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## Western Grebe

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*Low breeding numbers and threats to their nesting colonies put these birds at risk.*





## Why are Western Grebes at risk?

The Western Grebe, a large waterbird that breeds in the interior of British Columbia and winters on the coast, is at risk in this province because its specialized habitat requirements limit it to only a few nesting locations and because of human disturbance at these sites.

British Columbia has many lakes, but only a few meet the Western Grebe's nesting requirements. These include: warm water temperatures and a long ice-free period to allow the growth of appropriate aquatic vegetation for nest-building; the presence of significant populations of small, schooling fish; stable water levels; protection from wind and waves; and deep water near the nesting area for feeding. The scarcity of suitable breeding habitat in B.C. is compounded by the fact that nesting is easily disrupted by humans. The floating nests are located in shallows along the edges of lakes and are easily tipped or flooded by the wakes of passing boats. Excessive noise, human activity and shoreline development can also cause the grebes to abandon their nests. The best nesting sites are medium to large lakes in the warm Southern Interior – exactly the kinds of places favoured by people for summer recreation.

Although nesting has been recorded at about 14 locations in the province, some were not suitable for maintaining colonies. Colonies of five or more pairs are known to have existed at only five locations in B.C. and are now found at only three of those. The loss of former colonies at Swan Lake near Vernon and at Williams Lake is mainly attributed to the effects of human disturbance.

Two of the surviving nesting colonies

– in Salmon Arm Bay on Shuswap Lake, and in the north arm of Okanagan Lake – are located in areas where recreational activity is already high and development could potentially increase. The Salmon Arm colony is also at risk from the impacts of cattle grazing along the lake shore. The third remaining colony, at the Creston Valley Wildlife Management Area (CVWMA), is less susceptible to human disturbance. Nevertheless, this colony is vulnerable to storms and to water-level changes associated with downstream flood control.

Threats on the wintering grounds may include death or injury from oil spills, gill nets and pesticides, and decrease in prey availability due to over-fishing by humans and degradation of estuaries.

## What is their status?

Based on Christmas bird counts along the Pacific coast, biologists estimate that the total population of the Western Grebe is over 100 000. They have been unable to determine whether the population is increasing, decreasing or remaining stable. Nesting habitat

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has been lost in some areas, while alterations to the landscape, such as reservoir construction, have provided new habitat in others. The number of Western Grebes that nest in British Columbia is small. Our colonies have not been surveyed regularly, so we do not have accurate information about the trend in provincial abundance. We know that two former nesting colonies have been abandoned. At Williams Lake, where a colony of 5 to 35 pairs was present in the 1930s and

early 1940s, no nesting has occurred since about 1964. At Swan Lake, where about 40 pairs nested between 1950 and 1966, there has been no evidence of nesting since 1992. Breeding colonies of up to 90 pairs at Shuswap Lake, 40 pairs at Okanagan Lake and 55 pairs at CVWMA have persisted in recent years. Scattered occurrences of one or two nests at other locations have also been reported. Although a few small colonies may have gone undetected, it is unlikely that the province supports many more than 200 nesting pairs.

In fall and winter, the provincial population is swelled by migrants from breeding colonies as far east as Manitoba, and possibly from the northern United States. Christmas counts on B.C.'s coastal waters have averaged about 20 000 in recent years.

Because of its low breeding numbers in British Columbia and the threats to its nesting colonies, the Western Grebe has been assigned to the provincial Red List of species being considered for legal designation as Endangered or Threatened. The Western Grebe is protected from killing or collecting by the British Columbia *Wildlife Act* and by the federal *Migratory Bird Convention Act*.

## What do they look like?

Grebes are highly specialized for swimming and diving. They are seldom seen out of the water except when on their nests. Their legs and feet are well designed for providing strong propulsion underwater – the legs are set far back on the body and the feet are lobed rather than fully webbed like a duck's.

Six species of grebes are found in British Columbia. The Western Grebe (*Aechmophorus occidentalis*) is our largest species, measuring about 64 centimetres in length and weighing up to 1.8 kilograms. The Western Grebe is best distinguished by its long, curved neck. It is the only one of our grebes that sports



strongly contrasting black and white plumage year-round. Both sexes have the same colouring, but males are slightly larger than females. The top of the head, the back of the neck and the upper parts of the body are black to slatey-grey in colour, while the throat, the front and sides of the neck, and the belly are white. During the breeding season, the black feathers on top of the head form a slight crest. At close range, this graceful grebe's bright red eyes are also discernible.

Even when not visible, the presence of the Western Grebe is often revealed by its far-carrying call, a plaintive, high-pitched "creek-creek" that is easily recognizable. This grebe is more gregarious than other

grebes. It is found in large groups at breeding colonies, on lakes during migration and on the ocean in winter.

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Clark's Grebe, a closely related species that was formerly thought to be a colour phase of the Western Grebe, is an occasional visitor to southern B.C.; nesting is extremely rare. The most obvious difference between these two similar species is that the dark head feathers of the Western Grebe extend down below its eyes, whereas the eyes of Clark's Grebe are surrounded by white feathers. Their bills are also different colours: Clark's is orange-yellow, while the Western Grebe's is yellowish-green.

What makes them unique?

The Western Grebe's unique courtship ceremonies have been studied extensively and are among the most complex known among birds. The elaborate and energetic series of ritualized displays

begins soon after the grebes reach their nesting colonies in late April or early May. They are readily observed at accessible colonies like the one at Salmon Arm.

The two main rituals are the "rushing ceremony" and the "weed ceremony." During the rushing ceremony, two grebes engage in advertising calls and various head movements, then lunge forward and run rapidly across the surface of the water, side-by-side, for up to 20 metres. They do not call during the rush, but the pattering of their feet on the water can be heard for some distance. At the end of the rush they dive. The rushing ceremony is believed to be important for attracting mates.

The weed ceremony, which occurs later in pair formation, starts with various postures such as "neck-stretching" and "bob-shaking," after which both members of the pair dive and bring up weeds in their bills. They then face one another, feet churning to hold their bodies vertical, and move slowly

forward or spiral with their weed-laden bills held close together. This “weed dance” ends when one bird drops its weeds, but the ceremony continues with further posturing.

How do they reproduce?

Following several days of courtship, both members of the pair set to work building their nest. In B.C. this usually happens in May. The floating nests measure about 50 cm across and have a soggy depression in the middle which holds the eggs. These small rafts are made of aquatic vegetation and anchored to plants like rushes or pondweed. It takes about three days to build a nest big enough to support a grebe, but the pair continues to add nest material during the laying and incubation period.

The eggs are laid one day apart. Pale blue when first produced, they become nest-stained over time. Clutches of one to seven eggs have been found in B.C., with three or four being more usual. During the egg laying period, the male attends and guards his mate, and both adults vigorously defend the nest against intruders. The eggs are incubated alternately by both parents for about 24 days and are rarely left untended. Incubation bouts last several to many hours.

One or two days before hatching, the young peep loudly from inside their eggs. Then they begin pipping (breaking the shell). The *precocial* (well developed) chicks hatch at about one-day intervals. As each one hatches, the parents meticulously dispose of the eggshells over the side of the nest. Within minutes of hatching, the downy but still-wet chick emerges from under the rear of the incubating adult and climbs onto its back. The soggy nest cavity is not a suitable place for brooding, so when all the young have hatched, the family leaves the nest for good with the

chicks riding on their parents' backs. They may travel several kilometres to where food is most available. Sometimes the last egg is left behind.

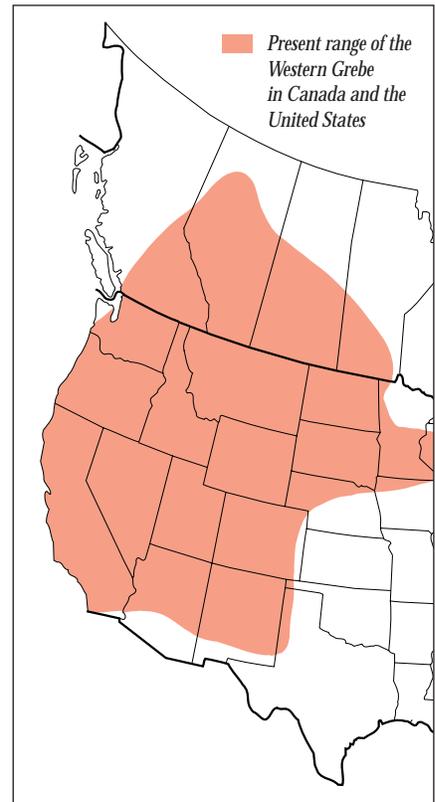
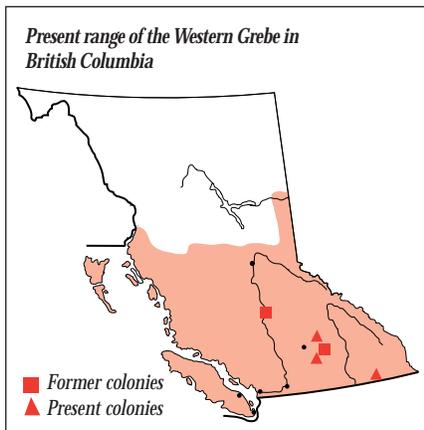
Newly hatched young spend only brief periods off their parents' backs. Back-brooding lasts two to four weeks, although the young still ride occasionally until they are almost fully grown. Usually, one parent carries the brood while the other dives for their food. At the end of a session of brooding, the carrying adult rises up in the water,

*The Western Grebe's unique courtship ceremonies are among the most complex known among birds.*

flaps its wings and dumps the chicks in the water. They then climb onto the other parent's back. The adults provide a foothold for the young by holding one foot stiffly out on the water surface to provide support. As the chicks grow and the parents' back space gets too small to hold them all, the dominant chicks get first access.

The young birds are fed by their parents until they are about eight weeks old, but may begin some diving before that. At about 10 weeks, their flight feathers are fully grown and they can fly short distances.

Western Grebes have a fairly lengthy nesting season. Incubating adults have



been recorded in B.C. from April 29 to August 31. Western Grebes usually re-nest if the first nest is destroyed. Normally, new nests are constructed each year, but late-nesting pairs may use a nest that has been vacated by a successful early-nesting pair.

What do they eat?

Small fish make up 80 to 100 percent of the Western Grebe's diet, with aquatic insects, crustaceans and worms comprising the remainder. The grebe thrusts its head forward like a spear, impaling fish with its sharp bill. It also catches fish by using its bill like forceps. A superb diver, the Western Grebe propels itself underwater with synchronous thrusts of its hind feet, and can stay submerged for a minute or longer. Small prey are usually swallowed underwater; larger ones are brought to the surface and then consumed.

Freshwater feeding in British Columbia has been studied only at CVWMA. Of the 10 kinds of fish that occur there, only 2 were eaten: Yellow Perch and Pumpkinseed. These were

probably selected because they are abundant and small enough for the grebes to swallow. These introduced fish are not widely distributed in B.C., and different species are most likely eaten at other nesting colonies.

In their saltwater wintering sites, Western Grebes have been reported to prey on a variety of small fish. Recent research near Victoria suggests that some Western Grebes hunt at night because the fish they feed on follow the vertical migrations of plankton – by day, the plankton and the fish that prey on them are at considerable depths, beyond the diving range of the grebes, but at night they gather near the surface. Bioluminescent plankton organisms called dinoflagellates swarm in these waters and emit light when disturbed. Biologists believe that as fish swim through these swarms, they leave a trail of light and unwittingly reveal themselves to the hungry grebes. Further research is needed to confirm this fascinating theory.

Grebes are remarkable for the number of feathers they eat. The feathers have no food value, but form a ball in the gut that is thought to keep fish bones from injuring the lining of the stomach. They also help clean out indigestible materials and may prevent the build-up of gastro-intestinal parasites.

Where do they live?

The aptly named Western Grebe lives only in western North America. Its breeding range extends from southern British Columbia eastward across the prairie provinces into Manitoba, and south through the western states to northern Mexico. In B.C., nesting has been recorded as far north as Williams Lake, but is mostly restricted to low-elevation lakes in the dry Southern Interior, east to Creston. There are a few rare records of nesting in coastal areas.

Many lakes in the southern half of the province are used during the eastward spring migration to breeding sites, and the westward return to salt water in autumn. Lakes such as Okanagan,



R. Wayne Campbell photo

Shuswap, Kootenay and Windermere are important stepping stones for tens of thousands of grebes heading for and returning from the prairie provinces, and possibly the northern states. Flights between lakes are always made at night.

Lakes used as stop-overs during migration are not necessarily suitable for breeding. Good nesting habitat must have emergent vegetation – plants like bulrushes, cattails or reed canarygrass that grow in shallow water and extend above the water surface. These are used to anchor the nests, and provide some protection against wind and waves. Sometimes submergent plants may be used in the absence of emergents. Western Grebes also require deeper water that supports large numbers of small fish near the nesting area.

Relatively stable water levels are also very important. When levels are unusually high, emergent plants may not extend high enough above the water to be useful for nesting. Levels that are lower than normal may result in plant growth that is too dense for nesting or may strand the nests on dry ground. Colony sites in any lake often shift slightly from year to

year in response to changes in water level and the distribution of emergent plants.

From about October to April Western Grebes are found along the Pacific coast from southeast Alaska to Baja California.

In British Columbia at this time of year, they are most abundant in sheltered waters like Georgia Strait and Puget Sound, usually within two or three kilometres of shore. Christmas counts in some areas of coastal B.C. have averaged 500 to 5000 birds per count. In the Southern Interior, flocks of up to 100 grebes sometimes winter on large, ice-free lakes.

What can we do?

Since suitable nesting sites are so limited, conservation efforts must focus on habitat protection both for the grebes and for their prey. These efforts should include: obtaining protected status for the lakes or parts of lakes where Western Grebes nest; ensuring that the land surrounding the colonies is not subject to harmful alterations; ensuring healthy aquatic ecosystems that provide food for the colonies; and protecting nesting colonies from current and anticipated human disturbance. Minimizing threats on the wintering grounds is also important.

British Columbia's three main existing colonies – at Shuswap and Okanagan lakes and at CVWMA – vary in their protection needs. The Shuswap colony, directly in front of the town of Salmon Arm, has received a lot of conservation attention, including marshland acquisition, control of shoreline development and implementation

*When all the young have hatched, the family leaves the nest for good with the chicks riding on their parents' backs.*



TWO GREBES ENGAGING IN THE "RUSHING CEREMONY."  
*Creston Valley Wildlife Management Area photo*



THE SALMON ARM GREBE COLONY HAS RECEIVED MUCH CONSERVATION ATTENTION.  
*R. Wayne Campbell photo*



GREBES BUILD FLOATING NESTS FROM AQUATIC VEGETATION.  
*R. Wayne Campbell photo*

of boating restrictions at and near the nesting sites. This program, spearheaded by the Salmon Arm Bay Nature Enhancement Society, benefits grebes and many other species. This colony has been maintaining its numbers despite its close proximity to much human activity, a tribute to the efforts of local conservationists. In 1997, the public and business community in Salmon Arm sponsored their first annual Grebe Festival. Held in May, when these easily observed birds are actively courting along the Salmon Arm waterfront, the festival heightens awareness about Western Grebes and raises funds for habitat protection and enhancement.

At Salmon Arm, Ring-billed Gulls (a Blue-listed species) have established a colony on an artificial island. Careful study is required to determine if the gulls may pose a threat to grebe eggs or chicks.

The little-studied colony in the north arm of Okanagan Lake is potentially threatened by disturbance from power boats and jet skis, and by lakeshore development. There are already campsites, trailer parks, summer cottages and boat ramps near the nesting areas. The nesting grebes here are probably affected by human activities, and further proliferation of recreational activities could cause them to abandon the site. An action plan to preserve habitat and control disturbance is badly needed in this area.

Western Grebes began nesting at Duck Lake in the 1960s when diking and water-level control in the CVWMA stopped excessive spring flooding and resulted in

suitable emergent vegetation and fish populations. Being inside a conservation area where power boats are banned, this colony is less threatened by disturbance than the others. However, water levels are controlled to prevent downstream flooding and may be unfavourable for nesting grebes. In addition, increasingly dense cattail stands around the lake edge may be forcing the grebes to nest in more exposed areas. Investigation of these concerns is a high priority.

Studies need to be done at lakes where Western Grebes formerly nested to determine why they have been abandoned. Restoration of suitable habitat conditions might induce the grebes to recolonize these sites.

Protection of grebes from threats on their ocean wintering grounds is complex. Since we do not know exactly where members of our nesting colonies winter, it is difficult to determine effects of mortality there on size of nesting colonies. However, protection of the nesting habitat of the Western Grebe in British Columbia, including the ecosystems that support their food supply, is a feasible objective and one worthy of public support. Their continued presence as a breeding species will contribute to this province's rich biodiversity. We will also be rewarded with the continuing opportunity to view the free show these uninhibited birds put on each spring – an opportunity that shouldn't be missed. 

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BROCHURE FUNDING PROVIDED BY



ISBN 0-7726-7667-4  
MELP 973745.299  
FEBRUARY 1999

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ARTWORK COPYRIGHT MICHAEL HAMES  
DESIGN BY ARIFIN GRAHAM, ALARIS DESIGN  
DISTRIBUTION MAP BY RICK PAWLAS  
PROJECT COORDINATION BY LAURA FRIIS

Printed in British Columbia on recycled paper with vegetable inks  
Q.P. 4500015472

