Yukon Southern Lakes Nest Box Project Report, 2000

by

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A female Barrow's Goldeneye at McIntyre Creek Wetlands; after fuelwood harvest, this dead tree offers a stump for a perch instead of a nest cavity. Photo by Cameron D. Eckert.

1. EXECUTIVE SUMMARY

The Yukon Southern Lakes region is home to 27 species of cavity nesting birds and at least two mammals. In the Yukon, cavity nesters have suffered habitat loss due to residential and industrial development, fuelwood cutting, logging, and agriculture. The Yukon Southern Lakes Nest Box Project was initiated in the spring, 2000 to enhance habitat for cavity nesters by i) providing nest boxes for cavity nesting birds; ii) increasing public awareness and appreciation of the habitats required by cavity nesters and the role of nest boxes; and iii) increasing our community's capacity to monitor nesting success and populations of cavity nesters. The public education component included public workshops and classroom talks on nest boxes and the habitat needs of cavity nesters. Further, we coordinated volunteers to monitor nest boxes through the breeding season. This project established 95 new nest boxes in the Yukon Southern Lakes area. In 2000, we monitored a total of 88 nest boxes during the breeding season. We found that 41 nest boxes were used by a total of seven species of birds and one mammal. The dominant occupant was Tree Swallow. New nest boxes that were put up after the initiation of the breeding season did not tend to be used. The high occupancy rate (80 to 90 percent) of boxes that were established prior to the breeding season shows that the vast majority will be used in subsequent years. Further work on nest boxes in the Yukon Southern Lakes should focus on determining which factors increase the use of nest boxes by other species such as Mountain Bluebird, Boreal Chickadee, Red-breasted Nuthatch, ducks, raptors and owls. Many Yukoners have embraced the practice of establishing nest boxes. However, an understanding of the habitat requirements of cavity nesters and the adoption of land-use practices that benefit cavity nesters are not as well established. These key elements of awareness and action are essential for ensuring healthy populations of cavity nesters.

2. INTRODUCTION

Cavity nesting birds play an essential role in ecosystem function and productivity. They are a vital component of the Yukon's biodiversity. The Yukon Southern Lakes region is home to 27 species of cavity nesting birds and at least two mammals (Appendix A). These cavity nesters have suffered habitat loss due to residential and industrial development, fuelwood cutting, logging, and agriculture. This has resulted in a reduction in nest trees and nesting opportunities for cavity nesters. The Yukon Southern Lakes Nest Box Project was initiated in the spring, 2000 to enhance habitat for cavity nesters. The objectives of the project are to;

- Provide nest boxes for cavity nesting birds;
- Increase public awareness and appreciation of the habitats required by cavity nesters and the role of nest boxes;
- Increase our community's capacity to monitor nesting success and populations of cavity nesters.

There are a number of factors and circumstances which make this project a priority. The cavities that are required by cavity nesting birds are most often found in dead or dying trees (snags) in wetlands and forests. Residential and industrial development, fuelwood cutting, logging, and agriculture have resulted in losses of nest trees. A check of various wetlands in the Southern Lakes area by the Project Team found that the dead trees removed (i.e. for fuelwood) were of the size (diameter) required by cavity nesters. In some areas, all suitable trees had been removed. Trees left behind tended to be well below the size (diameter) that a cavity nester could use.

Nest boxes directly benefit cavity nesting birds by providing nest sites, which increases nesting success and enhances survival of these species. Nest boxes have been used successfully in North America to help recover declining populations of Eastern and Mountain Bluebirds (Ehrlich et.al. 1998). On February 26, 2000 the Project Team checked about 20 existing nest boxes in the Southern Lakes area and found that over 90

percent had been used by cavity nesting birds during previous seasons. This demonstrated that Yukon cavity nesters readily use nest boxes. The potential benefits associated with nest boxes include an immediate increase in nest sites; reduced rate of competition for nest sites; reduced rate of nest predation; and habitats previously unsuitable (through loss of nest trees) become useable. This may lead to increases in breeding rates, brood survival, nesting success, and recovery and maintenance of healthy populations of cavity nesters.

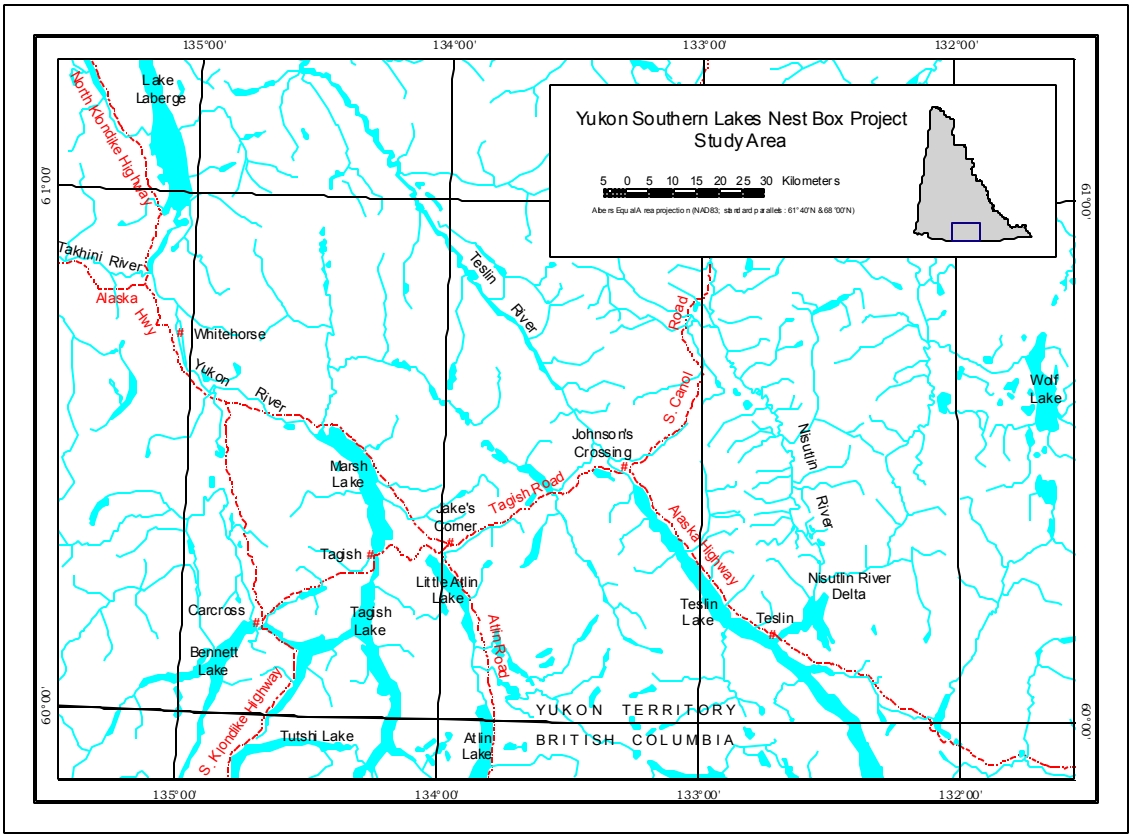
Community involvement in this project results in direct benefits to cavity nesters. This happens through increased awareness and appreciation of the habitat requirements of cavity nesters, and the role of nest boxes; greater education and wildlife viewing opportunities; and increased knowledge and understanding of breeding biology of cavity nesters. An increased awareness of the role of nest boxes will result in individual initiatives to put up nest boxes. In the long term, this project can foster community-wide adoption of the practice of establishing nest boxes and an appreciation of the habitat needs of cavity nesters.

The American Kestrel is a "secondary cavity nester" which typically uses nest cavities created by Northern Flickers. Photo by Cameron D. Eckert.

3. STUDY AREA and METHODS

3.1. Study area:

The study area, generally defined as the Yukon Southern Lakes includes Teslin Lake, Marsh Lake, Little Atlin Lake, Tagish Lake, Bennett Lake, and north to Lake Laberge. The focus this year (spring to fall 2000) was on areas around Lake Laberge, McIntyre Creek, Mary Lake and Marsh Lake.



The Yukon Southern Lakes ecoregion extends from northern British Columbia into south central Yukon (Ecological Stratification Working Group 1995; Ellis and Peepre 1995; Yukon Ecoregions Working Group 1999). It lies in the rainshadow to the lee of the St. Elias-Coast Mountains and the climate is arid. Permafrost is sporadic and discontinuous and covers less than a quarter of the area. The landscape features plateaus, rolling hills, and broad valleys occupied by lakes and rivers. Elevation generally ranges between 600 and 1,500 metres although several peaks are over 2,000 metres. A complex and productive

mosaic of lakes, rivers, and wetlands characterises the area. The major lakes are Laberge, Marsh, Teslin, Little Atlin, and Wolf Lake to the west. The major rivers are the Yukon, Teslin, and Takhini Rivers. Open coniferous and mixed forests typically dominate the vegetation. Forest fires are frequent and extensive and have significantly modified habitats, for example at the Takhini and Teslin burns. These fires give rise to open shrub communities followed by Trembling Aspen and Lodgepole Pine forests. White Spruce forests with feathermoss ground covers are found on floodplains, adjacent to lakes and along rivers and creeks. Balsam poplar is also found on floodplains and along creeks and usually precedes White Spruce in the successional sequence. White birch is not common, and generally exists on cooler, moister sites. Black Spruce is somewhat limited and is generally found on low, wet and cold sites near surface permafrost. Subalpine Fir and extensive shrub cover, particularly along drainages characterise treeline habitats. Alpine tundra usually features scattered dwarf shrubs. The Yukon Southern Lakes, with its combination of rich lowlands and rugged mountains features a wide range of ecosystems.

This image of Little Atlin Lake, Yukon, with Mount Landsdowne to the north shows many of the features, which characterise the Yukon Southern Lakes. Diverse habitats include lakes, rivers and wetlands, lowland White Spruce forest, upland Trembling Aspen and Lodgepole Pine forests, and high elevation alpine communities. Photo by Cameron D. Eckert.

3.2. Nest box construction & installation:

In spring and summer of 2000, at least 80 new nest boxes were constructed and distributed to breeding habitats used by cavity nesters. An additional 15 nest boxes were installed during winter 2000/2001. Most boxes were small to medium in size, appropriate for Tree and Violet-green Swallows, and songbirds such as Black-capped and Boreal Chickadees and Mountain Bluebird. Larger boxes suitable for cavity nesting ducks (e.g. Barrow's Goldeneye and Bufflehead), woodpeckers, and raptors (e.g. Boreal Owl, Merlin and American Kestrel) were also established at wetlands and in forests. Areas that have lost cavity trees through fuelwood cutting (e.g. McIntyre Creek Wetlands) or land clearing (e.g. Mayo Road) were identified as a high priority for new nest boxes. New nest boxes were affixed to dead trees and other non-living structures such as fence posts and dwellings. Where possible, nest boxes were placed to minimize their exposure to predators. For example, many boxes were put up when ponds were frozen, and secured to dead trees that would be surrounded by water following the spring thaw. Many existing nest boxes were assessed to ensure their availability to cavity nesters. The locations of most nest boxes were recorded using Global Positioning System (GPS) to facilitate monitoring.

A fleet of newly built nest boxes suitable for Northern Flickers or Mountain Bluebirds.

Recycled pop bottles make a simple and effective squirrel guard.

A nest box on a dead Lodgepole Pine offers nesting opportunity to Northern Flickers or Mountain Bluebirds.

3.3. Breeding season monitoring:

A monitoring protocol for checking nest boxes during the breeding season was designed and implemented. A database has been established for nesting data collected during this project. This database contributes to the Birds of the Yukon Database (Canadian Wildlife Service 2000), and Yukon Bird Club's Nest Records Program.

Nest boxes identified or established during this project were observed at key points during the breeding season to establish occupancy. The number of nest boxes monitored was a function of volunteer availability. In 2000, a total of 88 nest boxes were monitored (Appendix C). Some nest boxes were more intensively monitored for breeding chronology and nesting success. This information allows an assessment of the success of the project, increasing its effectiveness in future years, and ensuring direct benefits to cavity nesters.

3.4. Public education and community outreach:

A number of components of this project were designed to increase public awareness of the habitat needs of cavity nesters and the beneficial role of nest boxes. A public presentation was given in Whitehorse on April 13, 2000. This presentation explained the basics of nest box design and construction; habitat loss for cavity nesters; and how nest boxes are used to enhance habitat for cavity nesters. As well, this presentation offered the public the opportunity to participate in the project and the ongoing monitoring of nest boxes. The distribution of this report will further the public education and outreach.

A volunteer made a presentation about the benefits of nest boxes to students at an elementary school in Granger. In response to the public information session and promotion of the project a number of volunteers participated in the construction, placement and monitoring of nest boxes.

Left: Takhini Elementary School in Whitehorse has a long history of establishing nest boxes around the community. Here Heather Thompson and Patti Nash have selected a dead tree for a new box. Photo by Jeanette McCrie.

Nest boxes placed in open meadows or along forest edges and offer nest sites for swallows, chickadees and Mountain Bluebirds.

Placing the box well off the ground offers a more “predator-safe” location, well out of the reach of house cats.

4. RESULTS

In 2000, a total of 88 nest boxes were monitored. We found that 41 nest boxes were used by a total of seven species of birds and one mammal (Appendix C). New nest boxes that were put up after the initiation of the breeding season did not tend to be used. The occupancy rate (80 to 90 percent) of boxes that were established prior to the breeding season shows that the vast majority will be used in subsequent years. For example, 13 of 16 nest boxes located at McIntyre Creek Wetlands were used this past season. These boxes were in place prior to the initiation of the breeding season.

The dominant occupant was Tree Swallow (28 boxes) followed by Violet-green Swallow (3 boxes), Barrow's Goldeneye (2 boxes), Boreal Chickadee (2 boxes), Mountain Bluebird (2 boxes), Northern Flicker (1 box), Red-breasted Nuthatch (1 box), duck sp. (1 box), and Red Squirrel (1 box).

The following section describes the habitats and summarizes the nest box observations for sites monitored during 2000.

4.1. Lewes Marsh

Habitat: Lewes Marsh is a diverse and productive wetland along the Yukon River between Marsh Lake and the Yukon River bridge. The open marsh has a narrow border of grasses, willows, alders, and deciduous trees such as Trembling Aspen and Balsam Poplar. In the spring, low water levels attract thousands of shorebirds of many species. Ducks and swans occur in good numbers during migration. The adjacent White Spruce forests support cavity nesters such as Three-toed Woodpecker, Boreal and Mountain Chickadees, and Red-breasted Nuthatch. Small islands in the centre of the wetland feature grasses, shrubs and standing dead trees which are used by Northern Flickers and American Kestrels. There are numerous small ponds along the edge of the wetland have a mix of open forest, shrubs, grasses and standing dead trees. Cavity nesters such as Barrow's Goldeneye, Bufflehead, Downy and Hairy Woodpeckers, Black-capped Chickadees, and Tree Swallows use these habitats.

Nest box observations: Most of the nest boxes are located on the west side of the marsh. A total of 15 boxes (11 medium, 4 large) were checked on five dates from 2 June to 12 July 2000. Tree Swallows used two boxes. The other boxes were not used, primarily because they were put up after the initiation of the breeding season.

4.2. Mary Lake

Habitat: This small lake is located within the City of Whitehorse and supports many migrant and nesting birds and a few beaver lodges. A mixed forest of Trembling Aspen, Lodgepole Pine, and White Spruce surrounds the lake. The shoreline features grasses, willows, roses, and other small shrubs. There are numerous small dead trees standing in the water, especially in the north end of the lake. The old Skagway-Whitehorse railroad tracks border the west shore. The lake offers valuable nesting habitat for Barrow's Goldeneye which use nest cavities in dead trees. Given the adjacent residential development of the area, Mary Lake should be considered for special management to protect its natural features.

Nest box observations: A total of 11 boxes were checked on eight dates from 21 May to 7 July 2000. Nesting species included Barrow's Goldeneye (1 box), an unidentified duck (1 box), Tree Swallow (4 boxes), and Violet-green Swallow (1 box). Some boxes may not have been used as they were put up after the initiation of the breeding season.

A pair of Barrow's Goldeneye at Mary Lake. Photo by Jeanette McCrie.

4.3. Wolf Creek

Habitat: Wolf Creek is a tributary of the Yukon River located about 11 kilometres south of Whitehorse. This watershed is the focus of a major Environmental Monitoring and Assessment (EMAN) project. Wolf Creek has also been subject to a salmon enhancement project. The nest boxes established here are owl boxes and were placed in the forest. Lodgepole Pine and Trembling Aspen dominate the forests on dryer sites, and White Spruce and Balsam Poplar along the creek. The White Spruce and mixed forests supports owls, Three-toed Woodpecker, Boreal and Black-capped Chickadees, Spruce Grouse, and Golden-crowned Kinglet.

Nest box observations: Three large boxes (suitable for Boreal Owl) were checked on 26 May 2000 at which time they were not being used. These boxes were not checked again as it was unlikely that they would be used later in the season. The lack of occupants this year likely relates to the fact that the boxes were put up late in the breeding season.

Boreal Owl a potential nest box inhabitant at Wolf Creek. Photo by Heidi Hehn.

4.4. Whitehorse Sewage Lagoon

Habitat: A large area of open Lodgepole Pine and White Spruce with a few pocket wetlands was cleared for the development of the new Whitehorse Sewage Lagoons. This expansive open area is bordered by coniferous forest, mostly Lodgepole Pine with some White Spruce and Trembling Aspen. The open habitats are composed of grasses and young stands of willow and Trembling Aspen. The area is well used by nesting and migrant waterfowl including goldeneye which are cavity nesters. Swallows feed over the lagoons in spring, and Mountain Bluebirds are common. Species seen during migration include raptors such as Northern Harrier, Bald and Golden Eagles, and Short-eared Owl, and passerines such as Lapland Longspur, American Pipit and Horned Lark.

Nest box observations: A total of seven boxes were checked on 3 June and again on 12 June, 2000. There was no apparent use of these boxes which were put up after the initiation of the breeding season

4.5. Versluce Meadow

Habitat: Versluce Meadow is located in the residential neighbourhood of Porter Creek in the City of Whitehorse and is fully surrounded by residential development. The meadow exists through intermittent flooding of Porter Creek which passes through en route to Hidden Lake. The meadow is excavated for topsoil and cultivated for grass. Tall, dense willow and alder border the creek, and grasses and a variety of weed species dominate open areas. Cavity nesters which frequent these habitats include Northern Flicker, Mountain Bluebird, Black-capped Chickadee, Violet-green and Tree Swallows. Common songbirds include Red-winged Blackbird, Alder Flycatcher, Yellow Warbler, Common Yellowthroat, Savannah Sparrow, Lincoln's Sparrow, and the occasional Say's Phoebe.

Nest box observations: A total of three boxes were checked on eight dates from 9 June and 8 July 2000. Tree Swallows used one box, one contained an old nest, and the third required replacement.

4.6. McIntyre Creek Wetlands

Habitat: McIntyre wetlands are the largest in Whitehorse and provide critical habitat to diverse communities of birds and wildlife. Old-growth White Spruce forest, large patches of Balsam Poplar, scattered dead trees and lush shrubs create exceptional habitat for a diverse and abundant songbird community. Common cavity nesters include Barrow's Goldeneye, Northern Flicker, Three-toed Woodpecker, Red-breasted Nuthatch, and Boreal and Black-capped Chickadees. The rare Northern Rough-winged Swallow can be seen among the feeding frenzy of Tree, Violet-green, Bank, Cliff and Barn Swallows. Despite its importance to birds and wildlife, the area has been negatively impacted by fuelwood cutting. Many of the large snags of the size required by cavity nesters have been cut. This area has also been threatened with residential development. The Yukon Bird Club and Yukon Conservation Society along with a great many individuals have voiced their strong support for protecting these wetlands.

McIntyre Creek wetland's lush aquatic habitats support many species including huge masses of swallows during spring migration. Photos by Cameron D. Eckert (left) and Jeanette McCrie (right).

Nest box observations: A total of 16 nest boxes (suitable for swallows and chickadees) were monitored here. All boxes are located in the open wetland along McIntyre Creek between the Alaska Highway and the Icy Waters Fish Farm. Each box was observed for about 10 minutes on five different days between the 18 June to 18 July 2000. Nesting species included Boreal Chickadee (1 box), Tree Swallow (11 boxes), and Red Squirrel (1 box). Nine Tree Swallows nests were successful and the success of two was uncertain. The high use of boxes here is related to the fact that they were in place prior to the initiation of the breeding season.

Many Yukon Southern Lakes wetlands such as those along McIntyre Creek have suffered significant habitat loss through fuelwood cutting.

Photos by Cameron D. Eckert.

4.7. Yukon College Beaver Pond

Habitat: This small but rich beaver pond is situated along McIntyre Creek. It can be accessed by a nature trail from the Yukon College. This trail is well used by birdwatchers, local residents, and the staff and students from the college and Takhini Elementary School. It is surrounded mostly by Lodgepole Pine forest. The north end is marshy and vegetation there is composed mainly of willows and other small bushes. It is a good area for Boreal and Black-capped Chickadees, and many swallows, including the rare Northern Rough-winged Swallow feed over the pond. The pond offers good breeding habitat for cavity nesting ducks.

Nest box observations: A total of six boxes were checked on 28 June 2000. Tree Swallows used two boxes, three were not active, and vandals had destroyed two.

4.8. North Klondike Highway Rodeo Grounds

Habitat: The "Rodeo Grounds" are located along the North Klondike Highway just north of Whitehorse. This area consists mainly of open, dry, grassy fields with young Trembling Aspen and White Birch stands between the fields. Cavity nesters such as American Kestrel, Northern Flicker and Mountain Bluebird use these habitats. Tree Swallows are also fairly common here. One of the special avian features of Rodeo Grounds is nesting Upland Sandpipers, a rare species in the Southern Lakes area.

Nest box observations: A total of five boxes were checked on five days between 31 May and 11 July 2000. Tree Swallows used two boxes.

4.9. Shallow Bay

Habitat: Shallow Bay, at the southwest end of Lake Laberge is a remarkable wetland supporting very high numbers of migrant and breeding waterfowl and some shorebirds. The centre of the bay is open shallow water surrounded by a broad margin of grasses and aquatic macrophytes with a dense border of tall willows. Patches of White Spruce and Trembling Aspen with some standing dead trees enhance the habitat diversity here. These

mixed forests support Downy and Hairy Woodpeckers, and Northern Flickers. In spring, Shallow Bay is an important resting and feeding area for thousands of swans, geese and ducks. The open water attracts diving ducks, and is surrounded by a broad grassy edge favoured by swans, geese and dabbling ducks. It is an excellent area for raptors such as Golden Eagles, Rough-legged Hawks, Northern Harriers, Northern Shrikes and Short-eared Owls. It is also one of the best Yukon locations for Wilson's Phalarope. Rising waters in early summer reduce the margin of grasses, but the willows offer good nesting habitat for waterfowl, songbirds, and shorebirds. A variety of swallow species are also seen here.

Nest box observations: A total of four boxes were checked on 5 days between 31 May and 11 July 2000. Tree Swallows used two boxes, and one box had a partially completed nest but was otherwise unused.

4.10. Takhini Ponds

Habitat: These ponds are located on the Alaska Highway west of Whitehorse just before the Takhini River bridge. This is a cluster of small ponds in an otherwise dry area. Scattered Trembling Aspen and deciduous shrubs surround the ponds. The area is part of the "Takhini Burn" and there are many standing dead trees and extensive course woody debris on the ground. However, this area has also been heavily used for fuelwood cutting and many of the larger dead trees have been removed. These ponds are rich in insects and therefore used by cavity nesters such as Mountain Bluebirds, Boreal and Black-capped Chickadees and swallows. Dry conditions in recent years have lowered water levels in the ponds, although the area remains quite productive especially during migration in late April and early May. The ponds are well used by a migrant dabbling ducks, Bonaparte's Gulls, and breeding Horned Grebes. The area hosts nesting Killdeer, and a fairly high density of nesting Black-billed Magpies. Golden Eagles frequently soar overhead. Another set of ponds, known locally as the "Salt Ponds", is located on the north side of the Alaska Highway just west of Hunter's Road. This area is a grazing lease with a few small ponds along the highway and a larger pond set a few hundred metres back from the road. As with the other ponds, these are well used by migrant waterfowl and shorebirds.

Killdeer nest in the area and the open forest habitats support Hairy Woodpeckers, Northern Flickers, and Mountain Bluebirds.

Nest box observations: A total of ten boxes were checked on five dates from 9 June and 8 July 2000. Nesting species included Mountain Bluebird (1 box), Boreal Chickadee (1 box), and Tree Swallow (2 boxes).

Boreal Chickadee is a "secondary cavity nester" which uses nest cavities excavated by "primary cavity nesters" such as Three-toed Woodpecker. Photo by Jeanette McCrie.

4.11. Horse Creek Pond

Habitat: Horse Creek pond is located at the junction of the North Klondike Highway and Horse Creek Road just north of Shallow Bay. Willows, small dead trees, scattered Trembling Aspen, and rugged, dry hillsides surround this small beaver pond. Swallows regularly feed over the pond. Local residents use the pond for skating in winter.

Nest box observations: A total of three boxes were checked on three days between 31 May and 1 July 2000. Tree Swallows used one box.

4.12. Hidden Valley (9 Strawberry Lane)

Habitat: The nest boxes here are located in a country residential yard near the Takhini River in mixed forest including Trembling Aspen, White Spruce, Balsam Poplar, and willow. In general, these open habitats are used by cavity nesters such as Hairy Woodpecker, Northern Flicker, Tree and Violet-green Swallows and Black-capped Chickadee.

Nest box observations: Three nest boxes were monitored through the breeding season and occupants included Northern Flicker, Red-breasted Nuthatch, Tree Swallow and Violet-green Swallow. Only the Tree Swallows were successful this year. Observers Linda Gerrand and Jurg Hofer wrote;

> "*All three boxes are attached to trees in our yard. The Northern Flicker box (#1) is on the river bank on a tall spruce. It has been occupied by flickers for the past few years but this year I don't think they stayed. But they did nest somewhere close by. Box #2 in on a tall aspen and has been home to Red-breasted Nuthatches in the past. But this year they abandoned it and Tree Swallows moved in. The nuthatches stayed in the neighbourhood and visited the feeder regularly (and still do). Box #3 was on an aspen tree, and closest to the house. It has almost always housed swallows.*"

Violet-green Swallow. Photo by C. D. Eckert.

Red-breasted Nuthatch. Photo by J. McCrie.

4.13. Other locations

Volunteers on an opportunistic basis observed nest boxes around the City of Whitehorse. The habitats tended to be open mixed forests fragmented by residential and urban development.

1. ***Environment Canada Office:*** Two nest boxes located at the government offices at the corners of Hamilton Blvd. and the Alaska Highway were monitored through the breeding season. One box was used by Violet-green Swallows and successfully fledged four young (see photo below).

2. ***Takhini River Valley:*** Two nest boxes located in an open rural residential setting were monitored through the breeding season (Tannis Falkenberg). One box used by Mountain Bluebirds last year was not used this year. The second box had a successful nesting pair of Mountain Bluebirds with several young. The observer reported that there was fewer Mountain Bluebird in the area this year.

Violet-green Swallows ready to fledge. Photo by Cameron D. Eckert

5. DISCUSSION

The practice of putting up nest boxes for cavity nesting birds has a relatively long history in the Yukon. A. L. Rand (1946) reported that in 1944, Mountain Bluebirds were "*apparently nesting in holes in cut-banks, in hollow in aspens, and in bird houses in the settlement of Ross Post*." Since then, Yukoners have embraced the practice of putting up nest boxes to benefit cavity nesters. Through the course of our study, we found virtually no limit to the variety of nest boxes in the Southern Lakes area. They range from highly natural "boxes" made from sections of tree trunks, to industrial "boxes" constructed from tin coffee cans. They include highly ornate and decorative nest boxes, as well as plain functional models.

Yukon nest boxes range from "refined" to … "rustic"

In the Yukon, cavity nesters are generally free from competition for nest sites with introduced species such as House Sparrow and European Starling. These introduced species have had a significant negative impact on southern populations of cavity nesting birds. However, many Yukon cavity nesters are "habitat specialists" which require very

specific breeding habitats (e.g. Eckert et. al. 1997). These cavity nesters do suffer losses through human activities. Countless suitable nest trees are lost through fuelwood harvesting, as dead trees associated with burns and wetlands are cut down. Industrial and urban development of wetland areas results in habitat loss for cavity nesters. Key wetlands such as those at McIntyre Creek are without any protection and have been threatened through various forms of development in recent years. Most recently, a major wetland area in downtown Whitehorse was destroyed for commercial development.

Habitat loss for cavity nesters: In spring 2000, this wetland along Quartz Road in downtown Whitehorse was bulldozed and drained. Photo by Cameron D. Eckert.

This study found that nest boxes provide nest sites for a diverse group of birds. Seven species of birds and one mammal (Red Squirrel) used nest boxes during the summer of 2000. The dominant occupant was Tree Swallow, which corresponds to its abundance at the wetland sites we studied. As well, many of the boxes observed were swallow-sized. The Barrow's Goldeneye nest records were the Yukon's first documented records of this species using a nest box (Canadian Wildlife Service 2000). Observers commented that the cold spring seemed to be associated with fewer birds, particularly Mountain Bluebird. Despite the weather, our study found that nest boxes are an effective way to provide an immediate increase in nest sites for cavity nesters.

A nest box claims a small tree for cavity nesters where the larger trees they require have been cut.

A well designed nest box merges seamlessly with its environment.

Nest boxes that were in place prior to the initiation of the breeding season were much more likely to be used than those put out later in spring. On February 20, 2000 we checked about 20 existing nest boxes in the Southern Lakes area and found that 90 percent had been used by cavity nesting birds in previous years. This indicates that even though a nest may not be used in a given season, the vast majority is used over a period of a few years. We expect that the nest boxes put up after the initiation of the breeding season and therefore not used this year, will be used in subsequent years.

Nest boxes have proven to be an effective way to provide nest sites for cavity nesters and enhance their populations. Across North America, bird species as diverse as Osprey, Wood Duck, Eastern Bluebird and Prothonotary Warbler have benefited from artificial nesting structures (Ehrlich et.al. 1988). Nonetheless, proponents of nest box projects are unanimous in their assertion that habitat conservation is critical to the long-term health of these populations.

In addition to promoting nest boxes as a means to support cavity nesting birds, we recommend the following;

- Protection of wetlands throughout the Territory and especially in settlement areas where development pressure is high;
- Areas planned for development (e.g. agriculture, urban, forestry, etc) should be assessed for key habitats (e.g. wetlands, old-growth forest), and habitat features (e.g. standing dead trees) required by cavity nesters. Maintenance of these key habitats and features should be incorporated into development activities;
- Fuelwood harvesters can reduce their impact on cavity nesters by avoiding wetlands, and examining trees for nest holes and leaving nest trees standing.

We found that some species (e.g. swallows) readily use nest boxes. Further work on nest boxes in the Yukon Southern Lakes should focus on determining which factors increase the use of nest boxes by other species such as Mountain Bluebird, Boreal Chickadee, Red-breasted Nuthatch, ducks, raptors and owls. Many Yukoners have embraced the practice of establishing nest boxes. However, an understanding of the habitat requirements of cavity nesters and the adoption of land-use practices that benefit cavity nesters are not as well established. These key elements of awareness and action are essential for ensuring healthy populations of cavity nesters.

Ultimately, an awareness of the habitat requirements of cavity nesters and the adoption of land-use practices that recognize these needs are key to ensuring that species such as Northern Flicker (left) and Three-toed Woodpecker (right) will continue to find suitable nest trees.
Photos by Jeanette McCrie (left) and Cameron D. Eckert (right).

6. ACKNOWLEDGEMENTS

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8. APPENDIX A: Yukon Southern Lakes Cavity Nesters

Twenty-eight species of cavity nesters found in the Southern Lakes Area. Primary cavity nesters ([p]) are able to create cavities, while secondary cavity nesters ([s]) rely on cavities created by primary cavity nesters. Both primary and secondary cavity nesters will use nest boxes.

Ducks	**Woodpeckers**	**Songbirds**
Bufflehead [s]	Yellow-bellied Sapsucker [p]	Black-capped Chickadee [s]
Common Goldeneye [s]	Downy Woodpecker [p]	Mountain Chickadee [s]
Barrow's Goldeneye [s]	Hairy Woodpecker [p]	Boreal Chickadee [s]
Hooded Merganser [s]	Three-toed Woodpecker [p]	Red-breasted Nuthatch [s]
Red-breasted Merganser [s]	Black-backed Woodpecker [p]	Mountain Bluebird [s]
Common Merganser [s]	Northern Flicker [p]	Townsend's Solitaire [s]
Raptors	**Swallows**	**Mammals**
American Kestrel [s]	Tree Swallow [s]	Red Squirrel [s]
Merlin [s]	Violet-green Swallow [s]	Northern Flying Squirrel [s]
Northern Hawk Owl [s]	N. Rough-winged Swallow [p]	
Boreal Owl [s]	Bank Swallow [p]	
	Cliff Swallow [p]	

9. APPENDIX B: Yukon Southern Lakes Nest Box Project Guidelines

These guidelines will ensure that the Yukon Southern Lakes Nest Box Project maximizes benefits to cavity nesters and their habitats. These guidelines will enhance community support for the project, which in turn benefits cavity nesters and their habitats.

Nest boxes and the Environment:

- Nest boxes will be constructed of local wood;
- Nest boxes will be designed and constructed in a manner consistent with the natural environments into which they will be placed;
- Nest boxes will be placed to minimize exposure to nest;
- Nest boxes will only be fixed to dead trees or non-living structures (e.g. fence posts).

Nest boxes and the Community:

- Nest boxes will primarily be placed in appropriate natural settings (e.g. wetlands) on public land;
- Nest boxes that have been damaged or have deteriorated will be repaired or removed;
- Nest boxes will be place in “low traffic” areas to minimize the impacts of vandalism and human access to bird nests;
- The final project report will be distributed to the public as part of sharing information, increasing awareness, and responding to interest and/or concern about the habitat requirements of cavity nesters and the role of nest boxes.

Nest box monitoring:

- Nest boxes will be observed through the nesting season to determine occupancy;
- Nest box checks will be conducted in a manner that minimizes disturbance to nesting birds.

10. APPENDIX C: Nest Box Project nest record data, year 2000

Location	Box No.	Observer	Species	Date	Behaviour
Lewes Marsh	A11	AR	Tree Swallow	June 10	nest cup built in box, no eggs.
				June 24	5 eggs in box.
				July 3	5 young in box.
				July 12	5 young in box.
Lewes Marsh	A3	AR	Tree Swallow	June 2	grasses in box.
				June 10	2 eggs in box
				June 24	adult female on nest
				July 3	adult still incubating.
				July 12	adult still incubating.
Mary Lake	D10	SM	Tree Swallow	June 5	adult sitting in nest box.
				June 26	adult hunting over nest & water.
Mary Lake	D12	SM	Barrow's Goldeneye	June 12	male stay near box: nesting not confirmed.
Mary Lake	D14	SM	Tree Swallow	June 26	adult leave nest box to feed.
				July 3	adult carrying food to nest.
Mary Lake	D15	SM	duck sp.	June 26	lots of downy feathers in box.
				July 3	sign of box being used by duck.
Mary Lake	D16	SM	Tree Swallow	June 26	adult sitting in box.
Mary Lake	D19	SM	Violet-green Swallow	June 5	adult sitting in box.
Mary Lake	D2	AR	Tree Swallow	June 9	7 eggs in nest box.
				June 30	5-6 young in box.
				July 7	5 young in box.
Mary Lake	D7	SM	Barrow's Goldeneye	June 12	adult sitting in box.
				July 3	saw ducklings near box.
Versluce Meadow	L2	AR	Tree Swallow	June 9	6 eggs in box.
				July 8	eggs not hatched.
lower McIntyre Creek	2	RS	Tree Swallow	June 18	pair of adults sitting on and in box.
				June 27	one adult in box, other perched nearby.
				July 4	adults in and out feeding young.
				July 7	adult carrying food: young seen at nest hole.
				July 18	apparently fledged.
mid McIntyre Creek	1	RS	Tree Swallow	June 27	one adult in box, one on box.
				July 4	two adults in and out of box.
				July 7	two adults in and out of box.
				July 18	adult at box.
mid McIntyre Creek	2	RS	Tree Swallow	June 18	adult in box.
				June 27	adults defending nest from Common Raven.
				July 4	adult carrying food in and out feeding young.
				July 7	adult carrying food and feeding young at hole.
mid McIntyre Creek	4	RS	Tree Swallow	June 27	adult in box.
				July 4	adults in and out of box.
				July 7	adults in and out of box.
mid McIntyre Creek	5	RS	Tree Swallow	June 27	two adults in and out of box.
				July 4	adult perched nearby.
				July 7	adults perched near box.
mid McIntyre Creek	7	RS	Tree Swallow	June 18	adult sitting in nest box hole.
				June 27	two adults going in and out of box.
				July 4	one adult in box. Other in and out.
				July 7	adults in and out of box.

Location	Box No.	Observer	Species	Date	Behaviour
mid McIntyre Creek	8	RS	Tree Swallow	June 18	adult sitting in nest box hole.
				June 27	two adults going in and out of box.
mid McIntyre Creek	9	RS	Red Squirrel	June 27	possible squirrel in box.
				July 7	Red Squirrel in box.
mid McIntyre Creek	10	RS	Tree Swallow	June 18	box filled with feathers.
				July 4	adults mobbing, in and out of box.
mid McIntyre Creek	11	RS	Tree Swallow	June 18	adult sitting in nest box hole.
				June 27	adult at nest box.
Upper McIntyre Creek	1	RS	Boreal Chickadee	June 18	two adults going in/out of box feeding young. Adult left with fecal sac.
				June 27	apparently fledged.
Upper McIntyre Creek	2	RS	Tree Swallow	June 27	two adults in and out of box.
				July 8	adults carrying food and feeding young in box.
				July 5	adults carrying food and feeding young in box.
Upper McIntyre Creek	3	RS	Tree Swallow	June 18	two adults, apparently incubating.
				June 27	two adults in and out of nest box.
				July 8	adults carrying food and feeding young in box.
				July 5	adults carrying food and feeding young in box.
Yukon College	O3	AR/MG	Tree Swallow	June 13	adults and 3 eggs in box.
				June 28	Adult in and out of box.
				July 1	apparently fledged.
Yukon College	O7	AR	Tree Swallow	June 13	1 egg in nest box.
				July 1	5 eggs in box but no adults near.
Rodeo Grounds	R4	AR	Tree Swallow	June 13	5 eggs in nest box.
				July 1	5 young (~ 5 days old) in box.
				July 8	5 young in box.
Rodeo Grounds	R5	AR	Tree Swallow	May 31	some grasses in box.
				June 13	2 eggs in box.
				July 1	5 eggs in box.
				July 8	5 young (~2 days old).
				July 11	5 young (~5 days old).
Shallow Bay	S2	AR	Tree Swallow	May 31	nest cup 1/5 built in box.
				June 13	6 eggs in box.
				July 1	young (~3-4 days old) in box.
				July 8	5 or 6 young in box.
				July 11	4 young banded
Shallow Bay	S4	AR	Tree Swallow	June 13	6 eggs in box.
				July 1	young (~ 3 days old) in box.
				July 8	young in box.
				July 11	6 young in box.
Takhini Ponds	P1	AR	Mountain Bluebird	June 17	adults very active at box.
				June 24	not active.
				July 2	adult near box but not in.
Takhini Ponds	P10	AR	Tree Swallow	July 1	adults in and out of box.
				July 2	adults in and out of box.
				July 5	adults in and out of box.
Takhini Ponds	P5	AR	Tree Swallow	July 1	adult in and out of box.
				July 2	adult In box.
				July 5	adult in and out of box.
Takhini Ponds	P7	AR	Boreal Chickadee	June 17	adults feeding young in box.
				June 24	young apparently fledged.

Location	Box No.	Observer	Species	Date	Behaviour
Horse Creek Pond	T1	AR	Tree Swallow	May 31	nest cup 1/3 built in box.
				June 13	6 eggs in box.
				July 1	6 dead young (~4 days old) in box.
Hidden Valley	1	LG, JH	Northern Flicker	May 15	adult at nest box.
				June 5	no sign of adults, although they used box in '99.
Hidden Valley	2	LG, JH	Red-breasted Nuthatch	May 23	adult at nest box.
				June 5	apparently displaced by Tree Swallows.
Hidden Valley	2	LG, JH	Tree Swallow	June 5	adults in nest box.
				June 8	adults in nest box.
				June 18	adults in nest box.
				July 1	adults in nest box.
				July 4	young heard in box.
				July 14	very vocal young at box hole.
				July 16	young fledged.
Hidden Valley	3	LG, JH	Violet-green Swallow	May 29	adults building nest in box.
				June 3	adults in and out of box.
				June 8	adults in and out of box.
				June 11	adults chase squirrel away from box.
				June 14	no adults present.
				June 18	no adults. Box contained feathers and a bone. Nest was built on top of stash of mushrooms.
Whitehorse (Hamilton Blvd)	1	CE	Violet-green Swallow	July 25	4 young fledged from nest box.
Takhini River Valley	1	TF	Mountain Bluebird	June to July	a pair of adults at one box was reported to have successfully fledged young.

Observers: Cameron Eckert (CE), Tannis Falkenberg (TF), Linda Gerrand (LG), Mike Gill (MG), Jurg Hofer (JH), Suzanne MacDonald (SM), Amélie Rousseau (AR), Reagan Szabo (RS).

11. APPENDIX D: Project Budget, Year 2000

PROJECT BUDGET YEAR 2000	
ITEM or TASK	**Total**
PART I: Project Development & Management	
Project Coordinator: 0.6 day @ $250/day	150
Technical Advisor: 2 days @ $250/day	500
Field Manager: 1.16 days @ $250/day	290
YCS project administration	500
PART II: Nest box construction & installation	
Field Manager: 2 days @ $250/day	500
Technical Advisor: 1 days @ $250.00/day	250
Materials, supplies, and gas	160
PART III: Breeding Season Monitoring	
Field Manager: 4 days @ $250/day	1000
Technical Advisor: 1 days @ $250.00/day	250
PART IV: Educational Component	
Project Coordinator: 0.6 @ $250/day	150
Technical Advisor: 1 days @ $250.00/day	250
PART V: Data Analysis, Final Report and Project Assessment	
Field Manager: 1 days @ $250/day	250
Technical Advisor: 3 days @ $250/day	750
TOTAL	**5000**

New nest boxes established at McIntyre Creek Wetlands.

12. APPENDIX E: Standard Nest Box Sizes

Metric measurements:

Species	box floor (cm)	box height (cm)	entrance height (cm)	entrance diametre (cm)	placement height (m)
Mountain Bluebird	13x13	20-30	15-25	4	1-2
chickadee	10x10	20-25	15-20	2.8	1-5
Red-breasted Nuthatch	10x10	20-25	15-20	3.1	2-5
swallows	13x13	15-20	10-15	4	2-5
Downy Woodpecker	10x10	20-25	15-20	3.1	2-5
Hairy Woodpecker	15x15	30-38	23-30	4	2-6
Northern Flicker	18x18	40-45	35-40	6.25	2-6
Pileated Woodpecker	20x20	40-60	30-50	8x10	5-8
Yellow-bellied Sapsucker	13x13	30-38	23-30	4	3-6
Small owls and American Kestrel	20x20	30-38	23-30	8	3-6
ducks	25x45	25-60	30-40	10	3-6

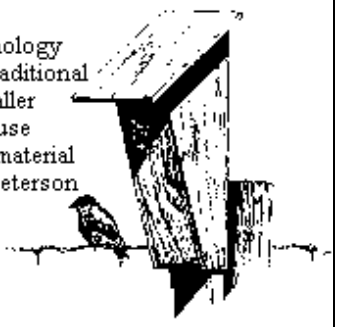
Imperial measurements:

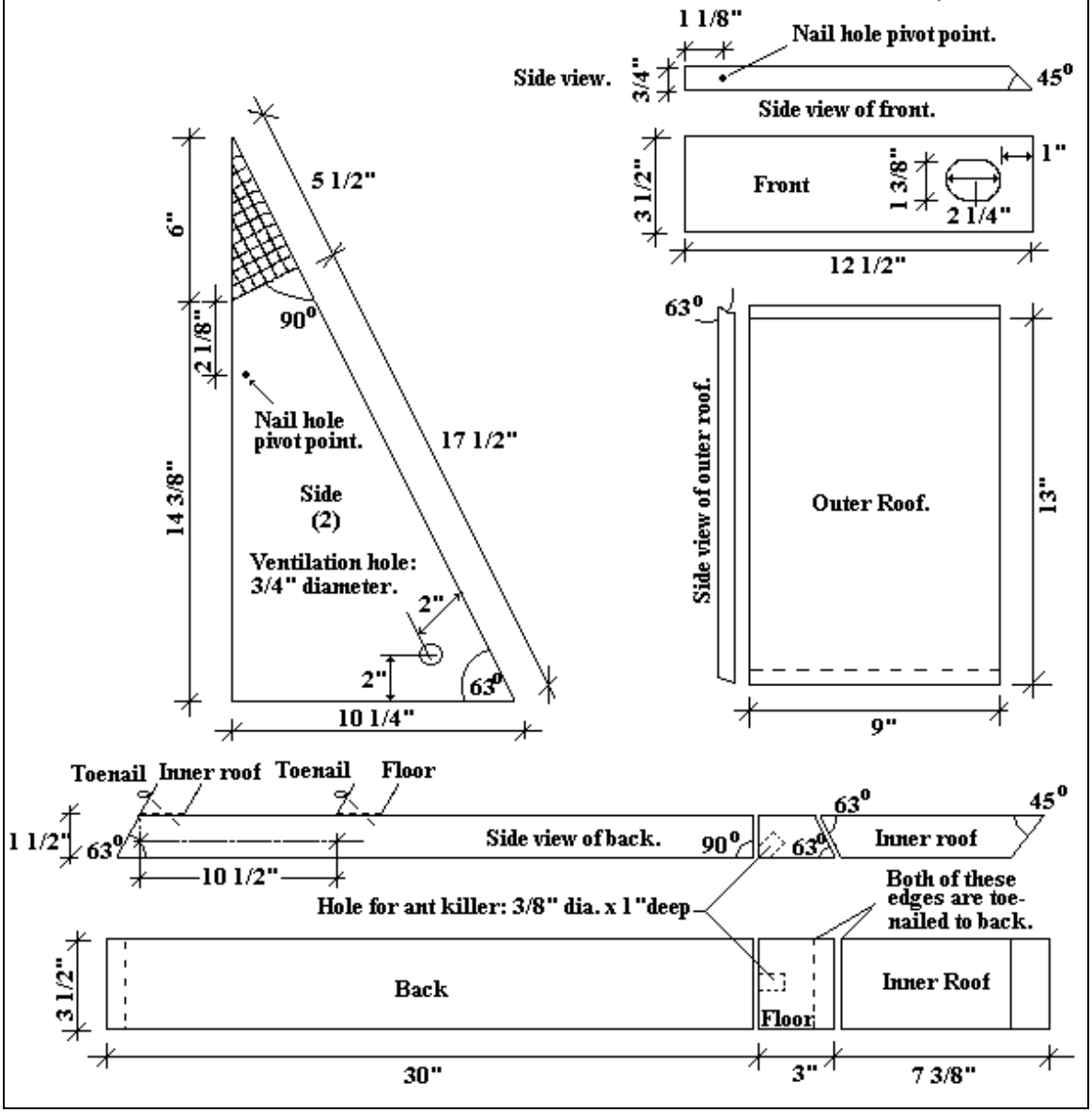
Species	box floor (in)	box height (in)	entrance height (in)	entrance diametre (in)	placement height (ft)
Mountain Bluebird	5x5	8-12	6-10	1-9/16	4-6
chickadee	4x4	8-10	6-8	1-1/8	4-15
Red-breasted Nuthatch	4x4	8-10	6-8	1-1/4	5-15
swallows	5x5	6-8	4-6	1-1/2	5-15
Downy Woodpecker	4x4	8-10	6-8	1-1/4	5-15
Hairy Woodpecker	6x6	12-15	9-12	1-1/2	8-20
Northern Flicker	7x7	16-18	14-16	2-1/2	6-20
Pileated Woodpecker	8x8	16-24	12-20	3x4	15-25
Yellow-bellied Sapsucker	5x5	12-15	9-12	1-1/2	10-20
Small owls and American Kestrel	8x8	12-15	9-12	3	10-30
ducks	10x18	10-24	12-16	4	10-20

13. APPENDIX F: Technical Plans for Bluebird House

Peterson Bluebird House

The most recent data presented by W.H. Davis in the Journal of Field Ornithology in 1996 suggests that eastern bluebirds prefer this style of house over the traditional rectangular box. Bluebirds seem to prefer the oval entrance and slightly smaller floor area of the Peterson house. This design is more difficult to build because of the angled cuts required. It is also more costly because of the increased material involved. Personal preference also plays a part in nest box choice and the Peterson house is often chosen for its appearance.

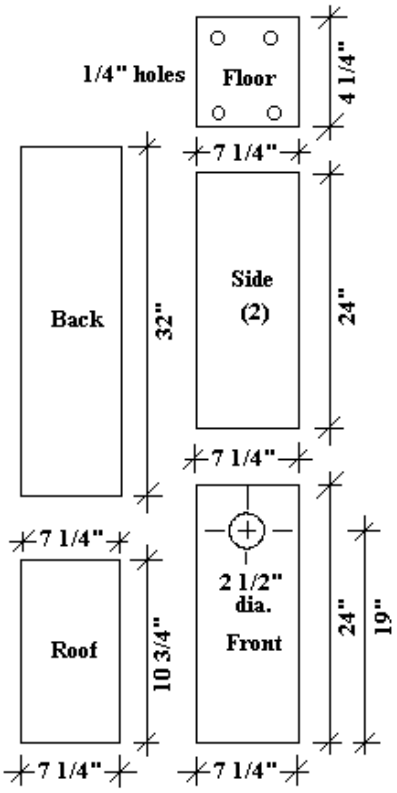


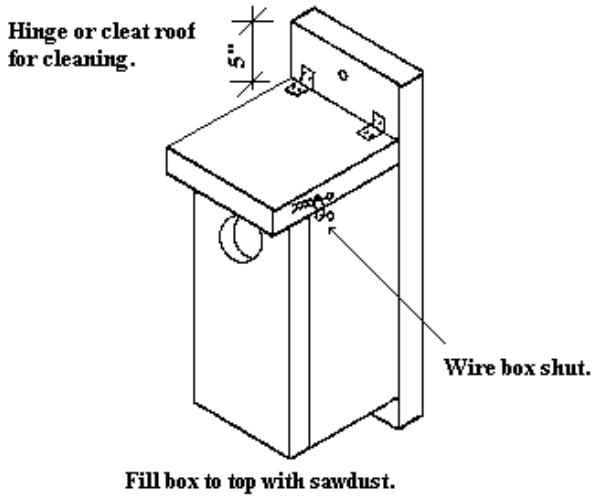


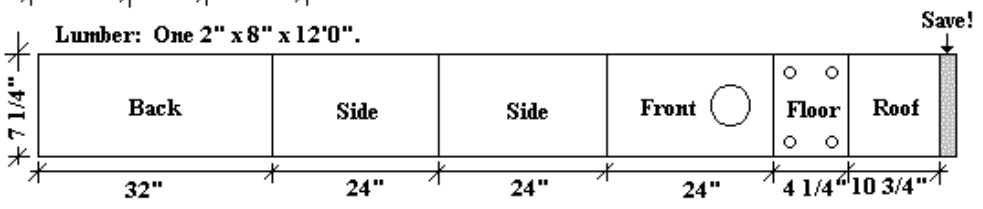
14. APPENDIX G: Technical Plans for Northern Flicker Box

Northern Flicker Nest Box

The flicker is a common woodpecker in North Dakota distinguished by its yellow tail feathers and red patch on the back of the head and neck. They nest in wooded areas and in town. Flickers are excavators and are more likely to use a nest box if it is completely filled and packed with sawdust. This simulates a dead tree with a rotting inside. Boxes should be attached to a post and placed 4-6 feet high. A 1 1/2" thick rough cut cedar material is preferred.







15. APPENDIX H: The “Yukoner” Nest Box.

Sometimes refined materials are not always on hand and a northern nest box enthusiast must make do with the available supplies. Behold, the “Yukoner” Nest Box …