to the patio.

Your final plan will be more successful if you develop several bubble diagrams. You may have a Plan A that gives more space to wildlife and a Plan B that gives more space to human activities. Or, you may develop three different

plans that range from highest to lowest cost. The more experimenting you do on paper, the more likely you will avoid problems when implementing your plan. There is no one best answer; everyone's wildlife habitat will be different, and you may come up with more than one good plan for your own yard.

It is unlikely that you will implement your ideas all at once. Once on paper your design ideas will serve as a long-term plan that can be developed as time and resources allow.

Design Principles

- Maximize undisturbed areas.
- As much as possible, provide large areas without buildings, paving, or paths. Provide some "undisturbed" sanctuaries and safe travel corridors for sensitive wildlife.
- Concentrate and contain human activity areas.
- Disturbance to wildlife can be lessened if areas with busy human activity are put close together and kept as small as possible. Avoid locating busy human activities in high value, existing wildlife habitat.
- Preserve existing trees.
- Old, well-established trees, or those that form clumps, are especially valuable. Avoid putting new features or structures where they will damage existing trees. Remember that a tree's roots grow far out from its trunk, and construction too close to the roots may harm the tree.
- Provide opportunities for viewing wildlife.
- Locate and shape human activity areas, such as patios and decks, so that wildlife can be viewed from those locations. Also consider views from inside the house.
- Take note of what there is in nature.
- Nature is the best model for a healthy and valuable wildlife habitat. In nature, things are the way they are and where they are because of complex ecological relationships. Observe the arrangements of plants along a stream or pond, around a meadow, or in a forest. The number and arrangement of plants in a good "naturescape" should be similar to these natural areas.

Completing Your Plan

After your have drawn your ideas, compare these preliminary plans to see which best fits your needs and those of wildlife. Once you have decided what you want, you now need to turn your bubble diagram into a specific landscape plan. Now is the time to add the details of plant species and materials (such as types of paving or fencing), and exact locations and dimensions of these features.

The most involved task will be selecting plants for your yard (see page 43). For example, suppose you want a tall evergreen hedge for privacy. Which plants have dense foliage, grow about three metres tall, can tolerate your specific environmental conditions, and are good for wildlife? Or, for summer shade and winter sun, which plants are deciduous, grow to 10 metres or more, and offer good food for wildlife?

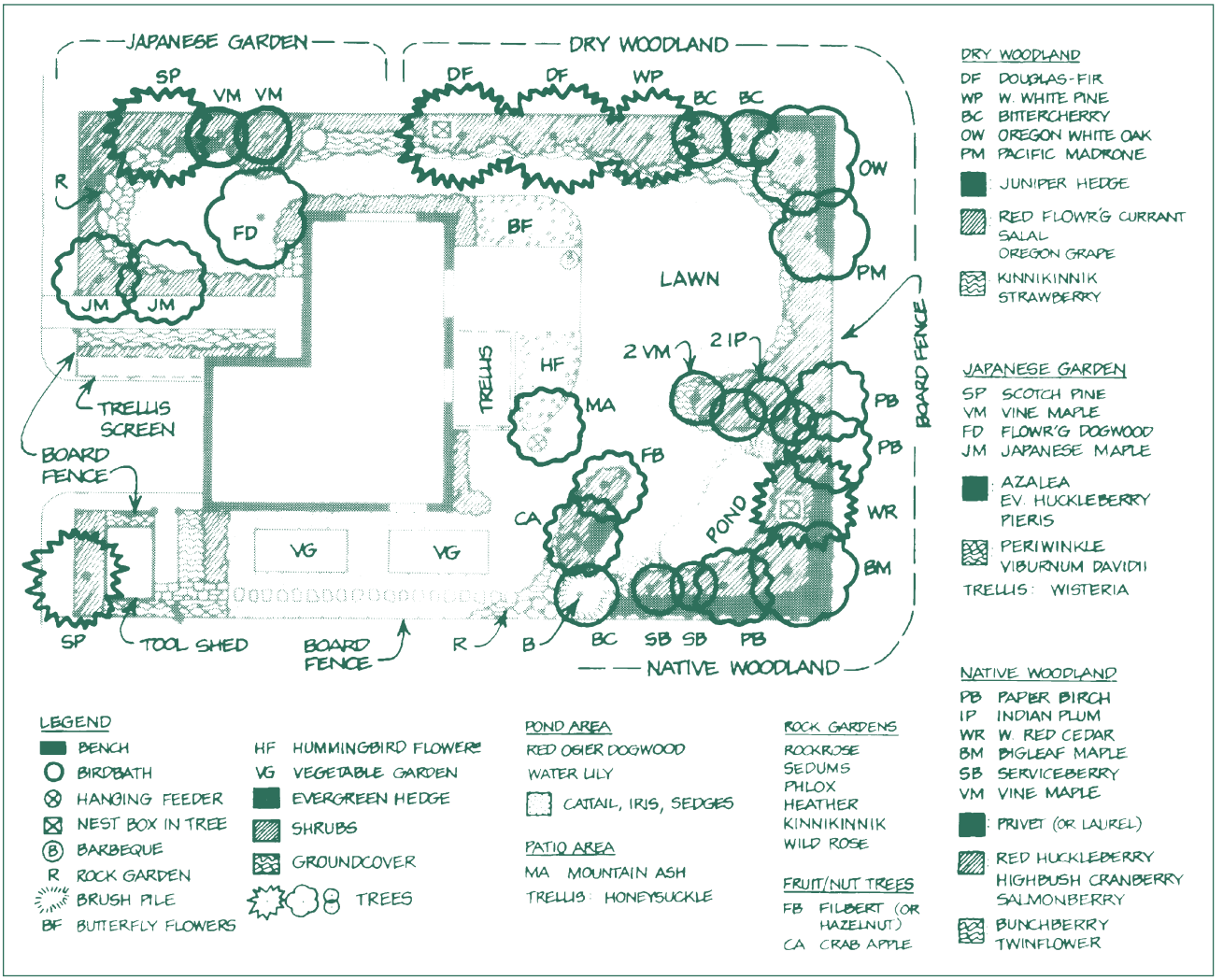
Other details also need to be added. For example, if you want a pond, you must determine how it will be lined, how it will be cleaned, and if you want recirculating

water. Details of grading and drainage must also be designed.

When all details have been worked out, draw your final plan. Accuracy is important because this is the "blueprint" that will guide your habitat construction and development over time.

Choosing Plants for Your Final Plan

- Choose plants that will provide a variety of seeds, berries, nectar (flowers), palatable foliage (for caterpillars), and good cover. Avoid sterile varieties that will not produce fruits or seeds.
- Pay attention to sun, water, and soil needs of each plant species and place them where they will best flourish. Refer to garden books and ask for advice from nurseries.

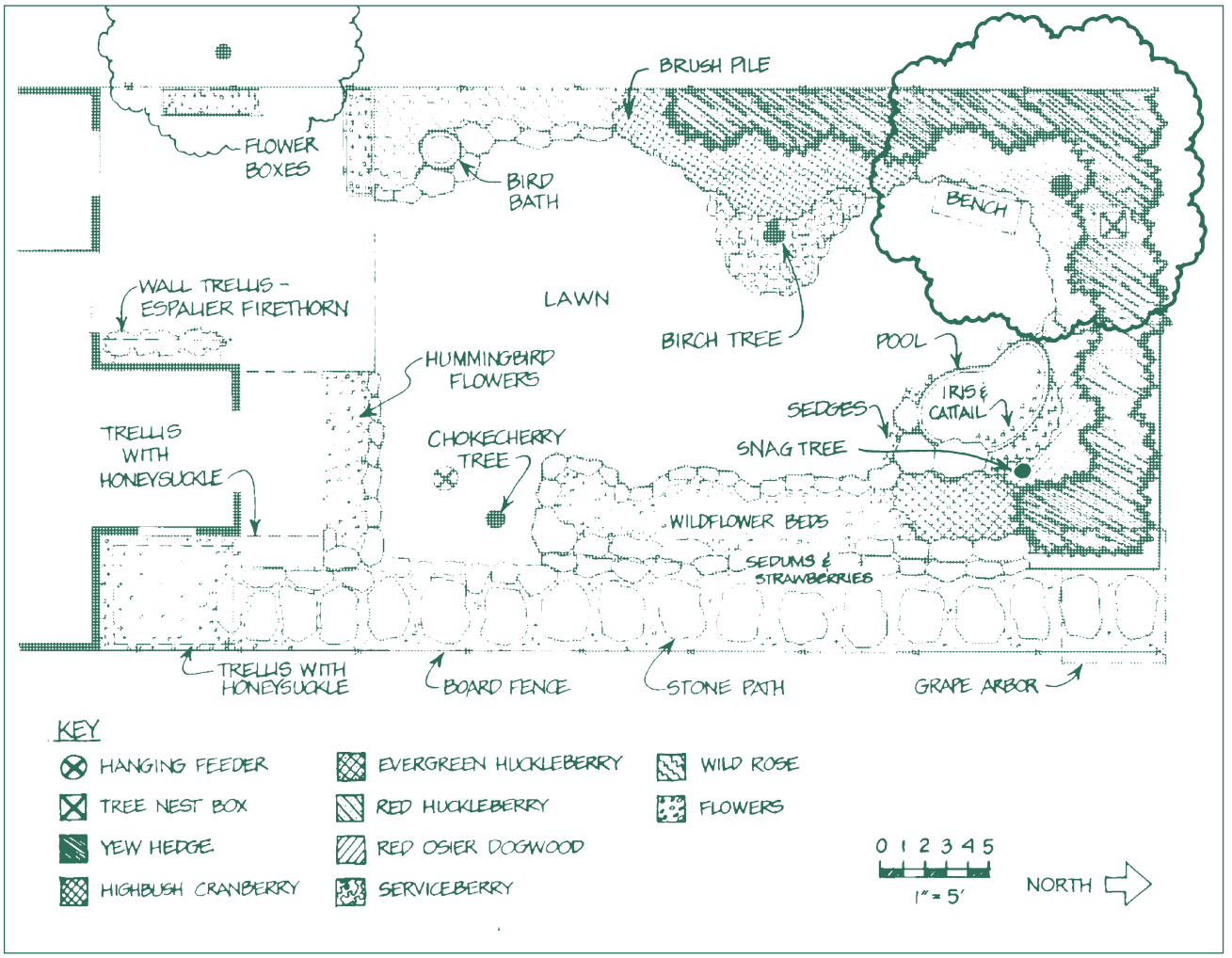


Include all the details in your final wildlife habitat landscape plan

- Consider height at maturity and other features such as fall colour, showy flowers, fragrance, or unique leaf shape. Combine for aesthetic variety.
- Keep in mind how plants save energy and add comfort by letting in winter sun, protecting from prevailing winter winds, and shading from summer heat. Evergreens give winter protection for you and wildlife, but will block the sun.

Many deciduous trees have good food for wildlife and allow in sun for winter warmth, but do not protect from winter winds.

- Note any special problems some plants might have, such as weak wood, messy fruit, peeling bark, susceptibility to disease, or invasive roots.
- You will probably find more than one plant that fits the needs of a certain spot. Cost, availability, and a personal preference for its unique features may influence your final selection.
- The best time to buy plants is spring or fall when plants are dormant. Nurseries and garden centres have their largest selections of plants in the spring.



Another idea for a Naturscape plan

Co-existing with Wildlife

The key to creating a successful wildlife habitat project is understanding wildlife behaviour, predator-prey relationships, and hazards to wildlife posed by an urban environment.

Birds and Windows: Tips to Ensure Safe Flight

When we create habitat for birds in our yards, we are likely to place the trees, plants, and supplementary feeders near the house, where we can take advantage of a nearby window for bird watching. If the window does not reflect objects that birds consider landing areas or paths of unobstructed flight, then no harm is done. But birds and reflecting windows are a hazardous combination.

Birds fly from one landing spot to another. As a bird nears its destination, it looks for a suitable place to land. The normal landing spots for birds are tree branches, fence posts, wires, bird feeders, and roofs.

Minimizing urban hazards

- Take care when locating bird feeders near windows. A seed feeder hung on a tree branch that is clearly reflected by a window can pose a serious hazard. Unless you break up the reflection, birds flying to and from the feeder may confuse the reflected branch with a real one, attempt a landing, and strike the window. Set window feeders within one metre of the glass to prevent collisions.
- Raccoons, skunks, and herons prey on amphibians. If these animals live near you, design protection into your pond before you build it
- Domestic cats prey on birds, butterflies, reptiles, and amphibians. If neighbourhood cats frequent your yard, you will have to devise ways to stop their access.

Most of these destinations, especially trees and hanging bird feeders, may be clearly reflected in patio doors and large windows. Under certain lighting conditions, even small windows may reflect a strong likeness of the world outside. Unless the reflection is broken up, a bird may easily confuse the reflected image with the real object, and fly into the glass.

The injuries vary from a momentary stunning to fatal injuries or outright death. Even if a bird is only stunned, it is highly vulnerable to predation until it regains complete awareness of its surroundings.

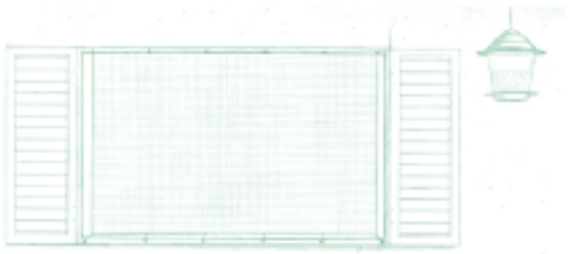
Whether you live in a house, or apartment building, if a tree or other perchable object is reflected in your windows, consider some way of breaking up the reflections. One solution is patterns placed 10 cm apart on the glass. If you are away from the house during the day, simply closing the curtains may be an option. Keep drapes or sheer curtains drawn at corner windows, where windows exist on both sides of the corner, to dissuade birds from pursuing an apparent short cut. Attaching falcon or hawk silhouettes or some other window adornment also breaks up reflections.

The best results with silhouettes are obtained by attaching more than one per window. Experiment with placement to see what works best for your particular situation. Check effectiveness by viewing the windows from the outside in different weather conditions, different angles of the sun, and during different seasons of the year, and note areas where adjustments are needed.

If you find that silhouettes block your favourite window views, there is a very effective alternative. Stretch fine netting over the entire window and attach it to the outside frame. The netting acts like a trampoline, softening the force of impact. It does require maintenance, however, mainly the removal of leaves and twigs. You can also use

Reflecting windows are dangerous for birds

Silhouettes on windows help break up reflections



Fine netting stretched over a window provides a trompoline-like surface

A pivoting silhouette strung between a window and a nearby tree

two cm mesh plastic screening hung from the top of a window frame on the outside to break up reflections, and prevent birds from flying in through open windows or doors.

A pivoting silhouette of a hawk or falcon is an excellent device for preventing bird strikes at large picture windows. Construct it from thin sheet metal, aluminum, or corrugated plastic poster board. Black or other dark colours work best.

Suspend the silhouette in a downward position with nylon string fastened to each wing tip. Attach one string to the house and the other to a fence post, tree trunk, shrub, or some other object. Place the silhouette closer to the window than the tree so as not to discourage the birds from using the tree.

The goal is to locate the silhouette between any potential perch and the window, thus obstructing the bird's flight path into the window. Any slight breeze will cause the silhouette to move, which will further deter the birds from coming near the window. If you prefer, try using some nylon lines or streamers in place of the silhouette.

Apartment towers fitted with large windows or clad with reflective materials encourage birds to crash into a huge false sky. Unfortunately, you can do little to make the building as a whole safer, but you can make sure your own windows do not produce dangerous reflections. If your windows reflect trees, use silhouettes to keep birds clear.

Birds migrating at night are attracted to lights shining from tall structures or buildings located at high elevations. Disoriented and confused, many circle until they drop from exhaustion; some crash into windows. The phenomenon is called "fatal light attraction." The problem is worse when the weather is foggy, cloudy, or rainy. If you live in a mountainside home or apartment tower, draw the drapes in lighted rooms. Encourage neighbours to do the same. Ask building management to inform all tenants how to reduce the injuries and deaths caused by fatal light attraction.

Predation on Wildlife by Domestic Cats

Many cat owners are unaware that their pets pose a major threat to wildlife in both urban and rural areas. Cats prey upon migratory and resident songbirds and wild bird populations. They also hunt other native species such as butterflies, snakes, lizards, amphibians, and especially small mammals. A significant percentage of the wildlife admitted to rehabilitation centres suffer from injuries inflicted by domestic cats.

If neighbourhood cats hunt in your wildlife habitat, talk with their owners. Explain your concerns and suggest that they keep their cats indoors. Indoor living is actually much safer because it protects cats from the dangers of traffic, diseases, parasites, and predation by larger, wild animals. If this suggestion is rejected, recommend an enclosed outdoor run as an alternative. A secure, attractive run would ensure the safety of the cat and wildlife. As a last resort, ask owners if they would at least consider attaching a bell collar. Two bells jangling

together make it more difficult for the cat to hunt undetected.

You can take measures of your own to keep cats away from your wildlife habitat. Mark restricted areas with a scent repellent. Water sprayed from a bottle, squirt gun, or hose will also deter, but not injure, cats. Be persistent; it may take some time to modify a cat's behaviour.

Domestic cats threaten wildlife

- Hunting by domestic cats is an instinctive behaviour that cannot be modified through training. Even de-clawed cats can still hunt and kill wildlife. Owners have two solutions: keep their cats indoors or confined to an outdoor enclosure. Many dog owners build runs for their dogs to allow them the pleasure of outdoor living. Cat owners can adopt the same approach.
- Cats are not a part of the natural ecosystem; they are predators introduced and maintained by humans. Populations of natural predators are kept in balance by a variety of factors, but the number of cats continues to grow unchecked in both urban and rural areas.
- Domestic cats are fed by their owners and do not need to hunt to survive. They tend to be non-selective predators that kill the strong and healthy as well as the weak and injured.

Managing Habitat Conflicts Between You and Wildlife

To have natural habitat is to have wildlife. Caring for wildlife habitat at home obliges you to respect the needs of wildlife attracted to your habitat and to understand their behaviour, especially their seasonal activities.

Urbanization and the expansion of housing developments in rural areas destroys and fragments more and more natural habitat each year. When habitat suffers great changes in aspect and size, some species adapt; others do not. Woodpeckers, for example, have difficulty finding a niche in the urbanized landscape; their numbers have therefore fallen in direct relation to the decline in habitat. Other species, like House Finches, have found new ways to satisfy their basic needs.

When humans and wildlife share the same habitat, the probability of conflict grows stronger. When a creature raids our garbage cans, or attacks our pets, or builds a home under the porch, we label it a "pest" or a "nuisance." This label is unfair. The animal is merely attempting to survive in an area where its kind has lived for hundreds, perhaps thousands, of years.

Wildlife, which have adapted to and live in urban environments, have to seek out food and shelter, supplemental to what's available naturally, from un-natural, urban and rural sources. For example, birds and squirrels are attracted to seed feeders. Raccoons and skunks are attracted to food sources such as vegetable gardens, the family pet's outdoor food dish, garbage cans, and compost piles. These animals are unaware that their rummaging through your garbage cans to forage for food creates a mess and extra clean-up work for you.

An animal has a number of locations where it forages for food as well as new areas it will explore for possible food sources. The animal's foraging patterns may change with the seasons. That same animal also has a number of hiding places and, if possible, more than one potential nesting or denning site within the boundaries of its territory, whether that territory is in natural or urbanized habitat.

The larger species of urban and rural wildlife find what they hope will be safe hiding places and denning sites under porches and garden sheds (e.g. skunks) and in chimneys, attics, and old, unused garages (e.g. raccoons). These artificial dens substitute for hollow logs and hollow trees, which they would use in their natural habitat. Smaller species, such as deer mice, will take up residence in garden sheds or within walls of houses if they can find an entranceway. Bats will favour attics for roosting and rearing their young. All they need is a dime-sized hole for entry.

A roof in need of repair offers an attractive den site to animals

A hole under a porch is a potential den site

Although these, and other animals, have learned to adapt to our neighbourhoods, we must remember that they are wild. Restoring natural habitat to residential areas will, over time, provide more and more natural sources of food, shelter, and nesting sites and diminish the conflicts between humans and wildlife.

The more you know about the animals living in your wildlife habitat, the easier you will be able to devise ways of co-existing. Notes on natural history of wildlife indigenous to your area are provided in the accompanying booklets. Separate booklets are available for major ecoprovinces in British Columbia. More detailed information is available in books listed in the resource booklets. Your own observations of wildlife in your yard and neighbourhood will increase your awareness of the seasonal and life cycles of various species.

Adopting a preventive measures approach is the key to living in harmony with wildlife. Animals use their own versions of a road network — complete with horizontal and vertical routes and connecting intersections — for travelling from one place to another. By enhancing these networks you make it easier for animals to travel safely. You also want to minimize wildlife access to your house through periodic repairs and maintenance.

Squirrels travel the telephone wires along lanes and jump from those to tree branches. From the branch, they move down the tree trunk to ground level to forage for food. From the ground they may climb a fence, run along the tops of the pickets or along a horizontal railing, back to the tree or a hydro pole and end up back on the overhead telephone wires.

Raccoons climb trees, can move along from branch to branch, and can jump short distances if necessary. So beware of leaving your roof unrepaired. A raccoon, travelling via an overhanging branch, might take up residence in a convenient opening. A likely tenant is a female raccoon searching for a denning site.

By eliminating those connections in the wildlife travel network which lead to your habitat or house, or any other part of your property where you do not want to run into habitat use conflict, you effectively minimize the chance of conflict. Trim a tree branch or remove stacked firewood at the side of your house to make your roof inaccessible. Ensure that no spaces or gaps that animals could further excavate and use as a den develop under your veranda or sun porch.

A natural home for wildlife

Other than the supplementary feeding of birds through the placement of seed and suet feeders in your yard, it is best to let animals find their own, more natural food sources. Providing natural habitat will help a lot.

If you live near natural habitat for bears or cougars, it is even more important to remove artificial sources of food and to practice proper composting to make your yard less attractive.

Keep pet food dishes inside or leave them outside only while your pet is feeding. Do not leave pet food dishes outside overnight. Add lime to your compost to deter rodents. Securely fasten your garbage can lids to prevent wildlife from being able to rummage. Clean up below bird feeders on a regular basis to avoid attracting mice or rats. Wherever possible, eliminate rodent access to bird feeders.

For obvious health reasons, most municipalities have rodent control by-laws that prohibit people from creating or allowing conditions that encourage rodent activity on their property. To assist the natural control of rodents, provide some elements of habitat for owls. For example, a prominent limb in a large tree serves as a perch from which the Great-horned Owl, Barred Owl, or Northern Saw-whet Owl can hunt for rodents.

If you find wildlife droppings in your yard, wear gloves, or place your hand inside a plastic bag and pick them up. Turn the bag inside out to enclose the droppings and discard in your garbage. Use the same precautions when removing domestic animal droppings.

Keep your pet indoors at night, and under close supervision during its daytime outdoor activities. This helps ensure your pet's safety from predation by wildlife.

Wildlife travel routes that connect to your yard may invite unwanted wildlife residents

Sometimes, despite your best efforts, human-wildlife habitat conflicts do arise and you have no choice but to encourage animals to find alternative hiding places and nesting sites. If food is plentiful and accessible denning remains in or below residential structures, live-trapping an animal and having it removed just creates a void or vacant territory quickly filled by another animal also seeking food and shelter.

If an animal has denned in your garage roof, or under your garden shed, and is raising young, it is best to exercise patience and live with the situation until the young are old enough to join their mother on foraging trips (approximately eight weeks for raccoons and skunks). At that time deterrents can be used to discourage the mother and young from returning to the den site. And, who knows, you may find you don't mind the occasional wildlife family being raised under your garden shed or in the attic of a garage you no longer use.

Animals, especially nocturnal wildlife, dislike strong smells, loud noises, or bright lights. Deterrents, such as moth balls, hot pepper sauces, bleach, and motion-activated security floodlights, can be used singly, or in combination, to discourage animals from attics or under verandas. Once you are absolutely certain the family has not returned to the den site, close in the access point.

Where animals have entered through a gap between the ground and a near-ground sundeck, place galvanized steel screen in an "L" configuration. Leave an opening for the animals to exit and cover with window screen. Monitor it frequently. Once the screen has been torn open, and you are certain no animals remain inside, secure the remaining opening with metal mesh.

Live-trapping and relocation should be considered only as a last resort because it puts the released animal at a great disadvantage. A high percentage of relocated animals die in their new location. Disoriented by unfamiliar habitat, they have trouble finding the safest shelter or the best places to forage for food and water. Relocated animals must compete with resident animals of the same species who know the territory well. Wildlife raised in urban or rural residential settings have learned urban or

Wildlife travel routes that connect to your house may invite unwanted wildlife residents

Ways to make your chimney, roof, and attic less attractive to animals:

- Cap all unused chimneys.
- Repair damaged soffits and cover with light-weight screening.
- Fasten all loose shingles.
- Repair areas of rotted roof — even very small openings are an invitation to wildlife.
- Cover open air vents with wire mesh.

Apply the same procedure to your garage or other structures.

rural habitat survival skills from their mothers — they are ill-prepared to fend for themselves in the wild. Live-trapping and relocation can also spread disease from one area to another.

If live-trapping is necessary, a more humane alternative to a release in the wild is having the animal euthanised by a veterinarian or animal control agency. If the animal has young, these must be trapped and euthanised as well.

If you hire a professional wildlife removal company, make sure they intend to monitor traps frequently and remove the animals in a suitable way. Ask whether the animals will be relocated or euthanised. Relocation is not usually recommended unless the animals will be released near the area where they were trapped.

Rather than live-trapping and relocating, consider providing alternate hiding places or den sites in your wildlife habitat. A carefully placed hollow log, plant cover around a hollow stump, or a nest box in a tall tree, or above an infrequently used shed or garage, provide good shelter, especially in a relatively undisturbed area of your yard. These sites give the animal an alternative retreat once you convince it to give up the human portion of your habitat.

There are many ways to manage habitat conflicts so that both you and wildlife benefit. Call a local rehabilitation organization or humane society for more information.

One way to secure your garbage cans.

Deer In the Wildlife Habitat Garden

Co-existing with deer in British Columbia can be particularly challenging to the wildlife habitat gardener in rural areas:

- Regular applications of bloodmeal may deer from certain areas of your yard.
- In some locations, deer seem to ignore some native plants such as monkshood, pearly everlasting, columbine, foxglove, certain poppy varieties, and several rose species, to name a few.
- The presence of dogs often keeps deer away.
- Tall, deer-proof fences can exclude deer from valuable fruit trees, vegetable gardens and flower beds.

The Naturescape Land Ethic

A land ethic is a set of principles that governs stewardship of the land. The following principles comprise the Naturescape land ethic:

- Respect your neighbours' viewpoint. Keep your outdoor space neat and tidy. Explain why you are caring for wildlife habitat at home. Describe its benefits to the neighbourhood, community, and beyond.
- Make sure that the plants you select are suitable for your site. Include a variety of plants capable of providing food for wildlife throughout the seasons. Avoid the use of any substance harmful to wildlife and soil organisms.
- Care for and co-exist with the species you have attracted to your property. Respect all wild things and provide for their basic needs.
- Enrich your environment by recycling and composting. Use natural fertilizers and mulches to nurture the soil.
- Make learning about the natural world a lifelong practice. There is much to marvel at and much to be thankful for. Recognize that we, too, are part of the web of life, and what we do to it, we ultimately do to ourselves.

Restoration of wildlife habitat happens gradually, one yard at a time. Each private outdoor space is unique, each is important, and each is potentially part of a much larger network of private and public green spaces.

People working together are stronger than people working alone. Many organizations — local naturalist groups, garden clubs, residents' associations, and youth organizations — are already working on neighbourhood or community wildlife habitat projects. Join up and contribute your energy and skill. Or form your own group to accomplish an overlooked but important project. Present ideas to local councils. Help create public demonstration wildlife habitat gardens. Encourage local governments to promote natural habitat on public grounds and parks.

Your participation in Naturescape British Columbia marks the beginning of a voyage of adventure and discovery. You are among thousands of travellers determined to make a big difference with a little space. Enjoy the voyage.

References

Sincere thanks to the following organizations, in alphabetical order, who very kindly consented to the generous use of information contained in their publications in the development of the Naturescape kits:

Backyard Habitat Program, City of Abbotsford, for information on general wildlife habitat.

Bat Conservation International, Inc., PO Box 162603, Austin, Texas, USA, 78716 (Toll-free phone number: 1-800-538-BATS), for information on bats or www.batcon.org.

Canadian Federation of Humane Societies, 102-30 Concourse Gate, Nepean, Ontario, K2E 7V7, for information on living with wildlife or www.cfhs.ca.

Canadian Nature Federation, 520 - 1 Nicholas Street, Ottawa, Ontario, K1N 7B7, for information on backyard wildlife habitat or www.cnf.ca.

Canadian Wildlife Federation, 2740 Queensview, Ottawa, Ontario, K2B 1A2, for information on backyard wildlife habitat.

FLAP or Fatal Light Awareness Program, 1 Guelph Road, Erin, Ontario, N0B 1T0, for information on light and window hazards to birds in urban areas or www.flap.org.

Greater Vancouver Regional District, Water Planning & Operations, 4330 Kingsway, Burnaby, B.C. V5H 4G8, for information on water conservation or www.gvrd.bc.ca.

Ministry of Agriculture, Fisheries and Food, for information on beneficial insects.

Progressive Animal Welfare Society (PAWS), 15305 44th Avenue West, Box 1037, Lynnwood, Washington, 98046, for information on domestic cats and wildlife.

Washington Department of Fish and Wildlife (Backyard Wildlife Sanctuary Program), 16018 Mill Creek Road, Mill Creek, Washington, 98012, for information on backyard wildlife habitat.

Further Information

This Provincial Guide is only one component of your Naturescape British Columbia kit. Two important complementary works are the Native Plant and Animal Booklet and the Resource Booklet. The latter publication contains resources and services, plus an extensive list of references on the concepts described in this guide. Additional references may be available at libraries, and through local naturalist and garden clubs.

Photo credits:

Front cover

American Robin (Victoria), Mark Nyhof

Back cover

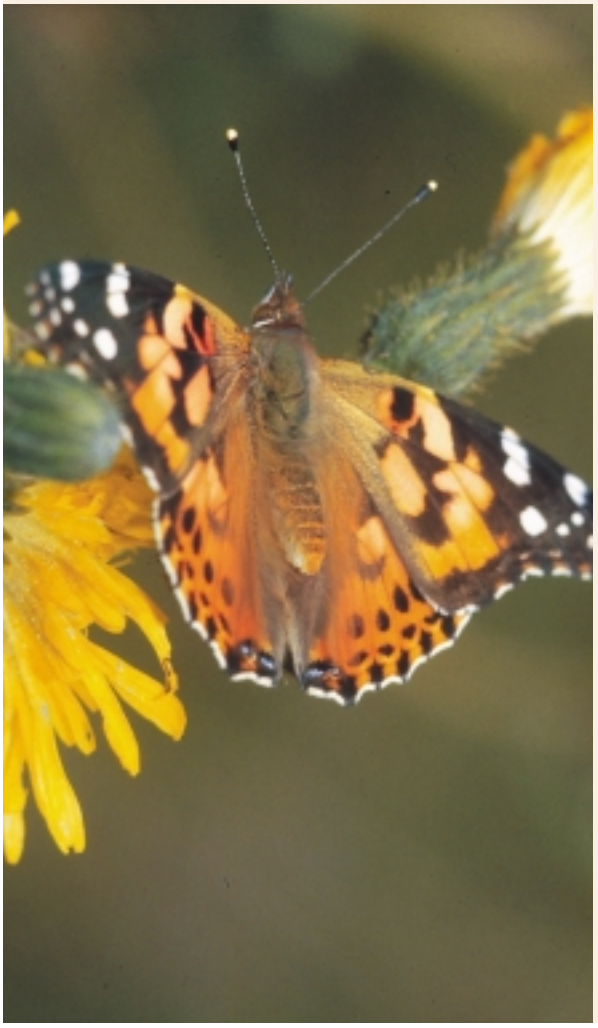
Chipmunk (Oliver), Mark Nyhof

Cotton Grass, (Alaska Highway), R.S Silver

Shooting Stars, (Sparwood), Mike Stanlake

Backyard Pond, (Abbotsford), Ervio Sian

Painted Lady, Wildlife Branch



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