



Cottonwood
Riparian
Ecosystems
of the
Southern
Interior

In British Columbia's southern interior, these biologically rich forests have been reduced to small fragments.





Why are cottonwood ecosystems at risk?

In British Columbia's dry southern interior, black cottonwood forests are found along the banks of streams and lakes where moisture is plentiful. These islands of green in an otherwise arid environment provide crucial habitat for a wide range of plant and animal species. At one time, these ecosystems were more widespread than they are today. Now, many have been completely cleared or significantly altered by human development.

The loss of these valuable forests has been the result of several factors. Settlers often cleared cottonwood forests to establish their homes and farms in these areas of rich soil, flat land, and abundant water. Even where the cottonwood forest was not completely cleared, agricultural development has had its impact. For example, intensive livestock grazing in some of these sensitive areas has resulted in damage to soil structure, removal of understory vegetation, reduction of native plant species, and the invasion of introduced plants. Today, these sites are highly desirable for urban development and for transportation corridors such as highways, railways, power lines and pipe lines.

Another key factor in the destruction of cottonwood forests has been the alteration of natural waterways. Where they are found on active floodplains, cottonwood forests rely on the natural cycle of flooding to replenish soil nutrients and maintain soil moisture. However, many streams in the southern interior have been channelled and dyked to prevent flooding. For example, most of the me-

andering length of the Okanagan River between Penticton and the U.S. border has been converted into a straight channel. Even if the adjacent land is not developed, once the flooding disturbance is lost it is only a matter of time before the cottonwoods die off and are replaced by other tree or plant species.

Waterways can be altered in more extreme ways. Some major rivers, like the upper Kootenay, have had much of their fringing cottonwood forests drowned under the reservoirs created by large dams.

What is their history?

Since the end of the last ice age, the stream courses of the southern interior have been created and recreated by the active processes of water movement. The formation and maintenance of cottonwood forests are closely related to these natural processes of flooding and disturbance. Many plants cannot cope with the saturated soils and periodic flooding that occur on river floodplains and along lakeshores.

Cottonwood forests rely on the natural cycle of flooding to replenish soil nutrients and maintain soil moisture.

The seeds take root in exposed moist mineral soil and the seedlings, once established, grow very rapidly and soon are able to withstand the frequent flooding. As other plants are killed off by floods, cottonwood and other flood-resistant plants survive to dominate these communities.

What is their present status?

The BC Conservation Data Centre has ranked the cottonwood ecosystems of the southern interior among the rarest plant communities of the province. Already reduced to mere fragments, the remaining stands are considered endangered. In the South Okanagan and Similkameen Valleys, fewer than 500 hectares remain, 411 hectares of which is privately owned land. Undisturbed stands make up only a fraction of this total.

What are they?

Cottonwood forests are riparian ecosystems. The word "riparian" comes from the Latin "ripa" meaning bank or shore. In ecological terms, the riparian zone is the area adjacent to streams and lakes that is wet enough to develop and support vegetation distinct from that found in neighbouring freely drained upland areas.

A member of the poplar family, black cottonwood is a deciduous tree that thrives on wet sites, especially on floodplains. In these areas, cottonwoods can form extensive stands and can grow to be very impressive in size, up to 40 metres in height. Black cottonwood grows rapidly when young and forms dense stands on newly disturbed areas. Although the bark on young trees is smooth and green, as the tree ages it takes on a distinctive grey colour and becomes deeply furrowed. In the spring and early summer, a sticky resin covers the buds and new leaves. This resin has a very sweet fragrance that can waft along a valley for long distances. Cottonwoods get their name from the large number of seeds they produce, which are covered with white, fluffy hairs. When the seeds are dropped in full summer, the air is filled with clumps of cotton-like seeds floating on the wind.

Although black cottonwood may be the dominant and most conspicuous



UPLAND SPECIES SUCH AS GOPHER SNAKES ALSO DEPEND UPON COTTONWOOD ECOSYSTEMS FOR COOLING SHADE AND FOR FOOD.

tree growing on these wet sites, it is certainly not the only one. Water birch, paper birch, trembling aspen, ponderosa pine, Douglas-fir, and mountain alder may also be found in these forests. In most cases, these forests support a dense and diverse collection of understory plants, especially shrubs. In the warmest ecosystems, one finds shrubs such as common snowberry, Douglas maple, red-osier dogwood, and Nootka rose. On less hot and dry sites, the shrub layer typically contains saskatoon, tall Oregon-grape, chokecherry, Bebb's willow, black hawthorn, poison-ivy and sumac, as well as white clematis and blue clematis.

Very few herbs and grasses are found in these cottonwood forests and where they do occur they are not abundant. In drier parts of the southern interior look for showy aster, common horsetail, and star-flowered Solomon's-seal growing beneath the trees and shrubs. In other areas you may also find yarrow, Canada golden-rod, northern bedstraw, blue wildrye, and various bluegrasses.

Already reduced to mere fragments, the remaining stands are considered endangered.

While cottonwood stands are some-

times found in moist depressions, they are most well developed on floodplains where the soils are formed by the action of the river. In some areas these soils are very coarse textured, such as those made up from gravel and sand deposited by a rapidly flowing river, while in other areas the soil may be more finely textured where a slow moving stream has deposited layers of fine sand or silt. Even though the soil may be very coarsely textured, water is plentiful for most of the year in these areas.

Why are they important?

The cottonwood forests of the southern interior provide crucial habitat for a wide range of plant and animal species, especially species which are not well adapted to living in the arid

grasslands and forests which dominate this part of the province. Without these productive forests the southern interior would support far fewer plant and animal species. For species which prefer cooler and moister habitats, these lush cottonwood forests are a welcome oasis; they also provide food and cover for species which live in adjacent dry ecosystems. Black-headed Grosbeaks, Veeries, Gray Cat-birds and Red-eyed Vireos sing from the dense foliage. American Crows nest in the canopy, and have their nests taken over in subsequent springs by Long-eared or Great Horned owls.

Because cottonwoods grow quickly and die relatively young, sites include many large trees and snags (standing dead trees) which are important to a variety of wildlife species. Osprey, Bald Eagle, owls, woodpeckers, and bluebirds prefer large cottonwood trees or snags for roosting, nesting, or foraging. In landscapes where grasslands are the dominant ecosystem, cottonwood forests may be the only source of large trees and snags for several kilometres in any direction.

Cottonwood forests of the southern interior provide key habitat for a number of species which are considered to be endangered or sensitive. For example, the shrubby understory pro-

vides habitat for Yellow-breasted Chats, a species which has been placed on BC Environment's Red List (species being considered for designation as Endangered or Threatened in British Columbia). Lewis' Woodpeckers and Western Screech-owls, both on BC Environment's Blue List (species con-

Cottonwood forests provide key habitat for a number of species which are considered to be endangered or sensitive.

sidered vulnerable and/or deserving special management attention), depend upon mature cottonwoods for nesting habitat.

Four Blue-listed reptiles, the Western Rattlesnake, the Rubber Boa, the Western Yellowbellied Racer and the Gopher

Snake, may be found in cottonwood forests of the southern interior. Although we think of Western Rattlesnake habitat as hot, dry and rocky, these and other snakes come to riparian areas to forage and cool off on hot summer days. Here they feed on small mammals found in abundance in cotton wood forests.

The warm valleys of British Columbia's southern interior are home to the greatest variety and density of bats found in Canada. Although most of these species roost in caves, buildings and cliffs, many bats found in this region – including the Red-listed Western Red Bat and the Blue-listed Spotted Bat, Fringed Myotis, and Western Small-footed Myotis – forage for insects which are found in abundance over rivers and wetlands adjacent to cottonwood forests. Indeed, invertebrates such as shade-loving flies, moths and wood-boring beetles

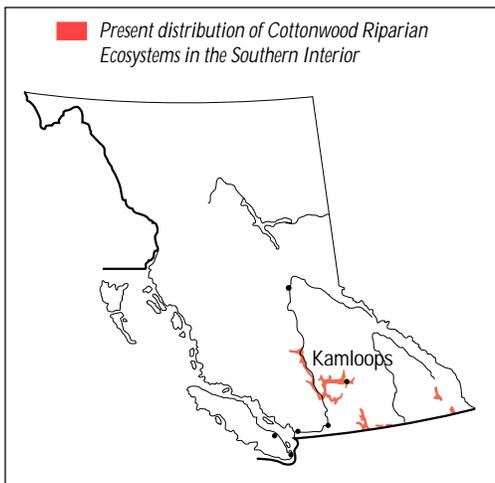
thrive in cottonwood riparian forests.

Riparian ecosystems moderate aquatic habitat in streams, lakes, and wetlands – the shade provided by riparian trees helps keep water cool during the heat of summer, often a critical factor for fish. Overhanging trees and shrubs drop leaves and twigs into the water and this organic matter becomes an important part of the food chain, feeding microorganisms and small invertebrates which are in turn consumed by larger creatures. As riparian trees die, they not only provide snags for wildlife but may eventually fall into the stream where they help create cover and pool habitat for fish and other aquatic creatures. Riparian forests protect streams in other ways as well – for example, tree roots and fallen trees help stabilize stream banks and prevent erosion and siltation of stream beds.

In British Columbia's southern interior, cottonwood ecosystems have been recognized as crucial components of protected areas because they are rare, they support a great diversity of plant and animal species, and they occur in riparian areas where they can play an important role in landscape connectivity. Intact riparian forests can connect one ecosystem with another – animals use them as travel corridors to move through the landscape.

Finally, riparian ecosystems are valuable to people. Many people use riparian areas for recreational activities – swimming, fishing, boating, camping, walking, and bird watching to name only a few.

For many thousands of years, First Nations peoples made efficient use of cottonwood riparian forests, hunting game found there and gathering a variety of plant products. Black cottonwood itself is a valued plant – the cambium (the thin layer of living cells underneath the bark) is harvested and eaten in the spring, the cottony seed fluff is used to stuff pillows, the bark is stripped and



used to make buckets and young shoots used to make sweatlodge frames. The sticky resin was used for a variety of medicinal purposes, as an ointment for cuts, and as an infusion for tuberculosis. Old or bruised cottonwood leaves were used as poultices and the young buds were used as glue and for waterproofing. Some of these methods continue to be taught and are in use today.

What can we do?

More than ever before, land managers are realizing the ecological importance of cottonwood riparian ecosystems found in the southern interior. As a first step in efforts to conserve these areas, they have been conducting research to identify locations where these ecosystems still exist, to document the plants and animals found in them, and to understand how they function and how they have been damaged by human activities. Remarkably little is known about these ecosystems and much more effort is needed to fully understand them.

Land use pressures threaten the few intact cottonwood riparian ecosystems remaining in the province's southern interior. Three strategies to protect these ecosystems are: 1) setting aside public lands as protected areas; 2) private land stewardship, 3) purchasing private land to add to protected areas; 4) eliminating or reducing environmental degradation through a variety of management techniques, such as those outlined in the Riparian Management Area Guidebook of the *Forest Practices Code*.

Fortunately, the ecology of cottonwood ecosystems makes them excellent candidates to recover from disturbance. Research in adjacent regions has shown



IN AUTUMN, THE GOLDEN FOLIAGE OF COTTONWOODS ADD COLOUR TO THE MUTED TONES OF THE SURROUNDING LANDSCAPE. *Steve Cannings photo*

that these ecosystems can quickly renew themselves once the source of degradation has been removed. In fact, this passive style of ecosystem restoration has proven to be far more successful than labour intensive techniques involving soil preparation and planting of seedlings.

Realistically, the opportunities to fully protect cottonwood ecosystems in parks or ecological reserves in the southern interior are limited. The protection of these critical ecosystems must be achieved through private land stewardship.

Private landowners are increasingly aware of the ecological importance of cottonwood forests. Controlling the entry of cattle into riparian forests, finding alternatives to dyking and channelling, and preventing further conversion of these forests to agricultural use are

ways that landowners can help maintain the cottonwood ecosystems that remain today. Wildlife values can be enhanced by retaining cottonwood snags and understory shrubs, as these features are vital to wildlife.

Many landowners are proud of their land's contribution to wildlife habitat within a fragmented landscape. They value the critical role these ecosystems play in the ecology of the southern interior. It is important that they share that sense of pride with their neighbours.

You can increase public awareness through local or provincial natural history and conservation organizations. You can support habitat acquisition by government or by agencies such as the Habitat Conservation Trust Fund and

The Nature Trust of B.C. You can support stewardship programs that offer incentives to landowners to manage their natural lands with conservation in mind. You can help municipalities develop plans and bylaws that will protect these and other sensitive ecosystems. If these rare, valuable, and increasingly threatened ecosystems are to be protected, we must act now. 



EUROPEAN BITTERSWEET IS A COLOURFUL INTRODUCED NIGHTSHADE VINE THAT INVADES RIPARIAN AREAS AND OUTCOMPETES NATIVE PLANT SPECIES. *Robert Cannings photo*



CHANNELLED, CLEARED AND DEVELOPED, THIS ONCE EXTENSIVE STAND OF COTTONWOODS HAS BEEN REDUCED TO A SMALL FRAGMENT. YET THIS FRAGMENT IS ONE OF THE BEST REMAINING COTTONWOOD STANDS IN THE SOUTH OKANAGAN.

Robert Cannings photo



DENSE THICKETS OF DECIDUOUS SHRUBS AT THE EDGES OF COTTONWOOD FOREST PROVIDE IDEAL HABITAT FOR YELLOW-BREASTED CHATS, GRAY CATBIRDS AND BLACK-HEADED GROSBEAKS.

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LEWIS' WOODPECKERS ARE DEPENDENT ON COTTONWOOD AND PONDEROSA PINE SNAGS FOR NESTING SITES.

Steve Cannings photo



STAR-FLOWERED SOLOMON'S-SEAL IS A LILY THAT IS FOUND IN MOIST SHADY WOODLANDS.

Steve Cannings photo



IN THE DRY SOUTHERN INTERIOR, WESTERN SCREECH-OWLS ARE RESTRICTED TO THE MOIST WOODLANDS ALONG STREAMS AND LAKES.

Robert Cannings photo

FOR INFORMATION ON HABITAT ACQUISITION AND STEWARDSHIP PROGRAMS, CONTACT:
Habitat Conservation Trust Fund
PO Box 9354
Stn. Provincial Government
Victoria, British Columbia V8W 9M1

The Nature Trust of British Columbia
808-100 Park Royal South
West Vancouver, British Columbia
V7T 1A2

FOR INFORMATION ON WHAT YOU CAN DO TO RESTORE, PRESERVE OR IMPROVE WILDLIFE HABITAT, CONTACT:
Naturescape British Columbia
Ministry of Environment, Lands and Parks
Parliament Buildings
Victoria, British Columbia V8V 1X4

FOR MORE INFORMATION ON COTTONWOOD-RIPARIAN ECOSYSTEMS, CONTACT:
BC Conservation Data Centre
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