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# How do woodpeckers choose where to nest?

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## Abstract

Many human activities disturb the natural *habitats* of various species. This is why it is very important for wildlife managers to determine and protect *high-quality habitats*, which are habitats the most *reproductively successful* individuals choose. When it comes to breeding birds, researchers usually identify habitat by comparing the characteristics of the *vegetation* where pairs choose to nest to the characteristics of the other available but neglected vegetation. We suspected that this method was not reliable for identifying highquality habitat, because it doesn't account for the preferences of early breeders, who are usually a lot more experienced and reproductively successful birds. This is why we contrasted the choices of earlier breeding *yellow-bellied sapsucker* pairs to those of the later ones. We then compared this method to the one usually used. We found that measuring the preferences of early breeders led to a better ability to measure the quality of the habitat.

**Figure 1:** Yellow-bellied sapsucker pair feeding nestlings in an aspen tree

## Introduction

All living things, including humans, need a place to live where they can find all necessary resources like food, water, shelter, etc. For us, this place is our home! We call the homes of animals and plants their *habitat*. Animals choose their homes for the same reasons we people do: to be safe from bad weather and natural enemies and to raise their young.

However many human activities, such as forestry, mining and agriculture, disturb the natural habitats for a lot of species, which can lead to their populations declining. This is why it is very important to identify and protect *high-quality habitats* – the habitats the most reproductively successful individuals choose. To find out what birds choose as habitat, researchers often compare the characteristics of the vegetation on which breeding birds choose to nest with the characteristics of the plants which are available but the birds neglect. This type of analysis is called a *"use-availability"* study, and researchers learn from these studies which habitat characteristics the birds choose most often.

But many studies show that the most frequently selected characteristics for nesting were not the best choices when it comes to reproductive success. Thus, a use-availability study might not be the best indicator for high-quality bird habitats. What if we monitor the choices of more experienced birds, who breed earlier and thus have more options available for nest sites than the later breeders? We wondered if this could be a better indicator for high-quality bird habitat.

We decided to study yellow-bellied sapsucker *woodpeckers*, a *keystone species* who provide resources to other species as well. Woodpeckers make nests by *excavating cavities* in tree trunks. Sometimes when they are finished nesting, other species like bats, northern flying squirrels, and even small owls use these same cavities for breeding and shelter. Sapsuckers make sap wells in the trunks of living trees, especially birch trees. These little holes help them get to the nourishing tree sap, which they lick out with their specialized tongues. Other species can also use these holes to get access to the sap.

## Methods

To answer our research question, we monitored the nests of yellow-bellied sapsuckers in a boreal forest in British Columbia (Figure 2) for three years. We assessed the woodpeckers' habitat choices:

1. with a use-availability analysis (Study 1)
2. by comparing the nest-site choices of earlier breeding birds to those of the later breeding ones (Study 2)

We then found out whether the choices each study identified led to reproductive success, measured as the number of *fledglings* in each nest.

Using field observations and published studies, we predicted what habitat characteristics the birds would prefer, hypothesizing they would choose:

- larger trees so that they can make larger cavities for their chicks
- more decayed trees because it's easier to make holes in them
- trees in close vicinity to other potential nest trees
- to excavate cavities with south-facing entrances – to ensure more warmth inside
- to excavate or use old cavities higher from the ground (to protect chicks from predators)

**Figure 2:** Location of the study site in northeastern British Columbia, Canada.
Photo credit: Wikipedia

## Results

According to Study 1 (the use-availability analysis) the sapsuckers didn't choose trees for nesting based on food availability. They chose to nest in:

- medium-sized instead of available large trees
- decaying *aspen* trees (Figure 3)
- aspen trees surrounded by other aspen trees that were also decaying

However, none of the habitat choices led to higher fledgling counts

**Figure 3:** Aspen trees (a) and birch tree (b)

In Study 2 (comparing early breeders vs later breeders) we had differing results (Figure 4). Early breeders:

- laid more eggs and *fledged* more chicks.
- nested in areas with more live birch trees.
- excavated the cavities higher than later breeders did.
- often excavated north-facing cavities, and more chicks fledged from north-facing than south-facing cavities.
- chose to nest in less decayed trees.

Which group of birds (earlier or later breeders) nest where food trees are more abundant?

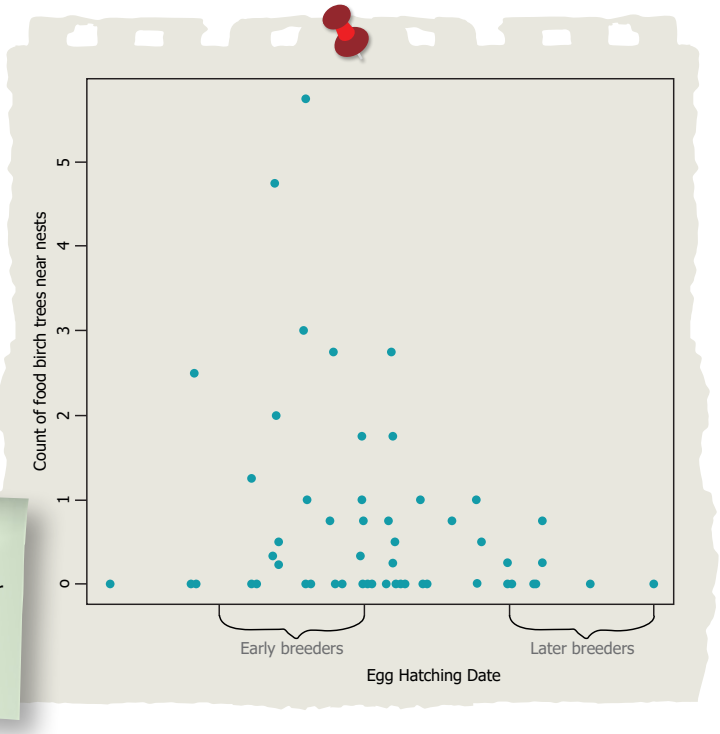


**Figure 4:** Earlier breeders choose to nest near more food (birch) trees

## Discussion

We found that the use-availability study showed which habitat characteristics most pairs chose, but none of these characteristics predicted reproductive success. That's because this analysis did not reflect the preferences of the more reproductively successful birds, who are a smaller portion of the population but contribute a lot more to population growth. To our knowledge, ours is the first study to compare the choices of earlier breeding birds versus the later breeding ones to measure habitat quality. And the results showed that early breeders chose different characteristics for nest sites than the later breeders. For example, a lot of the early breeders excavated north-facing cavities, and most importantly more chicks fledged from north-facing cavities than south-facing cavities.

Earlier breeding pairs also preferred to nest among many live birch trees (which could provide them with a lot of food) and in less decayed trees. Even though we predicted they would choose really decayed trees since it is easier for the birds to make holes in them, it made sense to choose less decayed trees – after all, these trees are less likely to break (due to dead wood) and cause nests to fall down. All of our results suggest that the choices of early breeders are a better tool for habitat quality assessment than the use-availability study.

## Conclusion

Birds are very important to the environment. Many of them pollinate flowers, while others eat insects and keep their populations in check. Many fruit-eating birds help disperse seeds to new places, too. Plus, woodpeckers create cavities other species can use as homes, and sapsuckers make sap wells other animals eat from, too. So it is very important to protect birds and their habitat. Here are some simple things you can do to help them:

- Feed them: keep bird feeders on your balcony or in your yard.
- Keep cats indoors, because these predators kill millions of wild birds every year.
- Use fewer plastic bags and discard them safely, because birds sometimes get stuck in them.
- Avoid chemical pesticides as much as possible – they harm more than pests!
- Try to conserve paper, because it comes from forests where many birds like yellow-bellied sapsuckers try to find good habitat.

## Glossary of Key Terms

**Aspen tree:** deciduous tree with large round leaves. They grow straight and tall with many aspens near each other. Aspen trees are prone to decay on the inside of the tree trunk, and thus they make great homes for woodpeckers.

**Excavate cavities:** make holes. Woodpeckers use their beaks to excavate cavities in trees, and rabbits excavate cavities in the ground.

**Fledge a chick:** raise a baby bird until its wing feathers are developed enough to carry it in flight

**Fledgling:** a young bird who has just developed wing feathers

**Habitat:** a natural environment of an animal or plant (or other living organism). It provides food and shelter.

**High-quality habitats:** habitats the most experienced (and usually the most reproductively successful) breeders choose

**Reproductively successful:** producing a good number of offspring who are also able to reproduce later

**Use-availability study:** a study that compares the characteristics of the habitat that animals choose with the characteristics of areas that are available but the animals neglect

**Vegetation:** all the plant life of a particular area

**Yellow-bellied sapsuckers:** woodpecker species distributed around Canada and the USA. They provides resources to other species not only via the holes they make in the trees for nesting but also because they make sap wells. See Figure 1.

**Woodpeckers:** a large group of birds that excavate cavities in trees with their bills in which they lay eggs and raise their young

**Keystone species:** a species that makes habitat for other species. For example, woodpeckers excavate cavities in trees to nest in them. When they're finished with the cavity, other species use them for breeding and shelter.

## Check your understanding

1. Why do we think that early breeders choose better sites for nesting than the later breeding pairs?
2. In our study, were the early breeding woodpeckers more reproductively successful than the later breeding pairs?
3. What is a use-availability study?
4. What is the drawback of a use-availability study?
5. Why are birds an important part of the ecosystem?
6. For the curious: Why don't woodpeckers get headaches?

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