



# Nest Box Guide

FOR WATERFOWL

Alberta edition



**Ducks Unlimited Canada**  
Conserving Canada's Wetlands



Alberta Conservation  
Association  
*Conserving Alberta's Wild Side*

*Nest Box Guide For Waterfowl*  
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*Plywood for construction of nest boxes provided by Windsor Plywood.*

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## Why Nest Boxes?

Although most species of ducks in Alberta nest on the ground, there are some species of waterfowl that nest in holes or cavities high up in trees. Some of these cavities are formed through natural decay or fire, but many have been previously excavated by woodpeckers. Unfortunately, cavity-nesting species are among the most threatened birds in North America. This may be related to the loss of wetlands and old growth woodlands. In Alberta, over 60 percent of our slough/marsh wetlands have been lost, along with their adjacent woodlands. Through the Nest Box Program, Ducks Unlimited Canada (DUC) and the Alberta Conservation Association (ACA) have been working together to provide nesting cavities for waterfowl, with the long-term goal of conserving habitat. Natural habitat remains the most beneficial environment for waterfowl, but nest boxes provide an inexpensive, easy way to provide nesting sites for such waterfowl species as the Common Goldeneye and Bufflehead.



This guide is designed to bring awareness of the issue of habitat loss and the need for old growth woodland for cavity-nesting species to survive and reproduce. It also provides an opportunity to participate in a hands on approach to wildlife management. The species highlighted here are visible and watchable wildlife whose reproductive requirements are poorly known by the general public. By preserving and enhancing habitat for these cavity nesters, the benefits for other species, water conservation, and future generations of people is immeasurable.

This guide will provide plans for building a nest box, describe how to choose a suitable site and provide tips on how to maintain a nest box once it has been used. Your nest box could be used by cavity-nesting mammals or birds, including some waterfowl species. This guide will also assist in identifying which wildlife species used your box.



### Natural Cavities

Woodpeckers are known as primary excavators. A woodpecker usually excavates a new cavity each year which provides them with a nesting place, food and shelter. Their old, unused cavities are then used in subsequent years by cavity-nesting ducks, owls, squirrels and other birds. Woodpeckers perform a valuable function in the forest ecosystem with their cavities benefiting a number of other species. For woodpeckers to survive and perform their role of cavity excavation, they require healthy, old growth woodlots. These woodlots must have not only the large, decadent trees for excavating cavities, but also a healthy supply of replacement trees at all stages of growth.



## **Identifying Wildlife Species That Use Your Nest Boxes**

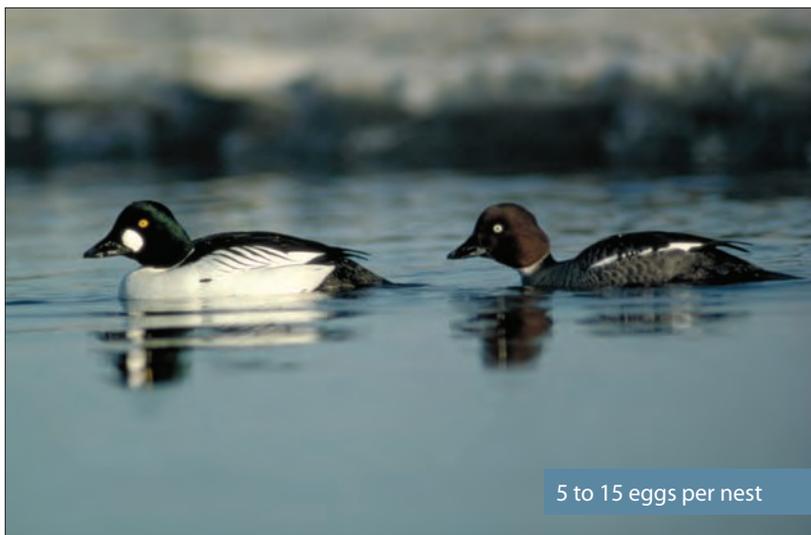




## Waterfowl

So how can you tell your nest box is serving its purpose? There are several species of waterfowl that may utilize the nest box. The presence of down, egg sacks and shell fragments usually indicate a successful nest.



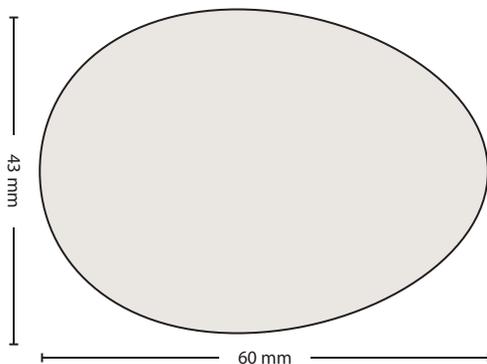


## Common Goldeneye (*Bucephala clangula*)

The Common Goldeneye is an early migrant diving duck found throughout the forested regions of Canada and may be found wherever deep water, permanent ponds coincide with large old growth woodland. A clutch of 5 to 15 olive green eggs are laid between mid-April and early June.

The incubation period is 28 to 32 days, after which the young remain in the nest 24 to 36 hours. They then follow the female to the water, sometimes up to a mile, and feed on aquatic life including aquatic insects and snails.

### Actual size (average egg)



### Common Goldeneye eggs





6 to 12 eggs per nest

## Barrow's Goldeneye (*Bucephala islandica*)

The Barrow's Goldeneye prefers the mountainous regions of Alberta and British Columbia. They have similar nesting habits to the Common Goldeneye and use abandoned Pileated Woodpecker cavities as nest sites. Eggs are bluish green to olive green.



**Actual size** (average egg)





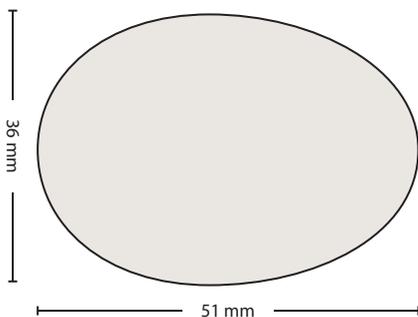
## Bufflehead (*Bucephala albeola*)

Buffleheads are small diving ducks that nest mainly in western Canada. Their range coincides closely to that of the Northern Flicker, whose cavities they depend on for nesting. Their buff-coloured eggs are laid every 1 to 2 days and incubated for approximately 30 days.

Buffleheads nest approximately two weeks later than goldeneye, from early May to early June. A couple of days after hatching, the brood of ducklings follows the female to the nearest water body where they will remain for about two months, until the flight stage.

When monitoring a bufflehead box during the nesting season, gently open the inspection door. If a female is present, close the door quietly and do not disturb her. This little duck is always active and is a real pleasure to observe, especially if you are fortunate enough to have a pond in front of your home.

### Actual size (average egg)



### Bufflehead eggs



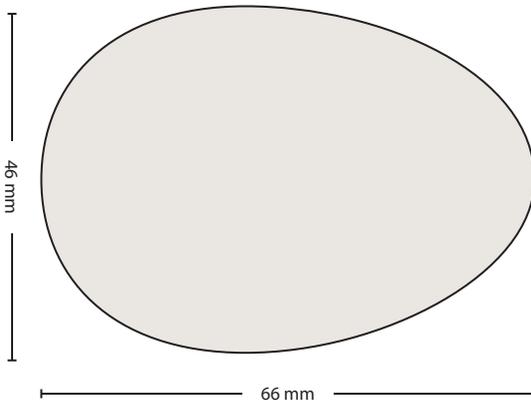


6 to 17 eggs per nest

## Common Merganser (*Mergus merganser*)

The largest of the cavity-nesting ducks, the Common Merganser feeds largely on fish and crustaceans and is found along large rivers and lakes. A large cavity (or box) is needed for this species, with an entrance of 4.5 x 5 inches allowing easy access. A merganser clutch will include 6-17 pale buff eggs and be incubated for 28-32 days. Mergansers often form large crèches of 15 to 30 young and are often seen hugging the shoreline by boaters and fishermen.

### Actual size (average egg)



Common Merganser  
eggs



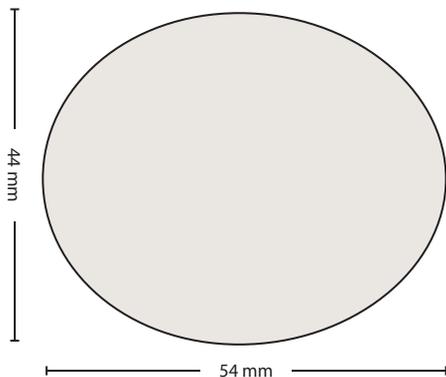


5 to 12 eggs per nest

## Hooded Merganser (*Lophodytes cucullatus*)

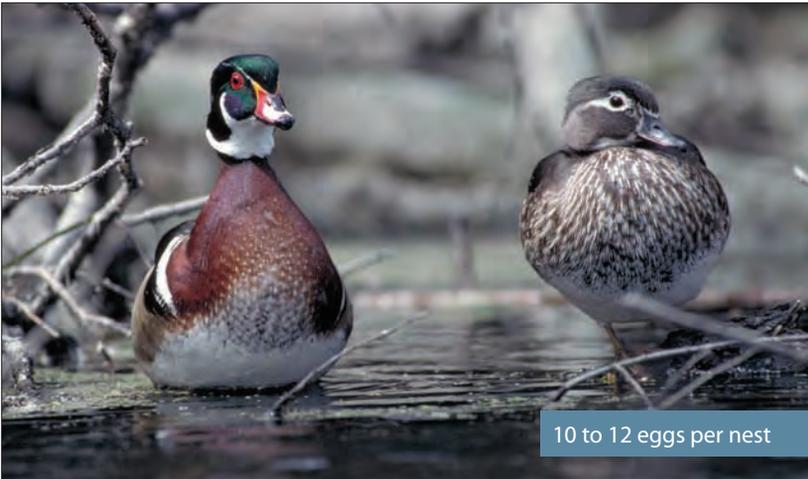
This uncommon little merganser occasionally nests in Western Canada in heavily wooded areas. The eggs are white with uncharacteristically thick shells and easy to distinguish from other cavity-nesting ducks. Shy by nature, the Hooded Merganser likes quiet wooded ponds where it feeds on tadpoles, frogs, fish and various types of aquatic insects.

**Actual size** (average egg)



**Hooded Merganser  
eggs**





10 to 12 eggs per nest

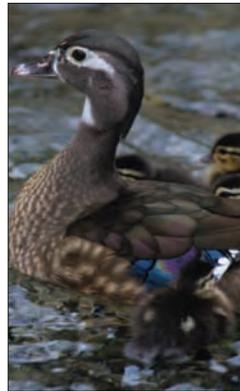
## Wood Duck (*Aix sponsa*)

Wood Ducks are colourful, perching ducks. Although seldom seen in Alberta they are the duck that most people associate with nest boxes. Wood Ducks typically lay 10-12 creamy white to pale buff eggs. Incubation typically lasts 30 days.

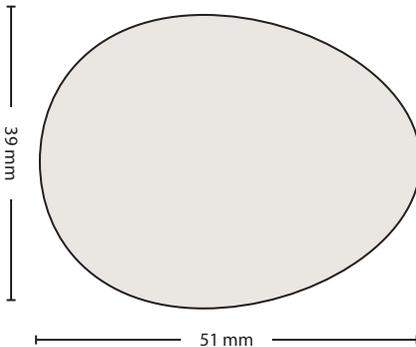
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A Wood Duck's diet consists of aquatic plants and insects. Thanks to duck nesting boxes placed along the rivers in and near Calgary, the local population of this species is increasing.



### Actual size (average egg)



### Natural cavity





## Mixed Clutches and Dump Nests

### Mixed Clutches

Mixed clutches occur when duck hens compete for the same nest cavity. The eggs from both hens often hatch successfully. The young are cared for by the dominant hen, perhaps not knowing or recognizing the difference between her young and the young of her competitor.



### Dump Nests

Eggs deposited in cavities where there is often no attempt to incubate are called dump nests. These nests may consist of one to 40 eggs of one or more waterfowl species. The absence of down in the nest is an indication that there has been no attempt to incubate.



## **Other Occupants**

These species prefer the large cavities provided by duck boxes.





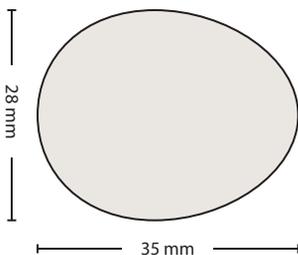
## American Kestrel (*Falco sparverius*)

American Kestrels are small cavity-nesting falcons that eat rodents, grasshoppers and insects. They are commonly observed perched on power lines or dead trees in association with the nest site. Nest boxes used by this species are easily recognizable by the whitewash of feces on the interior walls of the box, as well as a layer of rodent fur and the feathers of small birds.

The reddish, speckled eggs are laid on a nest of shavings or other previous nest. Kestrels do not add new nesting material to the cavity or box. The eggs are incubated by both sexes and hatch in approximately 28 to 30 days. Fledging occurs about one month later, but the young remain dependent on the adults for another couple of weeks.

Boxes should be placed fairly high, approximately 2.5 to 3.5 metres (8 to 12 feet) above the ground in open areas with mature trees for adults to perch on when searching for food.

**Actual size** (average egg)



**American Kestrel eggs**





## Northern Flying Squirrel (*Glaucomys sabrinus*)

The Northern Flying Squirrel may be found throughout the parkland in the river valleys and wooded areas as well as the spruce forests of western and northern Alberta. They prefer a large cavity such as a duck box for a communal winter nest constructed of fine bark and mosses and if mixed with duck down so much the better. When nesting season arrives, these squirrels disperse and raise their families in much smaller cavities such as small woodpecker holes. Their nests can then be used by waterfowl or Saw-whet Owls. These nocturnal creatures are seldom seen by people except when monitoring nest boxes or occasionally at bird feeders.



## Northern Saw-whet Owl (*Aegolius acadicus*)

This little owl is only 17-20 centimetres (7 to 8 inches) long. The Saw-whet Owl is a forest dweller who usually utilizes a Pileated Woodpecker or Northern Flicker cavity for raising its young. Saw-whet Owls may be heard establishing their territory in mid-March with a series of wistful toots, and nest from March to June.

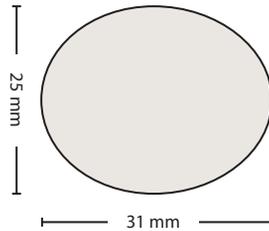
Eggs are non-glossy white and incubation begins upon laying the first egg. The male provides the family with rodents, frogs, and small birds. The young hatch over the period of a week and occupy the nest for 4 to 5 weeks. If an owl is present when you are checking the box, she will likely peek out the entrance hole of the box if you tap the tree.

Saw-whet Owls do not bring nesting material to the cavity so eggs are laid in the existing material. This may be wood shavings or the nest of a previous occupant such as a Flying Squirrel. A successful nest contains a layer of regurgitated pellets, fur, feathers, and the bones of small rodents.

Saw-whet Owl boxes should be placed in a large thick patch of ungrazed woodland as high as is feasible for maintenance (2.5 to 3.5 metres (8 to 12 feet) above ground level).



**Actual size (average egg)**



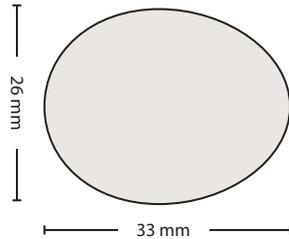
## Boreal Owl

*(Aegolius funereus)*

This northern and foothills species of small forest owl will normally nest in the larger cavities of Pileated Woodpeckers and may use the same cavity several years in a row. Eggs are dull white with no markings. As residential and industrial development extends into the western boreal forest, their use of nest boxes may increase.



**Actual size** (average egg)



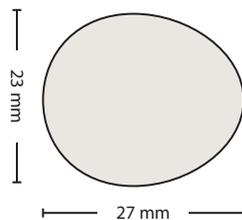
## Northern Pygmy Owl

*(Glaucidium gnoma)*

The foothills and mountains of Western Alberta support a breeding population of these tiny owls. Mixed-wood forest interspersed with meadows for hunting is the preferred habitat. They usually choose cavities left by the Northern Flicker and the Hairy Woodpecker. Eggs are glossy white.



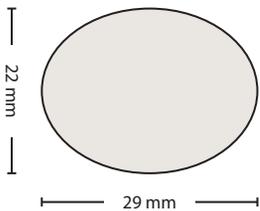
**Actual size** (average egg)



## Northern Flicker (*Colaptes auratus*)

The Northern Flicker is a mid-sized woodpecker and is found throughout Alberta. A Flicker's diet consists of ants and their larvae and pupae they forage from trees or on the ground. They will utilize a nest box, probably when a starling has taken over their cavity and the nesting urge is strong. Flicker eggs are glossy white. A Flicker nest typically contains an average of 6 pure white eggs.

**Actual size (average egg)**



### Northern Flicker hatchlings



Nest boxes are also used by the Pileated Woodpecker, but usually for roosting. These woodpeckers are an important cavity excavator for larger cavity-nesting duck species.



### Pileated Woodpecker





### Red Squirrel (*Tamiasciurus hudsonicus*)

Red Squirrels are a common species and often use nest boxes as places to have their young or for winter shelter. They frequently use nest boxes for storing food items such as mushrooms and seeds. These items are bulky, often filling the box up to the entrance hole and should be cleaned out if the boxes are to be used by waterfowl. Red squirrels are found in spruce forests or mixed woodlots with a food source such as beaked hazelnut.

Placing boxes away from conifers will reduce the chance of squirrels taking up residence.





## Other Occasional Users

Depending on the area where boxes are located and the availability of smaller cavities, duck nest boxes may have other occasional users.





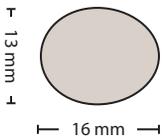
## House Wren (*Troglodytes aedon*)

This industrious little bird, a late spring migrant, will fill several cavities with twigs, using only one cavity for raising a family. The smaller the nest box the more likely wrens will build a “dummy” nest. Eggs are white to pinkish white marked lightly or extensively with reddish brown small spots or blotches.

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Twigs should be cleaned out of the nest boxes and replaced with wood shavings for future use by waterfowl.

### Actual size (average egg)



### House Wren nest





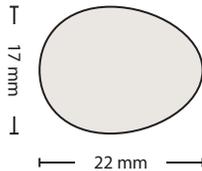
## Mountain Bluebird (*Sialia currucoides*)

These birds prefer a much smaller nest site, but if the need dictates, a duck box is sometimes used. Eggs are blue to bluish white.

### Mountain Bluebird eggs



### Actual size (average egg)





4 to 7 eggs per nest

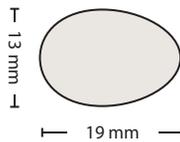
## 22 Tree Swallow *(Tachycineta bicolor)*

Tree Swallows prefer a smaller box, but will often build a grass nest lined with feathers in a corner of a duck sized nest box. Eggs are rosy pink to pure white with no markings.

### Tree Swallow eggs



### Actual size (average egg)



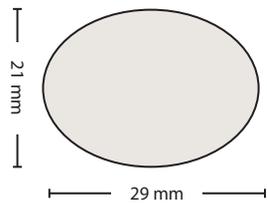


5 to 7 eggs per nest

## European Starling (*Sturnus vulgaris*)

Starlings were introduced to North America in 1890 and have spread widely. They have had a detrimental effect on all the cavity nesters. Starlings may cover duck eggs with nesting material or puncture the eggs and cause nest desertion. Several successive layers of straw and duck eggs may be found before one or the other wins and succeeds in nesting. In areas of high starling density, they will occupy all of the cavities and often raise a second brood. Starlings nest early (April) and make a bulky nest of coarse grass, straw and feathers. The robin-sized eggs are a light blue with an average clutch size of 5. A successful nest is a dirty, smelly mess and should be cleaned with the aid of a tool and gloves. A dust mask should also be worn. Starlings are very territorial, though this trait may be used to your advantage by twinning nest boxes (see page 28).

**Actual size** (average egg)



## Wasps and Bees

Wasps nest later than ducks and only occupy unused boxes. Honey bees may occupy up to 5 per cent of nest boxes in areas where bee keepers are active. They may survive for a couple of years and are easier to remove after a “dry out” period. Bumblebees often set up in the down of a duck nest and do not create any problems.



## Nest Box Construction

<b>Nest Box Measurements in Inches</b> Box is constructed from $\frac{3}{4}$ inch plywood	Width	Length
Back	7.75	24
Door	7.75	11
Floor	7.75	7.75
Stop	7.75	3
Bottom Strip	7.75	2
Sides – 2	9.25	18
Front	9.25	7.75
Top Strip	9.25	2
Roof	10.5	12

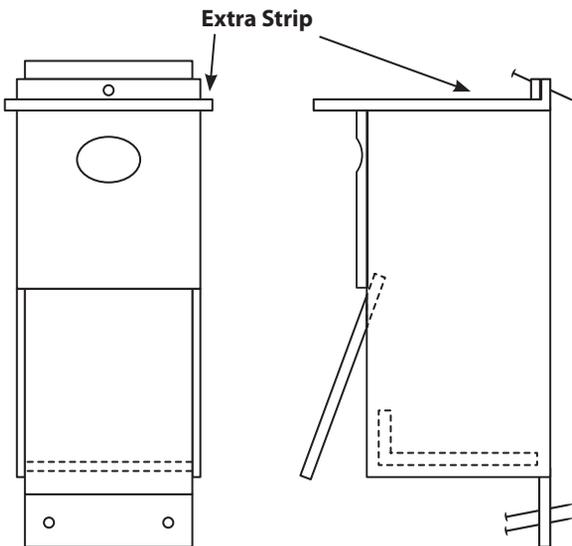
**Note** – Place shallow saw cuts on the inside of the door and front below entrance hole to aid ducklings when leaving the box.

<b>Entrance Hole in Inches</b> (elliptical, height X width, unless otherwise indicated) Place 2 inches below roof	
Common Goldeneye	3.5 x 4.5
Barrow's Goldeneye	4 x 5
Bufflehead	2.5 x 3
Common Merganser	4.5 x 5
Hooded Merganser	3.5 x 4
Wood Duck	3.5 x 4
Kestrel	3 (round)
Saw Whet Owl	3 (round)

1. Begin by nailing the shaving retainer (stop) to the floor.
2. Attach one side to the back – approximate position in the middle, overlap back (use three  $1\frac{1}{2}$  in. deck screws).
3. Fasten the front to the attached side, 2 screws (overlap side).
4. Now line up the other side (flush with the top) and screw everything together.
5. Position the floor (inset  $\frac{1}{4}$  in.) inside and ensure the stop is secured at right angles to floor. This allows the door to close properly.

6. Next place the door inside the front – should overlap the floor for easy opening. Hinge with 1½ in. nails placed ¼ in. below front, through the sides into the door.
7. Secure roof with 4 screws (long part over the entrance hole).
8. Attach one of the extra strips on top of the roof and the other on the bottom of the box, against the back. These strips allow for extra tree growth (nail heads take longer to pull through as the tree grows) and waterproofing.
9. Drill a hole through the side into the door at a 45 degree angle to secure the door with a double-headed nail. Make the hole big enough so the nail removes easily.
10. Drill a couple of holes (spike size) in the back (top and bottom) to make installation easier.

**Note** – Nails will not hold, use 1½ in. deck screws for final construction. An oil-based stain will extend the life of the box. Grey, green or a brown may blend in with the environment. Add 3-4 inches of shavings or sawdust and fasten box securely to a healthy tree with four 4-inch nails.



## Installing Nest Boxes

### Choosing a Suitable Site

Most cavity-nesting waterfowl in Alberta are diving ducks, therefore nest boxes should be placed near deep water, permanent ponds or streams with adjacent woodland for nesting. Approximately 3 to 5 acres of water is required per brood. Considering a 66 per cent hatch rate, two nest boxes would be adequate for a pond of this size.

Nest boxes installed prior to spring melt may be soon occupied by local breeding ducks. Depending on the size of the population, nest box use by ducks is typically low during the first year after installation. Be patient. Even if the box is not used in the first year, it may be investigated by a duck for use the following year. Hens carry out nest searches in late June or early July often in groups of 3 to 8. A saucer shape in the wood shavings is a good indication a yearling has visited the box. If this inspection occurs, there is a 70 per cent chance she will use the box the following spring. Most cavity-nesting waterfowl do not nest until they are 2 to 3 years old. However, Wood Ducks do nest as yearlings. If you notice that your nest boxes go unused for a number of seasons, they may need to be relocated to another area.

Saw-whet Owl boxes should be situated in ungrazed woodlots of at least 10 acres and preferably in or adjacent to larger blocks of mature forest. This type of area will also attract the Northern Flying Squirrel.

### Placement

Nest boxes should be mounted on live, healthy trees. Place them so that the entrance hole is approximately 2.5 metres (8 feet) above the ground (higher for owls and kestrels). Birch or poplar trees are good choices. Secure the box with 4-inch nails, two in the top and two in the bottom. Leave one nail in the top protruding about an inch to prevent the box from falling if nails are pulled through the plywood due to tree growth. Situate the box on the tree so that it leans slightly forward to aid the ducklings when they leave the box. For waterfowl, overhanging branches should be cleared to allow an unobstructed flight path to the entrance hole. Leave the branches in place for owls and kestrels. In order to prevent beavers from cutting the nest tree, wrap the bottom of the tree with stucco wire and staple it securely but loose enough to allow room for tree growth.

Place the initial boxes overlooking a water body so ducks can easily spot the entrance hole from the water. As the boxes are utilized and the population grows, additional boxes may be placed out of sight in the woods up to 800 metres (0.5 mile) away. Less conspicuous boxes tend to experience less dump nesting and a higher hatch success rate due to less predation from animals such as raccoons. However, ducklings are more vulnerable to predation as they walk to the water after hatching.

When installing the nest box, place 8 to 10 centimetres (3 to 4 inches) of wood shavings in the box. Cavity-nesting ducks, as well as kestrels and owls, do not carry nesting materials with them and will not typically nest in an empty box. If there is too little nest material, the eggs could freeze during a cold snap.

### Box Twinning

In areas with large starling populations, such as pastures and feedlots, a second smaller box specifically built for starlings with a smaller entrance hole may be situated just below the first box. A starling is more likely to utilize the smaller box and, because they are territorial, will prevent another pair of starling from nesting nearby. The first box thus provides a nesting site for ducks. The starling box should be located close enough to the ground (6 feet to entrance) to allow for easy cleaning. A 2½ inch entrance hole should be used in the starling box as it will still allow a Bufflehead or Kestrel to nest there if a starling does not. Goldeneye, Bufflehead and Kestrels will peacefully occupy twinned boxes at the same time. Since waterfowl defend territory on the water, there are no conflicts between the species at the boxes.

## Maintenance



Once the boxes have been used, annual maintenance will promote the highest use rates. However, boxes can be maintained less frequently. For relocation purposes, it is a good idea to number the boxes and mark the locations on a map, or use a GPS system for remote locations. Fall and winter are ideal times for monitoring. At this time, nesting species can be identified by the unhatched eggs, shell fragments, or the nesting material present.

The most important maintenance items are to ensure there is always 3 to 4 inches (8 to 10 cm) of nesting material in the box and that the box is still securely attached to the tree.



## Predation



Nest success is generally more than 80 per cent in the protected environment of a nest box.

In comparison, ground nesting ducks have an average success rate of 12 to 15 per cent.

Tree climbing mustelids, such as weasels and martens, will depredate some nests, killing the female on the nest. Squirrels may disrupt a nest and cause desertion if an egg is eaten inside the box, leaving yolk and shells behind. In southern Alberta, raccoons may be a problem, so placing boxes back from shorelines may help, as this species likes to travel the waterways. Predator guards may be installed, but are unsightly and time consuming. House cats could also be a problem if the nest box is close to your yard.

Black bears are known to depredate nest boxes in areas where they are resident. Wrapping loops of barbed wire around the tree may discourage bears from climbing to the nest box.

## Conserving Habitat

A well constructed nest box can last for 25 years, providing nest sites for a variety of cavity-nesting species. However, it is important to remember that nest boxes are a short-term solution to be used when large, old trees and natural cavities are unavailable. A more secure and longer term solution is to conserve native habitat.

Much of the habitat associated with cavity-nesting species is found on private land in central and southern Alberta. Important breeding areas for waterfowl usually coincide with agricultural land in the parkland and boreal transition zone. As a landowner or land manager, there are a number of ways you can help to conserve habitat:

**Provide supplemental nest sites:**

- » Install nest boxes.

**Grazing management:**

- » Protect your wetlands and wetland margins.
- » Protect even small temporary wetlands/margins.
- » Buffers of grass, shrubs and trees around your wetlands will help to keep nutrients and sediments out of the water and help to protect the health of the wetlands.
- » There are a number of off-site watering systems that offer a safe, clean way to water livestock.
- » Preserve the understory of woodlands. Be careful not to overgraze woodlots to allow for new growth of replacement trees.

**Woodlot management and selective cutting:**

- » Maintain wooded areas adjacent to wetland to encourage the presence of cavity-nesting waterfowl.
- » Avoid cutting large, dying trees that have potential for nesting cavities.

**Conservation easements or voluntary agreements with conservation organizations such as Ducks Unlimited Canada.**

- » Ensure your efforts at conservation will be carried on into the future.

Wetlands are not only beneficial to waterfowl, but are a natural feature on the landscape that benefit wildlife and people. After heavy rains and snow melt, wetlands can hold excess water and release it slowly and safely, helping to buffer the effects of droughts and floods. Healthy wetlands also help to control erosion, purify water, and replenish ground water. By installing nest boxes and conserving habitat you will have the opportunity and the pleasure to provide nesting sites for cavity-nesting waterfowl and other wildlife species that you might not otherwise see. Nest boxes also provide a wonderful opportunity for educating the community, young and old, about wildlife and the conservation of our natural environment.

Developed in partnership with:



**Ducks Unlimited Canada**  
Conserving Canada's Wetlands

**Government  
of Alberta** ■

NATURE  
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Alberta Conservation  
Association  
*Conserving Alberta's Wild Side*

**North American  
Wetlands  
Conservation Act**