

Vertebrate Species That Interact with Red-headed Woodpecker Nest Cavities As Documented by Nest Cameras

A Journey into New Discoveries Using Nest Cameras at Red-headed Woodpecker Nests



Text and Photography by Siah L St. Clair



The Red-headed Woodpecker Recovery project (RhWR) was organized in 2007 and is a 501(c)(3) tax-exempt non-profit organization.

Investigation and research activities about Red-headed Woodpeckers (RHWOs) at Cedar Creek Ecosystem Science Reserve began in 2008 when Cedar Creek ESR gave a permit to the RhWR to initiate those activities on site. The RhWR has continued investigation and research activities since 2008 both at Cedar Creek ESR and at other locations.

Field observation efforts for included information occurred between 2012 and 2025 in all 12 months of the year, with a combined 2,563 days and 15,438 hours by Siah St. Clair and work partner Jim Howitz. All observations were made during a succession of RHWO study and research projects. Many activities required extensive experience and expertise as well as special permits and permissions.

By conducting these observation activities new natural history behaviors of RHWOs have been documented and will be used to help reduce the decline of this species and other species impacted by the presence of RHWOs.

Unless otherwise noted, the information and photographs provided herein are based solely on observations by Siah L St. Clair, a volunteer of the Red-headed Woodpecker Recovery project.



Vertebrate Species That Interact with Red-headed Woodpecker

Nest Cavities as Documented by Nest Cameras

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Introduction--Background

Between 2019 and 2025 (over six full years) I placed nine specially adapted nest cameras three feet from 30 Red-headed Woodpecker nest and roost cavities at Cedar Creek Ecosystem Science Reserve in East Bethel, Minnesota. (See page 102 for more information about the cameras and help involved with installation and maintenance.) The cameras operated 24 hours per day 365 days a year. This resulted in 293,784 hours of cavity surveillance and 500,315 pictures and videos. (More details in separate article.)

While extensive behaviors at the cavities by Red-headed Woodpeckers were documented, the cameras also captured behaviors by 36 other vertebrate species interacting with the Red-headed Woodpeckers and/or their cavities in 13 distinct ways. Many of these interactions have not been documented before at Red-headed Woodpecker cavities.

This article has examples with pictures (screen shots from videos) of each of the kinds of interactions recorded by each of the species of these mammals, birds, reptiles, and amphibians. Brief descriptions accompany pictures for explanations of the interaction and relevant before and after information. This makes for a long article (102 pages). Check the content page for the page number of a specific animal.



Nest cameras documented 36 vertebrate species interacting with Red-headed Woodpecker cavities. These included 10 mammals, 23 birds, 2 reptiles, and 1 amphibian. These species were recorded during the day, at twilight, at night, and for some species every month of the year. Some were recorded only once (8), and another group (11) were recorded many hundreds or even thousands of times. Table 1 below lists the kinds of interactions recorded by these vertebrate species at the Red-headed Woodpecker cavities.

Table 1

Types of Interaction at Red-headed Woodpecker Cavities by 36 Vertebrates from Nest Cameras

	Interaction Type	# of Species		Interaction Type	# of Species
1.	Nest in Cavity	6	8.	Search for Food	19
2.	Inspects Cavity	22	9.	Find Nesting Material	1
3.	Roost in Cavity	9	10.	Use as Watering Hole	11
4.	Temporary Shelter	17	11.	Alter for Access or Food	4
5-6	Predator/Infanticide	11/2	12.	Obligate Brood Parasite	1
7.	Usurpation of Cavity	12	13.	Resource Competition=Death	1

Table 2

Vertebrates Documented Interacting with Red-headed Woodpecker Cavities by Nest Cameras

#	Species	#	Species
1.	White-footed Mouse <i>Peromyscus leucopus</i>	19.	Pileated Woodpecker <i>Dryocopus pileatus</i>
2.	Southern Flying Squirrel <i>Glaucomys volans</i>	20.	American Kestrel <i>Falco sparverius</i>
3.	Red Squirrel <i>Tamiasciurus hudsonicus</i>	21.	Great Crested Flycatcher <i>Myiarchus crinitus</i>
4.	Gray Squirrel <i>Sciurus carolinensis</i>	22.	Blue Jay <i>Cyanocitta cristata</i>
5.	Fox Squirrel <i>Sciurus niger</i>	23.	Common Raven <i>Corvus corax</i>
6.	Eastern Chipmunk <i>Tamias striatus</i>	24.	Black-capped Chickadee <i>Poecile atricapillus</i>
7.	Raccoon <i>Procyon lotor</i>	25.	Tree Swallow <i>Tachycineta bicolor</i>
8.	Fisher <i>Pekania pennanti</i>	26.	White-breasted Nuthatch <i>Sitta carolinensis</i>
9.	Mink <i>Neovison vison</i>	27.	Brown Creeper <i>Certhia americana</i>
10.	Bat (<i>Vespertilionidae</i>)	28.	Eastern Bluebird <i>Sialia sialis</i>
11.	Wood Duck <i>Aix sponsa</i>	29.	European Starling <i>Sturnus vulgaris</i>
12.	Red-tailed Hawk <i>Buteo jamaicensis</i>	30.	House Wren <i>Troglodytes aedon</i>
13.	Ruby-throated Hummingbird <i>Archilochus colubris</i>	31.	Baltimore Oriole <i>Icterus galbula</i>
14.	Red-bellied Woodpecker <i>Melanerpes carolinensis</i>	32.	Brown-headed Cowbird <i>Molothrus ater</i>
15.	Yellow-bellied Sapsucker <i>Sphyrapicus varius</i>	33.	Tufted Titmouse <i>Baeolophus bicolor</i>
16.	Downy Woodpecker <i>Dryobates pubescens</i>	34.	Bullsnake <i>Pituophis catenifer</i>
17.	Hairy Woodpecker <i>Dryobates villosus</i>	35.	Eastern Garter Snake <i>Thamnophis sirtalis</i>
18.	Northern Flicker <i>Colaptes auratus</i>	36.	Gray Treefrog <i>Hyla versicolor</i>

Some of the vertebrates listed in table 2 above were documented by the nest cameras only once. Examples are Mink, Fisher, Wood Duck, Tufted Titmouse, Eastern Garter Snake, and the Hummingbird. Tufted Titmice had not been observed in Cedar Creek for over 45 years, so this was an excellent recording of their presence. The other species are common in the area, and their interactions are described in the species accounts within this article.



Cavity Interaction Frequency

Many of the interactions at Red-headed Woodpecker cavities occurred hundreds of times with multiple species. Nest cavity inspection occurred in 22 species, search for food in 19 species, and 19 species used the cavities for temporary shelter. Two of the cavity interactions occurred in only one species. Collecting nest material occurred in only one species (Hummingbird), and Brood Parasitism was also in only one species (Cowbird). All other interactions were recorded in numerous species.

Individual Vertebrate Species Interactions with Red-headed Woodpecker Cavities

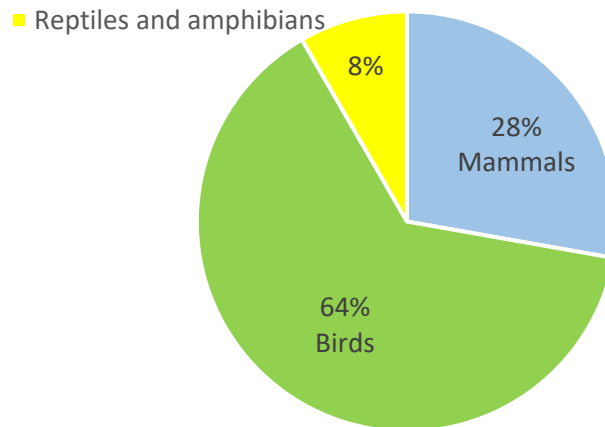
Vertebrate Groups Interacting With RHWOCavities

Table 3

Vertebrate Species by Class

1. Mammals	10
2. Birds	23
3. Reptiles	2
4. Amphibians	1

Total **36 Species**



The above table and pie chart show the different types and percentages of vertebrates that the nest cameras documented interacting with Red-headed Woodpecker nest cavities, but they do not give the frequency that interactions occurred. While a few species were documented only once by all nest cameras combined, a few other species were recorded 10, 20, or 397 times at a single nest cavity in one 24-hour period, day after day, or night after night. The nest cameras recorded 12,241 days and nights.

Southern Flying Squirrels and White footed Mice were the most common, regular species seen at all nest cavities (other than Red-headed Woodpeckers). They nested in the cavities, and in other cavities in the same tree. They were regularly recorded in all seasons at and around the cavities, tending young, finding food, stealing cached food, taking shelter, eating food, climbing up and down the trees, and attempting to usurp cavities.

Birds that nested in Red-headed Woodpecker cavities were seen many times a day bringing food to nestlings, bringing nesting material, removing old nest material, removing fecal sacs, or defending the nest against intruders. At one Tree Swallow nest (in an old Red-headed Woodpecker nest) on a June 27th the author recorded 397 visits by adults to the nest in just one day.

While some animals were only recorded once, Southern Flying Squirrels, White-footed Mice, and Tree Swallows, for example, were each recorded thousands of times at/near the cavities by the nest cameras.

What follows is a photographic and description journey into the specific interactions of the 36 vertebrate species recorded by the Red-headed Woodpecker nest cameras. When setting these cameras up the intention was to learn about Red-headed Woodpeckers. Discovering that so many other animals were interacting to such an extent at the cavities was unexpected and revelatory. The following pictures of interactions will be accompanied by descriptions of what is occurring in the picture. Most pictures are frame shots taken from 10 to 30 second-long low-resolution videos. Some have been lightened or brightened for clarity.

This photographic journey is organized first with all mammal species, then birds, and finally reptiles and amphibians. Each animal species will be presented by common name. A table of each group's species' interactions will begin the pages for that class of animals.

Mammal Interactions at Red-headed Woodpecker Nest and Roost Cavities



Eastern Chipmunk



Mink



Southern Flying Squirrel



Raccoon

These example mammal pictures are not from nest cameras.

Table 4

Interactions of Mammal Species at Red-headed Woodpecker Nest/Roost Cavities as Recorded by Nest Cameras

	Mammal Species At Cavity	Nest	Consider For nest Inspect nest cavity	Roost	Temp Shelter	Predation-P Infanticide-I or Resource Competition-R	Usurp	Search for food	Water Hole	Alter for Access or Food
1	Red Squirrel	X	X	X	X	I	X	X		
2	Gray Squirrel		X	X	X		X	X	X	X
3	Fox Squirrel		X	X	X		X	X	X	X
4	Southern Flying Squirrel	X	X	X	X	P-I-R	X	X	X	
5	E. Chipmunk		X		X					
6	W. F. Mouse	X	X		X		X	X		
7	Raccoon					P				
8	Mink					P				
9	Fisher					P				
10	Bat-species				X			X		

Nest cameras recorded ten different mammal species interacting with Red-headed Woodpecker nest or roost cavities in 11 different ways. **Infanticide** involves killing young of your own species, **resource competition**, when it involves killing young of another species, is for access to resources (cavities) and not for food. There may have been more than one bat species present. Seven of the mammal species directly interacted with Red-headed Woodpeckers. Nine of the ten species were recorded at night by the cameras. Most of all nighttime videos were initiated by one or more of these mammal species. Nighttime videos might be 4% of total videos over two weeks (47 of 1,247) or 76% over two weeks (486 of 644).

Eastern Fox Squirrel (*Sciurus niger*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Fox Squirrels are the largest tree squirrel in Minnesota and are not uncommon at Cedar Creek ESR. While I did not notice them much when working in the field at Cedar Creek, Fox Squirrels were regularly recorded by the RHWO nest cameras and involved in 7 types of interactions at the cavities. Fox Squirrels frequently **inspect** RHWO cavities, they **roost** in the cavities and use them in the daytime as **temporary shelter**. Fox Squirrels attempt to **usurp** RHWO cavities from other animals, they **search for food** in and around the cavities, and they **alter the cavities** to gain **access**. When a RHWO cavity fills with water they will use the cavity as a source of **drinking water**. Following are pictures (frame shots) from the nest cameras of each of these different interactions. Some types of interactions are more obvious when viewing the full video.



Fox Squirrels are too big to enter a normal Red-headed Woodpecker cavity, so they chew on the entrance until they have access and then use it for temporary shelter. Other animals also gain access with this enlarged entrance hole.



In this picture a Fox Squirrel is attempting to usurp a Red-headed Woodpecker cavity from a Southern Flying Squirrel. Flying squirrels are very aggressive and defend their home cavities even from much larger adversaries, as seen here.

The flying squirrel prevailed in this fairly short confrontation. The Fox Squirrel was not willing to risk severe bites to its nose from the much faster Flying Squirrel.

These pictures are examples that good cavities are in high demand day and night.



In this video frame shot a Fox Squirrel has chased a Hairy Woodpecker out of its night roost. It is easy to hear animals climbing on these trees at night, which is what alerted the Hairy Woodpecker to the possible danger. With the aggressive paw swipe by the squirrel, captured by this image, the Hairy Woodpecker left the tree.

The Fox Squirrel discovered the cavity entrance was too small and left, and the Hairy Woodpecker then returned to this night roost cavity.

Dead trees will shift position as the tree decays. This Red-headed Woodpecker cavity was successfully used as a nest by Red Heads the previous year, but during the winter the tree shifted position, letting rainwater run directly into the cavity, filling it. This image is of a Fox Squirrel on one of its regular visits here, getting a drink of fresh water, in a less exposed and much safer location than other water holes.





This Fox Squirrel is searching for cached acorns or any other food that might be located at this Red-headed Woodpecker nest cavity.

A pair of Red Heads nested successfully in this cavity during the summer months, but a low acorn production in this year caused them and the other Red Heads to migrate away for the fall and winter months. That means that this Fox Squirrel did not find any Red Head cached acorns, in this tree or elsewhere. This squirrel had a lean winter and needed to find enough food in other places to survive the winter.



The following winter (2021-22) there were more acorns and almost half of the Red-headed Woodpeckers stayed for the winter. The Red Head in this picture was one of the ones who stayed and had cached acorns on this nest tree. The Fox squirrel in the picture knows there are cached acorns and is trying to steal enough for a meal, but the Red Head uses its beak to chase the squirrel away.

There are many animals trying to 'cash' in on the woodpecker's stored acorns, and many are successful.

Fox Squirrels were regularly recorded checking out Red-headed Woodpecker cavities. Possibly searching for food, as a possible nighttime roost, or for temporary shelter. Dead trees are good places for viewing what is around but also make it easy to be seen. Predators are common at Cedar Creek and knowing where the closest bolt-hole is located may mean the difference in life or death.





On a cold, below zero night in February, 2020, this Fox Squirrel was recorded by the Red-headed Woodpecker nest cameras at two minutes after mid-night, entering this cavity as a night roost. The whole activity took less than 15 seconds. The squirrel entered, turned around, and stuck its nose out, as seen in the bottom picture at the end of the arrow.

This squirrel may have left another roost cavity to escape a predator or other unexpected event and knew about this cavity as a nearby choice.

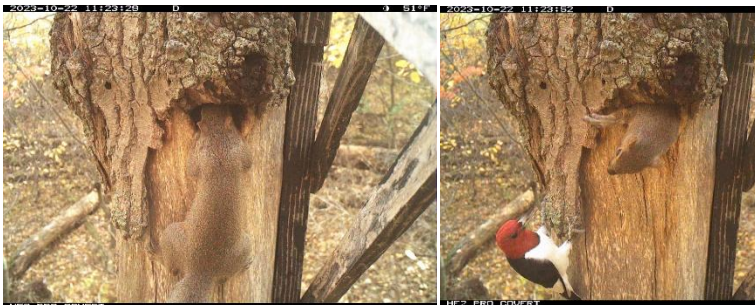
There are several other recordings of Fox Squirrels at night, which was a surprise to see.

It is fairly easy to identify a Fox squirrel at night (from a Gray Squirrel) because the “infrared” camera at night shows the orange color of the Fox Squirrel as very light where there is no difference in the feet, legs, and head color of a Gray Squirrel in a camera’s infrared pictures.

Eastern Gray Squirrel (*Sciurus carolinensis*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Gray Squirrels are common at Cedar Creek ESR, and regularly recorded by the RHWo nest cameras. They were involved in 7 types of interactions at the cavities, the same interactions as the Fox Squirrels. Gray Squirrels frequently **inspect RHWo cavities**, they **roost** in the cavities and use them in the daytime as **temporary shelter**. Gray Squirrels attempt to **usurp** RHWo cavities from other animals, they **search for food** in and around the cavities, and they **alter the cavities** to gain **access**. When a RHWo cavity fills with water they will use the cavity as a source of **drinking water**. Following are pictures (frame shots) from the nest cameras of each of these different interactions. Some types of interactions are more obvious when viewing the full video. The above picture shows a Gray Squirrel searching for food at a Red Head cavity.



Gray Squirrels inspect Red-headed Woodpecker cavities for food, as a potential nest, roost, temporary shelter, or as a possible bolt hole when predators are near. It took just 23 seconds for this Gray Squirrel to learn that this cavity was claimed by a Red-headed Woodpecker, and the squirrel beat a retreat.



Gray Squirrels regularly use Red-headed Woodpecker cavities for temporary shelter during the daytime. They use these cavities in this way all seasons of the year. Looking at the cavity entrance hole in the picture to the left it is easy to see that it has been enlarged by a squirrel chewing it on the left side.

This significant enlargement of the hole did not keep the Red-headed Woodpecker pair from using it as a successful nesting site for another three years. Which also shows that the use of this cavity by this squirrel is temporary and, in this case, only during the non-nesting season.

The pictures on the left here and on the bottom were taken by the first trail camera and not focused to three feet, which is why the squirrel is out of focus, but the camera records with a certainty that a Gray Squirrel was using this Red-headed Woodpecker cavity for temporary shelter during the daytime on December 28th. Notice how snug this cavity entrance is compared to the one above.



The picture on the right shows that the squirrel in the picture above was also using the same cavity as a night roost.

The cameras are triggered by heat and movement, and this picture on the right may have been triggered by the squirrel's head moving, or by a predator, a deer, or other animal walking past in the background.

The line on the tree running left from the cavity hole I placed there so I knew not to attach a long lag screw into the nest cavity while installing the camera frame.





This Gray Squirrel is attempting to usurp this old Red-headed Woodpecker cavity from a Southern Flying Squirrel that has a nest in the cavity. The nest cameras recorded these types of interactions regularly, but it was a surprise each time another event like this was documented. As mentioned before, available cavities are a limiting factor for the survival of many of these animals, which leads to conflict for cavity possession. Conflict can lead to injuries which are a strong deterrent to engaging in conflict.

Southern Flying Squirrels are very aggressive when defending a nest, as can be seen in the picture to the left. It took only a few lunges and bites before this Gray Squirrel gave up this usurpation attempt. Attempts at usurpation by Gray Squirrels that were captured by the nest cameras were unsuccessful. They may be searching for empty cavities or are very reluctant to engage in conflict when it presents itself, or both. They did sometimes return to see if the cavity was still occupied.

In the picture on the right a Gray Squirrel is attempting to usurp an active Red-headed Woodpecker nest cavity with nestlings inside. The male woodpecker is in a vigilant posture guarding the nest entrance and will poke any intruder with its beak. This squirrel climbed around and above the woodpecker and approached it again from above. The squirrel came very close to the woodpecker but was rebuffed by the presence, aggressive sounds made by, and a good beak poke on the nose delivered by the woodpecker.





Gray squirrels were recorded altering Red-headed Woodpecker nest cavities for access more frequently than any other species. The squirrel in this picture, with woodchips in its mouth, worked longer than any other. It would chisel pieces off the hole for a while, move to another position and do more. It would leave for a while and then return and work for another spell. This work continued for a few weeks. Eventually it was able to enter the cavity and then was not recorded again by the camera.



The Gray Squirrel in this picture is drinking rainwater that has filled an old Red-headed Woodpecker cavity. This cavity was used by the woodpeckers as a successful nest the previous year. During the intervening winter the dead tree had shifted, allowing rainwater to flow into the cavity, filling it regularly. This squirrel used this new watering hole often as a safe place to acquire fresh water. It was a squeeze for this squirrel but was worth the effort.

North American Red Squirrel (*Tamiasciurus hudsonicus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Red Squirrels have a smaller presence in the portions of Cedar Creek where the Red-headed Woodpeckers are found nesting. There are few evergreen trees in this area. Less than half of the nest cameras recorded Red Squirrels. At the nest cavities where they were observed Red Squirrels nested in Red-headed Woodpecker cavities, and inspected, roosted, and took shelter in cavities. They also attempted to usurp cavities, and an incidence of infanticide was recorded at an active Red Squirrel nest. The picture above shows a Red Squirrel about to attempt to usurp a roost cavity from a Red-headed Woodpecker female that was using it as a night roost. The attempt failed after a six-hour long conflict with the woodpecker.



The two pictures on the left show Red Squirrels taking nest material into two vacant Red-headed Woodpecker cavities. The presence of these cavities increases their chance of nest success.



In the pictures above and below, nest cameras recorded Red Squirrels using old Red-headed Woodpecker cavities as temporary shelter during the day and as a nighttime roost. The picture below was taken well after midnight. Both of these nest trees were well out in the open savanna with few other trees close by. Not a place Red Squirrels are expected.





This picture took me some time to figure out this animal's identity. This Red-headed Woodpecker roost tree had a male woodpecker that was roosting in the cavity and it had cached many, many acorn pieces under cracks in the bark. Numerous animals were on the tree day and night trying to steal the cached acorn pieces. This was in mid-winter. In the dark night the camera is using its infrared camera mode, and infrared does not record actual colors, but will make orange/light red fur look white. Red Squirrels in their winter fur have a light red/orange stripe all the way down their neck, back, and tail. This picture shows a winter Red Squirrel trying to find cached acorns early in the morning before the woodpecker emerged from its roost to chase it away.



In the picture to the left, a presumed male Red Squirrel has discovered a female's nest with babies and is killing the babies, one by one. He then carried them each up the tree, until all babies were gone.

If a male Red Squirrel finds a female's nest with babies that he is not the father of he kills the babies. Doing this may cause the female to have a second nest where he is the father of the young. Killing the babies in this way is called infanticide.

Southern Flying Squirrel (*Glaucomys volans*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Southern Flying Squirrels are the most frequent animal recorded by the nest cameras, other than Red Heads, at Red-headed Woodpecker cavities. They are nocturnal and are generally only seen during the daytime when defending their cavity. They are engaged in more types of interaction (10 of 13) at the cavities than any of the other 36 vertebrate species recorded. They **inspect cavities, use cavities to nest, roost, and for temporary shelter**. They are involved in **predation** at the cavities, as well as both **infanticide** and **resource competition involving death**. They attempt and do **usurp** cavities, they **search for food** and use cavities as a **watering hole**.



Roost:

In the picture above, taken on October 13, a flying squirrel is checking out this cavity as a potential winter roost. By October 30 there was a small group of flying squirrels living in this cavity, as seen in this picture on the left. In the fall and winter Southern Flying Squirrels are social animals, living in woodpecker cavities together to share warmth through the cold months, but active at night to find food.



Nests:

Southern Flying Squirrels regularly nest in old and new Red-headed Woodpecker cavities. On the left is a picture of an adult bringing nesting material to a cavity. I have also recorded them bringing fresh oak leaves to completely line a new nest cavity. Sometimes the cavity is completely filled with finely shredded material, particularly when the female is going to give birth in the cavity.

Southern Flying Squirrels will move their young to new cavities a few times, possibly to reduce chances of increasing parasites and predators. In this picture a female has a baby wrapped around her mouth that she is moving from a previous cavity to the one in the picture. She moves the babies one at a time and it takes a while to complete these transfers since she will have 3 to 5 babies. The males do not participate in rearing the young.

June 23rd is the date of the above picture of the female bringing her babies to this cavity and by June 30th the babies are starting to look out of the nest hole, as in the picture to the left with two babies looking out with mom on the outside. Within a few days they will be exploring the outside of the tree where the cavity is.

Nests continued:

At this Southern Flying Squirrel nest at a different tree and year the mom has left briefly, and all five babies are tentatively emerging for the first time. They would be about six weeks old here and will gain confidence quickly. They will not become independent of their mother until they are about four months old, much longer than the Red-headed Woodpecker nestlings that were in this cavity the previous year. Those nestlings became independent from their parents at about two months.

Southern Flying Squirrels are very aggressive, especially females that have young in the nest cavity. This mother flying squirrel has just started a second litter in the same cavity as the picture above with the five babies taken 4 months earlier.

A Hairy Woodpecker has an interest in the cavity and is quickly confronted by the mother flying squirrel.

Continued interest by the Hairy Woodpecker is ended when the Flying Squirrel moves into full attack mode to protect her newborn babies inside this old Red-headed Woodpecker cavity. The Hairy Woodpecker hastily retreats.

These used Red-headed Woodpecker cavities are in such high demand by other animals that an occupant, like this nesting Southern Flying Squirrel, often needs to go into protection mode like this several times a day.





Temporary Shelter:

Southern Flying Squirrels often use Red-headed Woodpecker cavities for temporary shelter. Here one of these squirrels is using the cavity hole while it eats a cached acorn it has found on the tree.

With the many predators that live in this habitat, especially owls at night, it is a survival need to have cavities like this to use for temporary shelter.

Usurpation: Southern Flying Squirrels are experts at usurping Red-headed Woodpecker nest cavities



This sequence of pictures shows a Southern Flying Squirrel usurping an active Red-headed Woodpecker (RHWO) nest in summer. Picture 1 shows the squirrel grabbing the male RHWO as it is guarding the nest at night. In pictures 2 and 3 the woodpecker is dragged out of the nest and let go while the squirrel holds onto the tree. The squirrel then entered the nest and killed the nestlings. The squirrel now has an empty cavity to nest in herself. Usurpations don't always work. The skill and experience of both animals determine success.



Usurpation continued:

Southern Flying Squirrels usurp Red-headed Woodpecker cavities in the fall and winter as well. Here one of the squirrels approaches a cavity that has a Hairy Woodpecker using the cavity as a night roost in October. The woodpecker's head can be seen inside the cavity.

As seen on the previous page, the squirrel reaches in and grabs the woodpecker while it is in this vigilant posture guarding its roost.

The Flying Squirrel throws the Hairy Woodpecker out of the cavity and then takes possession itself. The woodpecker now must find a different unoccupied cavity, and it knows of several that it can try. Red-headed Woodpeckers make numerous cavities for nests and roosts, giving these other species choices in these circumstances.





Usurpation continued:

Southern Flying Squirrels are successful with less than half of their usurpation attempts. It really does seem that some of the squirrels are less adept at usurping cavities, and that some of the “victims” have learned from experience or simply have better innate techniques to repel these attempts by the squirrels.

In these pictures a Southern Flying Squirrel reaches in to grab a roosting Hairy Woodpecker (1), but the woodpecker is ready and pokes the squirrel hard with its beak (2).

The result is that the Flying Squirrel is thrown away from the tree (3) and most likely recovered to glide away to another tree. But this Hairy Woodpecker spent the rest of the night in relative peace.

Infanticide:

A male Southern Flying Squirrel will kill the babies at a nest that he does not know if he is the father of the young. This will cause the female to stop lactating and become receptive so that he can father her next litter. They have two litters per year.

In picture 1 the male has one of the dead babies in his mouth.

In picture 2 the male is on the camera frame and has left the dead babies on top of the nest inside of the cavity hole. This process is one way a male uses to assure that his genes continue on in the community gene pool.



Resource Competition:

This Southern Flying Squirrel has killed this nestling Red-headed Woodpecker and is removing it from the cavity (a resource) so that she can use the cavity for her own nest. She does not eat the nestling, so this kind of death is called resource competition., as one animal competes with the other for a resource, in this case the resource is the cavity.





Predation:

Southern Flying Squirrels are listed by some as the most carnivorous of the squirrel family, eating, among other things, bird eggs and nestlings. The nest cameras appear to confirm their nest egg predation in the following picture sequences.

In this picture (1) from May 20th, a pair of Tree Swallows has completed building their nest in an old Red-headed Woodpecker cavity and have started laying eggs. They are not in the nest at night since they do not begin incubating the eggs until the next to the last egg is laid.

On May 23rd, a Southern Flying Squirrel appears at the nest. No Flying Squirrel had been recorded at this nest cavity or tree for several months. But now it appears on the night that unguarded eggs are available and immediately enters the cavity (2). This squirrel must have been watching from somewhere nearby and was aware of the unguarded eggs.

The Flying Squirrel hung head down in the cavity with its hind legs holding onto the hole edge. It stayed like this for some time, presumably eating the eggs, and eventually left. This behavior had not been recorded before in many thousands of Flying Squirrel videos by the nest cameras.

The next day the Tree Swallows were very upset, inspecting the nest over and over. Within a few days they left and were not seen again, and the Flying Squirrel did not return until....

Predation continued:

Eleven days after the previous Tree Swallow egg predation by the Southern Flying Squirrel, on June 4th, a pair of Eastern Bluebirds discovered the now empty nest cavity and began building their own nest as seen here in picture 1. They completed nest building quickly and began laying eggs. Bluebirds do not begin incubation until the last egg is laid, leaving the first laid eggs unguarded at night.

On the evening of June 11th, shortly before egg incubation would have begun, most probably the same Southern Flying Squirrel appeared again (2), and again immediately entered the nest cavity. These Flying Squirrels must watch bird activity from a high vantage point and somehow know when an opportunity for unprotected eggs is available. They take advantage of their opportunities in the darkness. They need calories, protein, and minerals to survive too, along with their young.

The Flying Squirrel once again hung head down, hanging by its hind legs, as it did 19 days earlier, and presumably ate the Bluebird eggs, and left a while later, not to be recorded again at this cavity for several months, which may have been another individual. The Bluebirds were also upset, looking again and again into the cavity in the morning, and after several days left and were not seen again.





Search for Food:

Southern Flying Squirrels are constantly searching for food, their actions often quicker than the eye can see. In this picture this squirrel has an acorn in its mouth, and it may be entering this cavity to have a safe place to eat the acorn.

In years when Red-headed Woodpeckers stay for the winter, the squirrels search for acorns that the woodpeckers have cached for their winter food supply. This picture shows how three woodpecker cached acorns are easily visible, but the Flying Squirrel in the picture needs to find them in the dark and probably will. Some woodpeckers are very good at hiding their cached acorns, This woodpecker was using this tree as a training tree for its fledglings, so the acorns are very obvious. This squirrel may get them first.

Use as Watering Hole:

Most Red-headed Woodpecker nest trees are dead, and as they decay they may lean more one year than they did the year before. This nest tree is an example that a few degrees of increased lean can change a good nest cavity into a cavity that collects rainwater, becoming a watering hole for many animals.

The Southern Flying Squirrel in this picture is getting a drink from this new excellent watering hole.

Eastern Chipmunk (*Tamias striatus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Eastern Chipmunks were only recorded by nest cameras a few times. They would **investigate a cavity** or use the cavity as **temporary shelter** as seen above and below left. They were also recorded investigating Red-headed Woodpecker cavities that had fallen to the ground, as in the picture below right.



White-footed Mouse (*Peromyscus leucopus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



White-footed Mice were the second most common animal seen at Red-headed Woodpecker nest cavities. They were constantly running up and down the trees at night, **searching for food, inspecting cavities**, using them for **temporary shelter**, trying to **usurp** the cavity, and **nesting** in the cavities. They were rarely seen during the daytime. The one in the picture above is carrying a young baby mouse into this nest cavity. It repeated this with several more babies, one at a time. Many cavities recorded this same behavior.



Nests:
Mother White-footed Mice moving their babies into their nests in vacant Red-headed Wood-pecker cavities.



Inspect Nest Cavity:

Two nights before she moved her babies into this vacant Red-headed Woodpecker cavity, this female White-footed Mouse inspected the nest cavity to make sure it would fit her needs. She may have made some alterations, but she approved the cavity and moved her babies two nights later, as seen in the picture on the previous page.



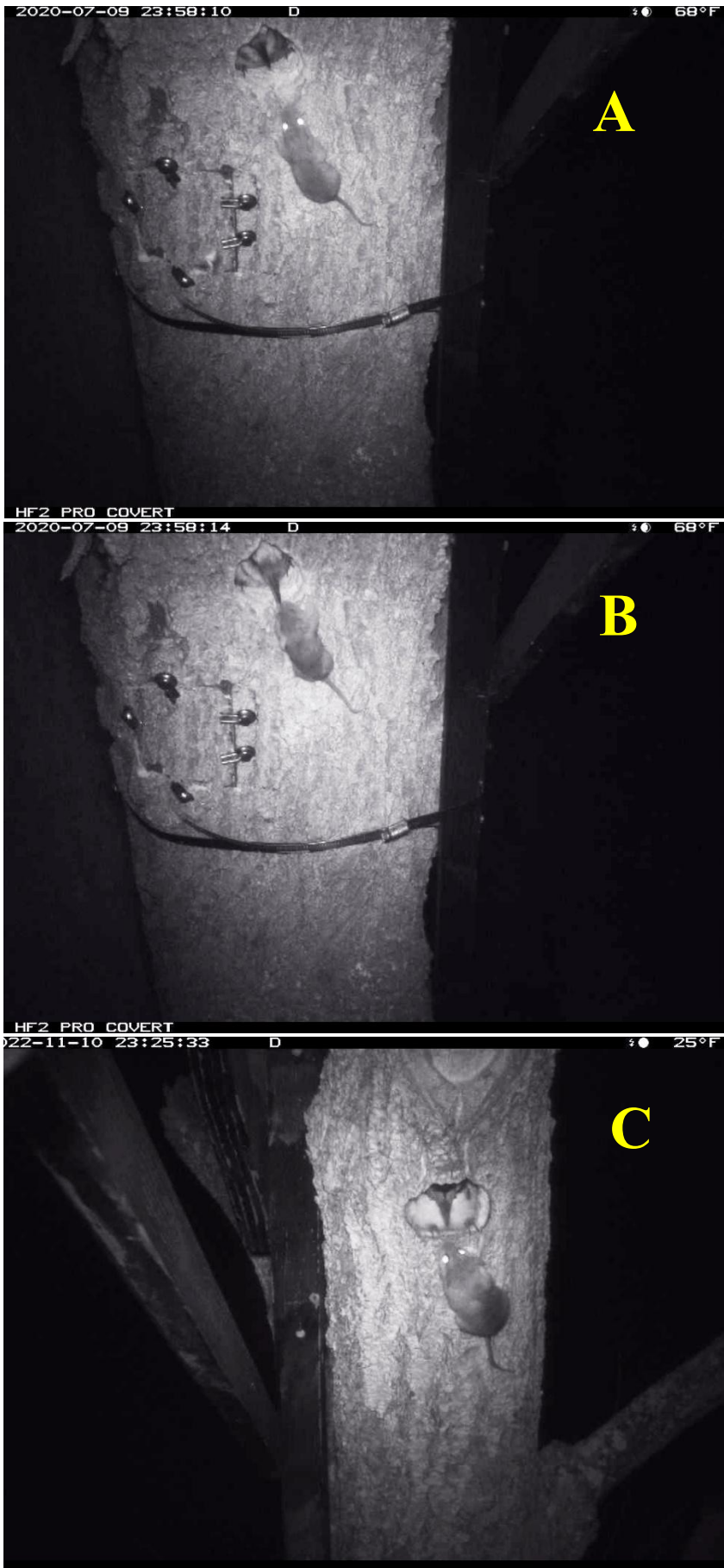
Search for Food:

Late on a February night this White-footed mouse is looking for food on this Red-headed Wood-pecker nest tree. It is probably looking for acorns cached by the woodpecker, or bits and pieces left by the woodpecker as it was eating.



Temporary Shelter:

Seventeen nights after the picture above was taken on a below zero winter night, a White-footed Mouse has taken temporary shelter in the Red-headed Woodpecker nest cavity. It is eating food that it has found on the tree, probably acorn pieces. The cavity may provide a bit of warmth but is also a safe place to hide from hungry predators, especially owls.



Usurpation:

For their small size, White-footed Mice are constantly attempting to usurp, or enter, already occupied Red-headed Woodpecker nest cavities. I have not once observed a nest camera video where they succeeded. It always seems to take a good poke in the nose to dissuade them from trying, at least for an hour or two.

In picture A the male Red-headed Woodpecker can hear the mouse moving on the bark of the tree and is in a vigilant pose guarding the eggs in its nest. The mouse sits in front of the woodpecker for a few seconds and then moves forward and is poked hard by the woodpecker's beak, as seen in picture B. And then the mouse leaves.

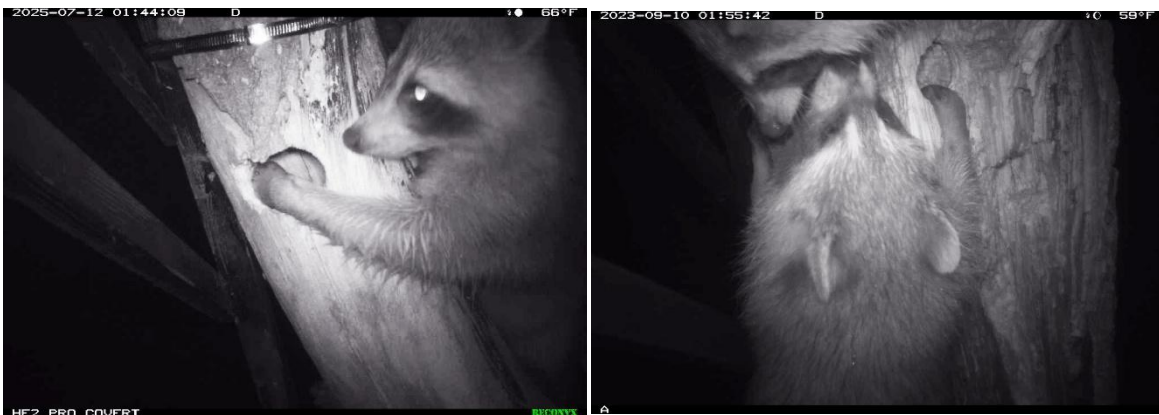
Sometimes I wonder how well they can see into the dark cavity, or if they think that maybe this time they will get past and make it inside.

I had also wondered if it was the possibility of food, maybe eggs, that presses these mice to take the risk of being poked hard. But the nest cameras revealed that they try to get into cavities that are being used for a roost regularly as well. In picture C a Hairy Woodpecker is using an old Red-headed Woodpecker cavity for a night roost. A White-footed Mouse attempted to usurp the cavity two times during this night. So, the possibility of food as a reward is not a factor. Another mystery to be solved.

Raccoon (*Procyon Lotor*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Raccoons function as predators at Red-headed Woodpecker cavities. Nest cameras recorded their presence at most of the cavities where cameras were placed. They were recorded throughout the night-time hours. The nest cameras did not record them having success at active Red-headed Woodpecker nests but did show them having success at the same cavity with other nesting species. See picture next page.



Raccoons would attempt to reach into the cavity entrance hole. Sometimes there would be two Raccoons together at the same nest cavity.



Predation:

Raccoons fail in their predation attempts at most active Red-headed Woodpecker nests because of the cavity design and because of the male woodpecker's behavior.

Male Red-headed Woodpeckers guard the nest at night and are in a vigilant posture at the cavity entrance when danger is near. The woodpecker in picture A can easily hear the Raccoon climbing the tree and knows it is a large predator.

Once the male woodpecker is aware of the kind of predator, he drops down to the bottom of the nest to keep the nestlings as low in the nest cavity as possible. The time stamp in picture B shows that it took 20 seconds from picture A for the Raccoon to climb to the nest hole.

The Raccoon can smell and hear the woodpeckers in the cavity but is unable to reach far enough into the cavity to capture them.

Almost exactly one year later, a European Starling is nesting in the same cavity (C). But adult Starlings do not guard their nests at night, and older nestlings spend the night perched just inside the entrance hole. The nestlings do not know to listen for predators climbing the tree, and a Raccoon quickly reaches in and grabs the last two nestlings in the nest. In picture C the Raccoon is having its dinner.

In this situation, Red-headed Woodpecker nestlings survive predation, and European Starling nestlings do not because of a difference in nesting behaviors.



Most Red-headed Woodpecker nest cavities have an inch or so of solid wood on the outside and softer wood on the inside. This is why most of these nests are resistant to Raccoon predation for Red-headed Woodpeckers, as in this picture.

But Red-headed Woodpeckers are weak cavity excavators and need soft heartwood to create their cavities. Soft heartwood is often created through the actions of heart-rot fungi. And the fungi keep working whether woodpeckers are present or not.



One of the only ways Raccoons are successful predators of Red-headed Woodpeckers is when the wood in the nest tree and cavity become so decayed that the Raccoon can easily tear the nest cavity apart to get at the nestlings inside.

The picture here is an example of a Red Head nest cavity that a raccoon ripped open and was able to get to the nestlings inside. A heart rot fungus fruiting body can be seen on the outside of the nest tree at the arrow.

This is not a picture from the nest cameras.

Mink (*Neovison vison*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Mink are **predators** at Red-headed Woodpecker nest cavities. The one in this picture is looking into the cavity here, which held a Southern Flying Squirrel a few seconds earlier, but the Mink made so much noise on the bark of this cherry tree while climbing the 25 feet on this very early Christmas morning that the squirrel was gone when it arrived. The Mink was very adept and fast at climbing and entered the hole.



Fisher (*Pekania pennanti*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Fishers are **predators** at Red-headed Woodpecker cavities. The male Red Head and several nestlings were in this nest at the time this Fisher was posing for this picture. It could hear them and smell them, but it could not reach in far enough to catch them. This was the only time the nest cameras documented a Fisher at a nest.



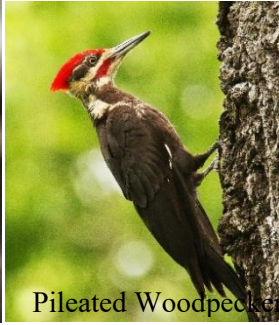
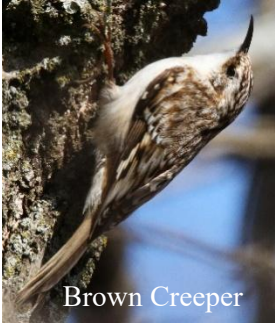
Bat (*Vespertilionidae*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Bats were recorded by the nest cameras at Red-headed Woodpecker cavities several times. In the videos they could be seen grabbing invertebrates off the tree surface after they had landed on the tree. This picture above shows this on an October 10 early morning, and below left, on a July 10, also **finding food**. In the picture below to the right the bat crawled into the cavity and stayed, seeking **temporary shelter**. It is not possible to identify these bats to species, so there may have been more than one species recorded.



Bird Interactions at Red-headed Woodpecker Nest and Roost Cavities



These pictures not from nest cameras

Table 5
Interactions of Bird Species at Red-headed Woodpecker Nest/Roost Cavities as Recorded by Nest Cameras

	Bird Species At Cavity	Nest	Inspect nest cavity	Roost R Temp Shelter T	Predation P Brood Parasite B	Search for food	Water Hole W Usurp U	Alter for Access or Food	Find Nest Matter
1	Hairy Woodpecker		X	R T		X	U W		
2	Downy Woodpecker		X	R T		X	U		
3	Red-bellied Woodpecker		X	R T		X	U		
4	Pileated Woodpecker		X			X	U	X	
5	Northern Flicker		X	R T		X	U W		
6	Yellow-bellied Sapsucker		X			X	W		
7	White-breasted Nuthatch		X	T		X	W		
8	Brown Creeper		X			X			
9	Black-capped Chickadee		X	T		X	W		
10	Tufted Titmouse		X						
11	House Wren		X	T		X			
12	Eastern Bluebird	X	X	T			U W		
13	Tree Swallow	X	X						
14	Great-crested Flycatcher		X						
15	Ruby-throated Hummingbird								X
16	Baltimore Oriole					X			
17	Brown-headed Cowbird				B				
18	European Starling	X	X	T		X	U W		
19	Wood Duck		X						
20	Blue Jay				P	X			
21	Common Raven				P			X	
22	American Kestrel				P				
23	Red-tailed Hawk				P				

Twenty-three bird species were recorded by the nest cameras interacting with the Red-headed Woodpecker cavities in 11 different ways. Through other observations this table could be extended, for example, while doing this nest camera work Northern Flickers, Hairy Woodpeckers, and Red-bellied Woodpeckers were documented nesting in old Red-headed Woodpecker cavities. But, the cameras did not capture these nests.

Hairy Woodpecker (*Dryobates villosus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Hairy Woodpeckers were regularly recorded by the nest cameras interacting with Red-headed Woodpecker cavities in six different ways as shown in table 5 below. While I observed them nesting in these cavities the nest cameras did not record nesting by Hairy Woodpeckers so are not included here.

Table 5

Bird Species At Cavity	Roost	Inspect nest cavity	Temp Shelter	Search for food	Water Hole	Usurp
Hairy Woodpecker	X	X	X	X	X	X



The picture above shows a male Hairy Woodpecker inspecting a Red-headed Woodpecker cavity. The pictures to the left show a male and a female inspecting empty Red Head cavities.



This female Hairy Woodpecker is using this year old Red-headed woodpecker cavity as temporary shelter on this early April late afternoon.

She may have been checking it out as a possible place to nest as nesting season was about to begin.



This Hairy Woodpecker is using this Red-headed Woodpecker cavity as a night roost on this October night. This cavity was a successful Red-headed Woodpecker nest site during the earlier summer months.

Hairy Woodpeckers do not use the same cavity for a night roost for very long, a week or so, and then go somewhere else, and maybe return for another week later, moving back and forth with other cavities.



Roost and Usurpation

The Hairy Woodpecker on the inside of this cavity had been using this as a night roost for several nights when this male Hairy Woodpecker showed up and would have liked to use the cavity. But the female inside was not receptive to being usurped out of her roost.

This confrontation lasted for about ten seconds, with the male leaving quietly to find a night roost in another location.



The Hairy Woodpecker in this cavity has just usurped this cavity from the fledgling Red-headed Woodpecker perched outside the cavity. The Hairy Woodpecker had been trying to get access to the cavity for a few days, but the fledgling was always there first. This time the Hairy Woodpecker snuck in a couple of seconds before the fledgling arrived, leaving the fledgling confused as to what to do.



Food: This Hairy Woodpecker is eating small insects and other invertebrates that always seem to be in abundance around the outside of Red-headed Woodpecker cavities, possibly because of the nestlings spraying their fecal matter on the inside of the cavity.



Food: This Hairy Woodpecker is finding food in the crevices of a newly broken open Red-headed Woodpecker cavity caused by wind damage to the tree. It appeared to be finding lots of food here and returned multiple times.

This dead Northern Pin Oak tree broke in half at the Red-headed Woodpecker nest cavity in a windstorm on the night of November 15, 2020. Somehow the nest camera stayed intact on the remaining tree and continued functioning, revealing behaviors not seen before in the now exposed nest cavity. It was a feeding bonanza for seven species captured by the camera. Over the following two months Hairy Woodpeckers were on video 49 times finding food in the crevices of the newly exposed cavity, as seen here.



Waterhole: The Red-headed Woodpecker cavity in this image was a successful nest site for a Red Headed pair the year before this picture was taken. In the intervening winter, the large dead Northern Pin Oak tree had shifted, leaning to the left a little. That shift caused rainwater to run along the tree bark and into this cavity, filling it full of fresh rainwater. The Hairy Woodpecker in this picture is getting a drink from this safe watering hole.

Downy Woodpecker (*Dryobates pubescens*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Downy Woodpeckers were not recorded as often as some of the other woodpecker species at Red-headed Woodpecker cavities. One camera recorded one using a cavity as a night roost repeatedly and for temporary shelter. Their other uses involved inspecting cavities, searching for food and an attempt to usurp.

Table 6

Bird Species At Cavity	Roost	Inspect nest cavity	Temp Shelter	Search for food	Usurp
Downy Woodpecker	X	X	X	X	X



Downy Woodpeckers were curious about cavities, as locations of food, or as a roost. The picture on the right shows a Downy hoping to usurp an Eastern Bluebird from its possession of the cavity, but it failed.



These two pictures show a Downy Woodpecker using a Red-headed Woodpecker cavity as a night roost (on multiple nights) above and using the same cavity as temporary shelter in the picture below. This very dead Bur Oak tree was in prairie with no other trees nearby. A few weeks after these pictures were taken, (on May 5th) this entire tree burned up (including the nest camera frame) as part of a prescribed prairie burn.





Here a male Downy Woodpecker is finding food in this newly exposed Red-headed Woodpecker cavity. Both Hairy and Downy Woodpeckers were taking advantage of this food opportunity the day after the tree broke in half. The videos taken by the nest cameras make it easy to distinguish these two species at this site.

Red-bellied Woodpecker (*Melanerpes carolinensis*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Red-bellied Woodpeckers were recorded frequently interacting with Red-headed Woodpecker cavities. They used the cavities as night roosts, for temporary shelter, and to search for food. They inspected the cavities and were recorded many times trying to usurp the cavities from an existing occupant.

Table 7

Bird Species At Cavity	Roost	Inspect nest cavity	Temp Shelter	Search for food	Usurp
Red-bellied Woodpecker	X	X	X	X	X



The pictures on this page are a sequence showing a Red-bellied Woodpecker entering a newly vacated Red-headed Woodpecker cavity to use as a temporary shelter on a September morning.

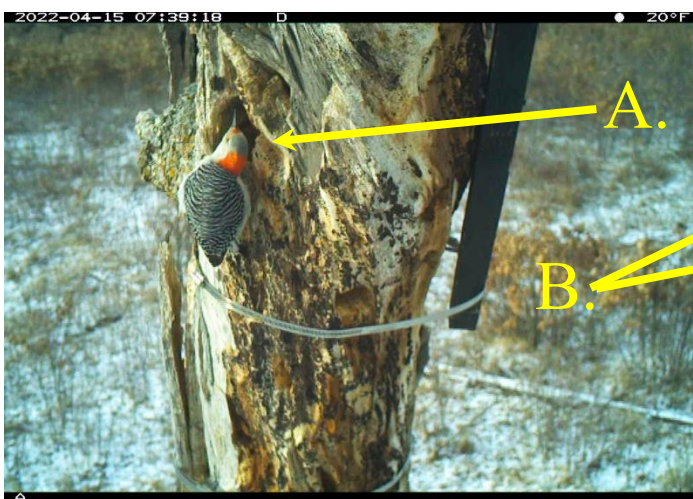


Roost:

Here a Red-bellied Woodpecker is using a Red-headed Woodpecker recently vacated cavity as a night roost (A). About two feet away there was a Southern Flying Squirrel nest (B) with active young. The young flying squirrels were running all over the tree and would blunder over and into the roost cavity (C). The Red-bellied Woodpecker may not have had much rest on this night in this cavity.



Inspect Cavity: In the pictures above two female Red-bellied Woodpeckers inspect Red-headed Woodpecker cavities as possible places to nest, find shelter, roost, or as a place to find food. In the two pictures below the female Red-bellied Woodpecker (A) finds some **food** around the nest hole, and six days earlier two male Red-bellied Woodpeckers (B) fight for possession of the nest tree in the picture.





Usurpation: In each of the two pictures above a male Red-bellied Woodpecker tries to usurp a Southern Flying Squirrel from a used Red-headed Woodpecker cavity. Each attempt failed. Flying squirrels are extremely aggressive and defend their cavities well.

Pileated Woodpecker (*Dryocopus pileatus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Pileated Woodpeckers were recorded numerous times at several Red-headed Woodpecker nest cavities by the cameras. They inspected the cavities, searched for and found food. They altered the cavities in their search for food, and they usurped cavities from other woodpeckers that were present at the cavities.

Table 8

Bird Species At Cavity	Inspect nest cavity	Search for Food	Alter for Access	Usurp
Pileated Woodpecker	X	X	X	X



Alter for Access to Food:

This picture is a screen shot from a video that shows a Pileated Woodpecker hammering apart the inside of a Red-headed Woodpecker cavity to find food. In the video woodchips are flying. The woodpecker's body is still while the head is a blur of motion as it pecks.



Search for food: Red-headed Woodpeckers and Southern Flying Squirrels both nested in this cavity during the summer, which, when combined with decaying wood, means lots of small invertebrates that Pileated Woodpeckers prefer to eat. This woodpecker is looking intently at the back wall for invertebrate food.



Search for Food: In these cropped nest camera pictures the tongue of the Pileated Woodpecker can be seen as it grabs small invertebrates off the surface of these two Red-headed Woodpecker cavity walls.



Usurpation:

The Red-bellied Woodpecker had been at the front of this Red-headed Woodpecker cavity finding food when it saw and heard the female Pileated Woodpecker approaching and it quickly moved aside. See arrow.

Pileated Woodpeckers usurp feeding spots by their large presence and calls. When the Pileated left this spot, the Red-bellied Woodpecker returned.



This frame shot is from a video that showed a pair of Pileated Woodpeckers doing courtship calls and motions around this old Red-headed Woodpecker cavity. They were excited. Only the edge of the wing of the female at the end of the arrows can be seen. They had visited the cavity a few times together and I was convinced that they were seriously considering remodeling the cavity for their own nest in the coming season. Unfortunately, a few days after this picture, this very dead tree fell down. A disappointment.

Northern Flicker (*Colaptes auratus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Northern Flickers were recorded regularly at Red-headed Woodpecker cavities. They roosted in the cavities, used them for temporary shelter, inspected and searched for food at the cavities. They tried and sometimes usurped the cavities from others and used the cavities as a water source when available.

Table 9

Bird Species At Cavity	Roost	Inspect nest cavity	Temp Shelter	Search for food	Water Hole	Usurp
Hairy Woodpecker	X	X	X	X	X	X



Northern Flickers **inspect cavities** as possible places for **shelter, roost, food**, and some arrive as a pair to check out the cavity as a possible place to nest. This pair did not choose this cavity but were very vocal as they discussed it.



Temporary Shelter:

This female Northern Flicker is using this cavity as shelter during the daytime for a brief period. Sometimes they do this to avoid predators, hawks in particular, during this early migration time of year. Or she might have been disturbed in her roost the night before and needs some rest during the day to recover.



Roost: This female Northern Flicker had to use her beak as a poker to convince the White-footed Mouse to stop trying to get into her night roost in this old Red-headed Woodpecker cavity.



Search for Food: While Northern Flickers are known for eating ants they also eat lots of small invertebrates which are often found around Red-headed Woodpecker cavities (and in dead trees). They pick them right off the surface of the wood.



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Usurpation: Northern Flickers attempt usurpation but, in these examples, they were not successful. In the picture above with two male Flickers, the bottom Flicker is trying to make himself look bigger with wings out to intimidate the Flicker at the nest hole but it did not work. In the bottom picture the Flicker picked on a nesting Red-headed Woodpecker with nestlings, and the Flicker quickly gave up this attempt.



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Water Hole: While climbing this dead tree to change batteries and the memory card in the nest camera the tree seemed straight and solid, but it had obviously “leaned” a bit during the winter and after a rain the nest cavity would fill with water that ran down the bark of the tree. Many animals discovered this new watering hole, including this male Northern Flicker, and came frequently for drinks.

Yellow-bellied Sapsucker (*Colaptes auratus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Yellow-bellied Sapsuckers were recorded by nest cameras mostly in late summer usually with juveniles at the Red-headed Woodpecker cavities, sometimes possible siblings at the same time, as in the picture above. These Sapsuckers **inspected nest cavities**, searched for and found invertebrate **food**, and visited the **waterhole** cavity.

While the nest cameras did not capture this, Yellow-bellied Sapsucker nests were often in trees very close to Red-headed Woodpecker nests, as close as 10-15 yards. Their nests were usually in aspen trees. They seemed to tolerate each other and must fill similar but slightly different niches within the same habitat. Several times juvenile Sapsuckers were observed begging for food from adult Red-headed Woodpeckers without success.

Table 10

Bird Species At Cavity	Inspect nest cavity	Search for food	Water Hole
Yellow-bellied Sapsucker	X	X	X



Inspect Nest Cavity:

Yellow-bellied Sapsuckers are very curious at Red-headed Woodpecker cavities. None have been recorded roosting in the cavities or taking shelter in one. They may be looking for food like the small invertebrates that are found at these cavities.



Search for Food:

This juvenile Sapsucker is searching for food and has found small invertebrates in the rotting wood at this cavity. It spent several minutes intently finding food in the cracks inside this cavity entrance hole.

As can be seen in the picture, young Yellow-bellied Sapsuckers are extremely well camouflaged when on these dead trees.



Water Hole:

This Yellow-bellied Sapsucker came to this old Red-headed Woodpecker cavity that had filled with rainwater repeatedly. It can be seen here getting a drink.

White-breasted Nuthatch (*Sitta carolinensis*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



White-breasted Nuthatches frequent Red-headed Woodpecker cavities to **inspect** them as a **source for food**, as a **temporary shelter**, and as a **source of water**. They will attempt to **usurp** a cavity from other species to achieve those goals.

Table 11

Bird Species At Cavity	Inspect nest cavity	Temp Shelter	Search for food	Water Hole	Usurp
White-breasted Nuthatch	X	X	X	X	X



Temporary Shelter:

Here a White-breasted Nuthatch is using the same cavity as temporary shelter during different seasons of the year. Or maybe these are two different Nuthatches.



Inspect Cavity and Search for Food: White-breasted Nuthatches regularly inspect Red-headed Woodpecker cavities, mostly searching for food as the Nuthatch in the picture below is doing.



A



Usurpation and Waterhole: White-breasted Nuthatches will try to usurp access to Red-headed Woodpecker cavities from other animals as the one above is trying with the Eastern Bluebird. They get water from old cavities that have filled with rainwater, as in the picture below.



Brown Creeper (*Certhia americana*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Brown Creepers occasionally were recorded at Red-headed Woodpecker cavities by the nest cameras **inspecting the cavities** and the areas around the cavity for invertebrate **food** and often finding it.

Table 12

Bird Species At Cavity	Inspect nest cavity	Search for food
White-breasted Nuthatch	X	X



Search for Food:

The Brown Creeper in these pictures has found some small invertebrates around the cavity opening of this Red-headed Woodpecker roost.

Black-capped Chickadee (*Poecile atricapillus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Black-capped Chickadees were recorded at Red-headed Woodpecker cavities inspecting the cavities, searching for food, using them for temporary shelter, and for getting a drink when water was available.

Table 13

Bird Species At Cavity	Inspect nest cavity	Temp Shelter	Search for food	Water Hole
Black-capped Chickadee	X	X	X	X



Inspect Nest Cavity:

Black-capped Chickadees inspect nest cavities and then leave, rarely staying for more than several seconds unless they are looking for temporary shelter.



Waterhole: Black-capped Chickadees will use an old Red-headed woodpecker nest that has filled with rainwater as a drinking water source as in the above picture. They will also use empty cavities as **temporary shelter**, especially in winter months.



**Tufted Titmouse (*Baeolophus bicolor*) Interactions
at Red-headed Woodpecker Nest and Roost Cavities**



Tufted Titmice are rare at Cedar Creek, and one may not have been photographed there for many decades. This one visited a Red-headed Woodpecker nest cavity and was recorded on a dark November morning with the camera still using its infrared aspect. It spent some time checking the nest cavity out.

Table 14

Bird Species At Cavity	Inspect nest cavity
Tufted Titmouse	X



Inspect Nest cavity:
This frame shot from the video shows the Titmouse at the cavity.



These two pictures from the video (above and below) show the Titmouse entering the Red-headed Woodpecker cavity to check it out.



House Wren (*Troglodytes aedon*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



House Wrens were occasional visitors to Red-headed Woodpecker cavities. They would **inspect the cavity**, **search for food**, and sometimes use the cavity as **temporary shelter** for a few seconds in their busy lives. They were also seen often by nest cameras at the cavities on trees that had fallen to the ground.

Table 14

Bird Species At Cavity	Inspect nest cavity	Temp Shelter	Search for food
House Wren	X	X	X



Searching for Food:

House Wrens spent most of their time at nest cavities searching for invertebrate food, usually around and inside the opening of the cavity.



The nest cameras often recorded House Wrens at the cavities that had fallen to the ground. Above, a pair checks out the cavity, and below a Wren takes a short break in the cavity opening.



Eastern Bluebird (*Sialia sialis*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Eastern Bluebirds are regularly recorded at Red-headed Woodpecker cavities, particularly in the spring and fall months. As can be seen in the picture above, they gather in small groups at the cavities in the fall and won't let other Bluebirds join them, sometimes **usurping** the cavity. They have not been recorded in the fall entering the cavities, just hanging around the outside of the cavity. They also **inspect** and **nest** in the cavities, use them as temporary shelter and as a watering hole when water is present.

Table 15

Bird Species At Cavity	Nest	Inspect nest cavity	Temp Shelter	Water Hole	Usurp
Eastern Bluebird	X	X	X	X	X



These two pictures show Eastern Bluebirds at the same Red-headed Woodpecker cavity in March and in late September. The March event may be an **inspection** for a nest cavity. The September event may be for a bolt hole in case of predators.



Nest: Eastern Bluebirds nest in Red-headed Woodpecker cavities. Here a female (above) and a male (below) are bringing nesting material to this cavity as they start building a nest.





Water hole and Temporary Shelter: In the picture above an Eastern Bluebird gets a drink from a Red-headed Woodpecker cavity that has filled with rainwater. Below, a Bluebird has taken shelter in a broken-open Red-headed Woodpecker cavity after it has finished its spring migration north.



Tree Swallow (*Tachycineta bicolor*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Tree Swallows **Nest** in and **Inspect** Red-headed Woodpecker Cavities. Some adult behaviors captured by the nest cameras at the nest are interesting with more than two adults attending the nestlings at times.

Table 16

Bird Species At Cavity	Nest	Inspect nest cavity
Tree Swallow	X	X



Inspect Nest Cavities:

Tree Swallows inspect many nest cavities during the nesting season as possible places to have a nest.



Nest: Tree Swallows nest in old Red-headed Woodpecker cavities. This pair had four very loud nestlings. The adults fed them 57 times in the 7AM hour on the day of these pictures.



Great-crested Flycatcher (*Myiarchus crinitus*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Great-crested Flycatchers were recorded numerous times checking out Red-headed Woodpecker nest cavities as possible nesting sites. They would sometimes show up as a pair to look at a cavity, but none were recorded nesting in the cavities.

Table 17

Bird Species At Cavity	Inspect nest cavity
Great-crested Flycatcher	X



Inspect Nest:

A pair of Great-crested Flycatchers are inspecting a Red-headed Woodpecker cavity as a potential nest.



A

Many cavities were checked out for possible nests. Pictures are from four different Red-headed Woodpecker cavities with Great-crested Flycatchers on these pages.



Ruby-throated Hummingbird (*Archilochus colubris*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



One of the nest cameras recorded a Ruby-throated Hummingbird collecting nesting material (spider webs) at a Red-headed Woodpecker nest cavity. I had observed this but am glad that one of the cameras captured it. When I would change the nest camera batteries and memory cards I would always have to remove all the spider webs that covered the camera lens and operating systems. Red-headed Woodpecker nests always attract a lot of small insects and consequently a lot of spiders resulting in spider webs.

Ruby-throated Hummingbird nests are made of spider web silk and covered in lichen pieces. The Hummingbirds collect the spiderweb silk by flying slowly up tree trunks and branches while wrapping the silk they find around the end of their beak. If you look at the Hummingbird in the picture you can see a small white bulge on the end of its beak. That is the spider web silk it had collected so far on this trip.

Table 18

Bird Species At Cavity	Collect Nest Material
Ruby-throated Hummingbird	X

Baltimore Oriole (*Icterus galbula*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



At one Red-headed Woodpecker nest with a nest camera, during one summer, a Baltimore Oriole had a nest in a tree about 50 feet away. The male Oriole would sometimes land on a small dead branch next to the woodpecker nest hole to look around below for insects it could use as food for its nestlings. On one of these occasions it noticed there were a lot of insects around the woodpecker nest hole. It watched for a few seconds, grabbed something, and flew back to its nest. For this one time, at least, it used the woodpecker nest area as a source of food.

Table 18

Bird Species At Cavity	Search for Food
Baltimore Oriole	X

Brown-headed Cowbird (*Molothrus ater*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



The nest cameras recorded Brown-headed Cowbirds at a few Red-headed Woodpecker nest cavities. None in which the Red-headed Woodpeckers had an active nest, but other birds seemed unable to hinder their inspections. While Cowbirds have been reported to lay eggs in active cavity nests, the nest cameras recorded them at nests with older nestlings or already failed nests so no parasitic egg laying was recorded.

Table 19

Bird Species At Cavity	Obligate Brood Parasite
Brown-headed Cowbird	X



Brood Parasite:

This nest cavity had four half-grown Tree Swallow nestlings on the day this picture was made. The Brown-headed Cowbird looked into the nest while the adults were dive-bombing it and determined that it was too late for it to lay eggs in this nest, and it left.

European Starling (*Sturnus vulgaris*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



European Starlings were often recorded by the nest cameras at Red-headed Woodpecker nest cavities but not at cavities with active Red-headed Woodpecker nests. Their number of interactions with the cavities was only matched or exceeded by the squirrel species. European Starlings use old Red-headed Woodpecker cavities for **nesting**, **temporary shelter**, while **searching for food** and as **predators**. They **inspect nest cavities** , will try to **usurp** cavities from other Starlings and other animals, and get **water** at cavities.

The nest cameras recorded unexpected behavior with Starlings. At a Tree Swallow nest with four nestlings in an old Red-headed Woodpecker nest cavity a European Starling landed at the cavity hole, looked in, and then entered the nest. While editing the videos captured from this event, I was certain that a predation event was about to be recorded but I was wrong. For the next seven minutes in the videos the Starling simply sat in the cavity looking out, while the parent Tree Swallows intensely divebombed at it. In the end the Starling left the nest, apparently without harming the nestlings, as all four were still present and fledged later.

Table 20

Bird Species At Cavity	Nest	Inspect nest cavity	Temp Shelter	Search for food	Water Hole	Predator	Usurp
European Starling	X	X	X	X	X	X	X



European Starlings frequently nest in old Red-headed Woodpecker cavities. Between Red-tailed Hawks and Raccoons this particular nest failed with no young birds surviving, partly because Starlings do not have a protective parent in the nest at night as Red-headed Woodpeckers do.





European Starlings were recorded by nest cameras inspecting Red-headed Woodpecker cavities (above) and using them for temporary shelter (below).





European Starlings are aggressive birds. In the picture above a Starling tries to take possession of a cavity away from a Red-headed Woodpecker that was looking into it. Below two Starlings fight for access to the Red-headed Woodpecker cavity with water in it.





In these pictures from the nest camera a Starling has entered a Tree swallow nest in an old Red-headed Woodpecker cavity. It sits inside the nest and watches as the parent swallows dive bomb it. After seven minutes it leaves without any apparent effect to the nest. Maybe the four nestlings were too big to be taken?



Predation:

These pictures were taken at the same nest as above, only two years later. Tree Swallows had again nested in this old Red-headed Woodpecker nest cavity.

In this case, a European starling has entered the nest and is throwing a Tree Swallow egg out of the nest. The camera did not record any other eggs being thrown out.

It is hard to know why the Starling was doing this behavior. It did not return to the nest cavity after the Tree Swallows abandoned the nest to use it as a nest itself, or as a roost or temporary shelter. It may have carried the dropped egg away to eat the contents.

This was the only incidence like this that was recorded over six years with many possible other nests, like the one above.





Here a European Starling is getting a drink from this Red-headed Woodpecker nest cavity that has filled with water and is being used as a **waterhole** by many different animals.

Wood Duck (*Aix sponsa*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



This female Wood Duck was **inspecting** this Red-headed Woodpecker nest cavity as a possible place to nest on this May morning. If a Red Head cavity entrance hole has been enlarged by squirrels it may become big enough for a Wood Duck to enter and nest. But this cavity hole was too small, and the Wood Duck left after a thorough inspection. Several Wood Duck nests were observed within 20 yards of active Red-headed Woodpecker nests while nest cameras were being maintained or installed.

Table 21

Bird Species At Cavity	Inspect Nest Cavity
Wood Duck	X

Blue Jay (*Cyanocitta cristata*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Blue Jays were recorded by nest cameras mostly in the spring and the fall at Red-headed Woodpecker cavities inspecting cavities and searching for food. Stealing cached acorns was a primary goal.

Table 22

Bird Species At Cavity	Inspect Nest Cavity	Search for Food
Blue Jay	X	X



Finding and stealing cached acorns in the fall is something Blue Jays try to do at Red-headed Woodpecker cavities as the above picture shows. They continue to do this in the spring with any left-over food items they can find, as in the picture below



Common Raven (*Corvus corax*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



This Common Raven made a hole with its strong beak into this old Red-headed Woodpecker cavity in an attempt to get at the Tree Swallow nest that was inside the cavity. It appeared that it had not done any damage to the nest, but I had to repair the wall of the cavity and patch up the hole so other predators could not get in. The Tree Swallows continued their nest and fledged four nestlings.

Table 23

Bird Species At Cavity	Alter for Access	Predator
Common Raven	X	X

American Kestrel (*Falco sparverius*) Interactions at Red-headed Woodpecker Nest and Roost Cavities

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American Kestrels were seen a few times each year at Cedar Creek ESR. One year they nested in an old Red-headed Woodpecker cavity and were recorded by three different nest cameras trying to catch food for their nestlings. In the picture above there were four loud Tree Swallow nestlings in this old Red-headed Woodpecker nest but this male Kestrel could not fit into the cavity to get at them.

Table 23

Bird Species At Cavity	Predator	Temporary Shelter
American Kestrel	X	X



In this very heavily cropped and fuzzy picture the female American Kestrel is at her nest in an old Red-headed Woodpecker cavity in Cedar Creek ESR. This picture is not from a nest camera.



This male American Kestrel was not able to get into this cavity to take the European Starling nestlings back to its nest. At 2" in diameter Red-headed Woodpecker cavity entrance holes are just a little too small for Kestrels, which means survival for Red-Heads and other animals.



An adult Red-headed Woodpecker had just bolted into this old nest cavity as this female American Kestrel landed at the cavity. She tried hard to get in but, again, the 2" diameter hole kept her out. After a few minutes she gave up and left. A few minutes later the adult Red Head emerged and went about the business of finding food for its nestlings in a different cavity about 50 yards away.



This male American Kestrel is using an old broken-open Red-headed Woodpecker cavity as temporary shelter and a look out as it takes a short rest on this early May morning.

Red-tailed Hawk (*Buteo jamaicensis*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Red-tailed Hawks were recorded twice by the Red-headed Woodpecker nest cameras. A Red Squirrel had a nest in the cavity in this tree and had bolted into the hole just before the Red-tailed Hawk appeared in a video this April morning, and the Hawk flew away having missed its meal this time.

Table 24

Bird Species At Cavity	Predator
Red-tailed Hawk	X

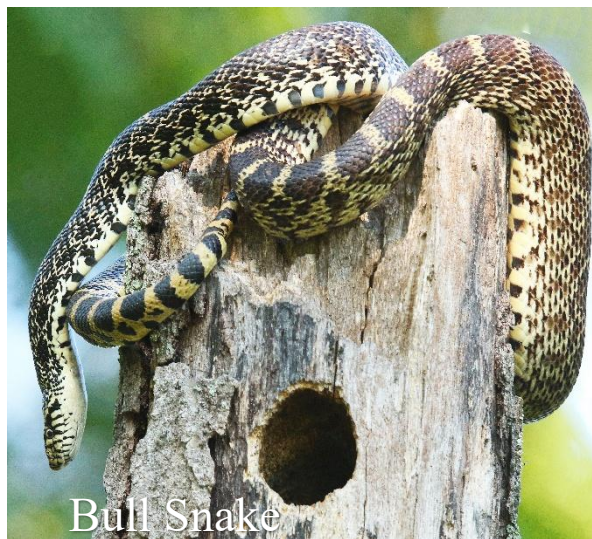


European starlings were nesting in this cavity when this picture was made. A nestling had fledged the day before and it stayed close by, on the other side of the tree. This Red-tailed Hawk saw it from across the meadow and within a few seconds the fledgling was gone, most likely a meal for nestling Red-tailed Hawks nearby.

Reptile Interactions at Red-headed Woodpecker Nest and Roost Cavities



Eastern (Common) Garter Snake



Bull Snake

These pictures are not from Red-headed Woodpecker nest cameras

Table 25
Interactions of Reptile Species at Red-headed Woodpecker Nest/Roost Cavities
as Recorded by Nest Cameras

Reptile Species At Cavity	Inspect Nest Cavity	Predator	Temporary Shelter
Bull Snake	X	X	X
Eastern Garter Snake	X	X	

Two reptiles were recorded by the nest cameras entering and leaving Red-headed Woodpecker nest cavities. Both species are primarily considered to be terrestrial and not arboreal (tree climbing). Over a 14 year period of observations Bull Snakes were observed numerous times between 20 and 40 feet high in trees and were very adept, sometimes moving from one dead tree to another using branches while searching out high cavities to inspect. The snakes could easily climb up and down the trees using cracks and bark roughness for purchase points.

The Eastern Garter Snake was recorded only once by the nest cameras. How it managed to get up a barkless dead tree to the Red-headed Woodpecker cavity is a mystery. When exiting the cavity it fell or purposely dropped to the ground.

Snakes were sometimes observed entering cavities where there was no prey available at the time, based on 24-hour nest camera observations, suggesting that they inspect cavities for possible prey. Perhaps scent markings left by prey animals on the bark may attract the snakes, or they simply take a chance looking in cavities as many are inhabited by animals of some kind.

Bull Snake (*Pituophis catenifer*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Bull Snakes are **predators**. The one in the picture above has found three Red-headed Woodpecker nestlings in the cavity where most of its body is inside the cavity constricting the nestlings. It moved its head inside a few seconds after this video frame shot to eat the nestlings. At Cedar Creek ESR Bull Snakes are a primary predator of Red-headed Woodpecker nestlings.



The picture on the left had Tree Swallow nestlings a few weeks earlier but they had fledged by the time the Bull Snake visited this cavity. White-footed Mice were on the nest frequently but were not nesting in this cavity at this time either.

Bull Snakes may see activity at a cavity or may smell scent markings at the bottom of the tree, but sometimes their effort to reach a tree cavity results in no food reward.



The top picture shows a parent European Starling trying to fight off a Bull Snake from entering its nest cavity, which is an old Red-headed Woodpecker cavity. Its efforts were completely unsuccessful, and the nestlings inside were eaten by the snake. The picture below shows the snake leaving the cavity three days later. This Bull Snake used the cavity as **temporary shelter** while it digested its big meal.



Eastern Garter Snake (*Thamnophis sirtalis*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



The Eastern Garter Snake entering the cavity entrance hole in this picture was a big surprise when seen on the video. I was not aware that they would climb trees, especially old dead trees with no bark near the bottom.

This snake entered this cavity at 11:01 on an August 30th, and left at 11:28, 27 minutes later. As no mice or other animals had used this cavity as a nest or roost for a couple of months, it is hard to imagine what food it may have been searching for or possibly found, unless it would be small invertebrates. Lots of birds, woodpeckers and others, investigated this cavity every day, but were not available for the snake.

The Red-headed Woodpecker in the picture was upset by the presence of the Eastern Garter Snake. It claimed and defended this cavity from others, sometimes drumming from this tree, but it had not nested or roosted in this tree cavity.

Many of the recordings from the Red-headed Woodpecker nest cameras are excellent at documenting an event while creating a mystery as to explaining why.

Amphibian Interactions at Red-headed Woodpecker Nest and Roost Cavities



Gray Tree Frogs were the only amphibian recorded by the nest cameras. Being recorded at all was usually accidental as the cameras were generally triggered by the heat and motion of a warm-blooded animal. There may have been frogs present on numerous other occasions that were not captured by the cameras.

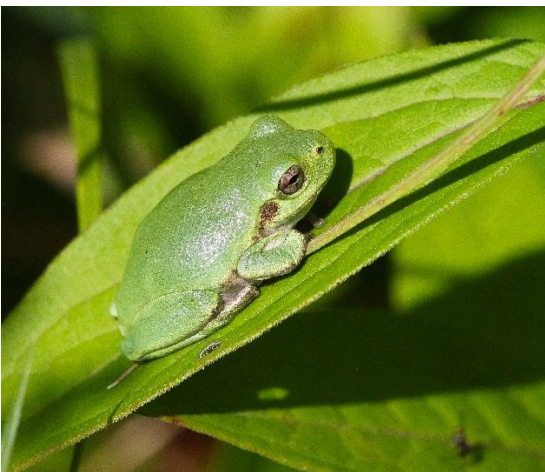
Table 26

Amphibian Species At Cavity	Search for Food	Temporary Shelter	Roost	Use as Water Hole
Gray Tree Frog	X	X	X	X

Gray Tree Frog (*Hyla versicolor*) Interactions at Red-headed Woodpecker Nest and Roost Cavities



Gray Tree Frogs, when captured by the nest cameras, were often just inside the cavity like this one is. It is a great place for catching insects moving in and out of the cavity. The video that this frame shot comes from was triggered by a Southern Flying Squirrel that is running around the backside of the tree and in a few seconds will land on the branch in the background and jump to the cavity, forcing the frog to move down the tree trunk a few inches. It is both using the cavity for **temporary shelter** and **searching for food**.



Gray Tree Frogs can change color, from a mottled gray to bright green, depending on their location, on green leaves or tree bark. While some Gray Tree Frogs choose to spend the daytime in a high roost in a tree, others choose to sit in the open on green leaves in the understory in daytime. There might be more food available during the daytime in the low greenery, but they are completely dependent on camouflage to survive. Why some choose high roosts, as the nest cameras have recorded, instead of active feeding in the understory during the daytime is another mystery to solve. This picture is not from a nest camera.



The Gray Tree Frog seen in this Red-headed Woodpecker nest hole was recorded in this same place for several days. These frogs seemed to use these types of locations as daytime roosts where they were fairly safe from sun and predators and then go down the tree to hunt in the vegetation at night. In the picture below the Gray Tree Frog is going up the tree to the woodpecker cavity filled with water.

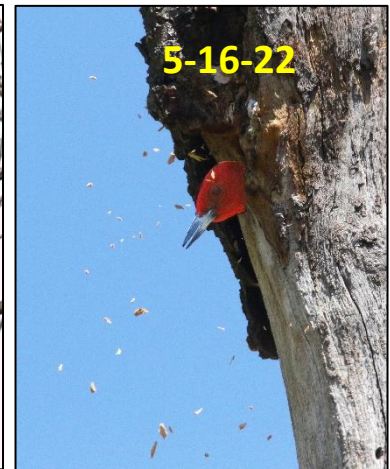
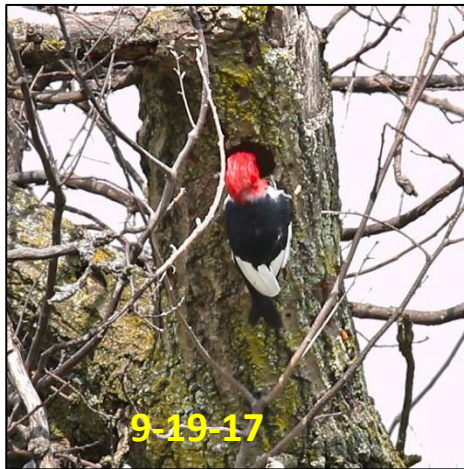




In these two pictures a Gray Tree Frog was seen going down the tree every night, above, and then in the morning it would be recorded returning up the tree, pictured below, going past the Red-headed Woodpecker nest to a roost somewhere above.



Conflict at Red-headed Woodpecker Cavities as Recorded by Nest Cameras Happens All Day and Night



Red-headed Woodpeckers Excavate Many Cavities in Spring and Fall

Red-headed Woodpeckers excavate numerous cavities within their territories during many months, for roosts, for nests, and for fledglings. Many other animals need and use these cavities, creating competition and conflict over access to Red-headed Woodpecker cavities. Sometimes the interactions are between species, and sometimes within the same species. Some interactions result in death, most do not, but all take time and energy from participants. Several examples of types of conflict follow.

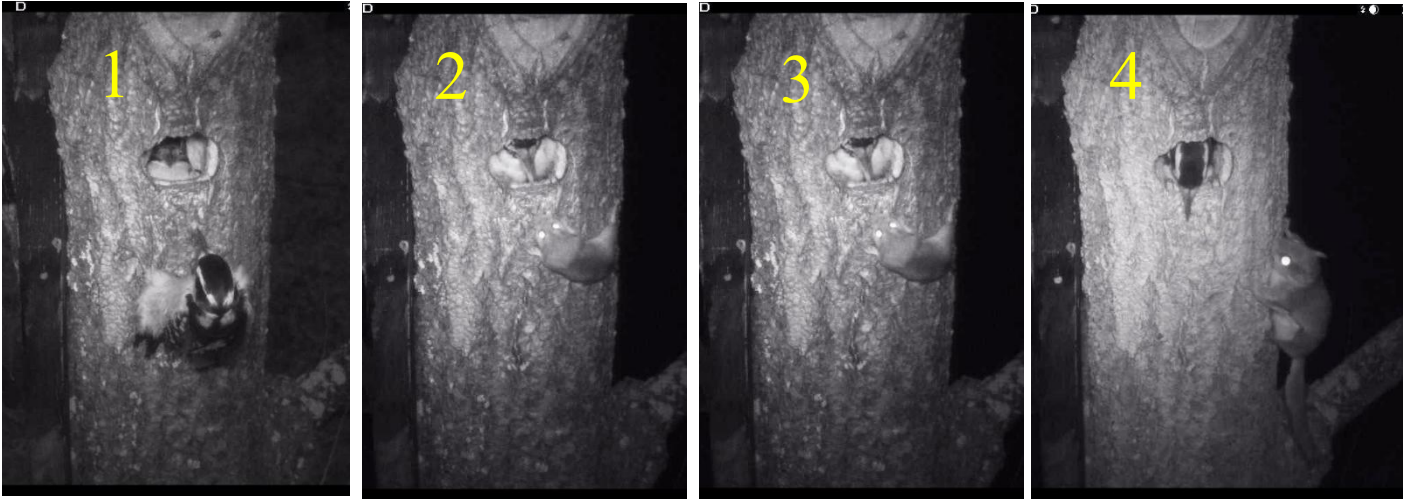


On the left a European Starling is in conflict with a Bull Snake that has entered its nest and is eating its nestlings.

On the right a Red-headed Woodpecker is in conflict with a Southern Flying Squirrel that is trying, and succeeds, in usurping the nest cavity from the woodpecker, who has three nestlings inside the cavity.

Conflict continues.....





Conflict. Vacant Red-headed Woodpecker nest cavities in good condition are in high demand and are rarely vacant. The pictures above show a Hairy Woodpecker that has decided to use this Red-headed Woodpecker cavity as a night roost. But others want it as well and conflict results. At 4:50 PM, in picture 1, at twilight, a second Hairy Woodpecker also wants the cavity for its night roost but loses out after some bill poking and calling from both birds. At 6:37 PM, in picture 2, a White-footed Mouse attempts to enter the cavity but is poked away. At 11:25 PM, in picture 3, the same or a different White-footed Mouse attempts to enter again but loses. At 1:53 AM, in picture 4, a Southern Flying Squirrel would like to enter but does not succeed. Being vigilant all night seems to be more work than rest for the woodpecker in this roost.



Conflict avoidance when possible. Red-headed Woodpecker cavities have many invertebrates in and around them, possibly because of nestlings that scatter spray their fecal matter inside the cavities. Birds, like other woodpecker species, arrive at the nests to eat the invertebrates. In the left picture above a Hairy Woodpecker is busy eating invertebrates it finds, but it can see a Red-bellied Woodpecker approaching, and to avoid conflict, it leaves. Within 3 seconds the Red-bellied Woodpecker lands and begins eating invertebrates (middle picture). The same thing happens to the Red-bellied Woodpecker, as it can see a Pileated Woodpecker approaching, so it quickly moves to the other side of the tree trunk, and peeks around (arrow) as the Pileated finds and eats invertebrates (right picture).



Conflict gets physical. Frequently, conflict escalates and gets physical when the need for a cavity outweighs the possibility of injury. The pictures above show Red-headed Woodpecker cavities where two different Hairy Woodpeckers have settled into separate cavities as a night roost. In pictures 1 and 2 the Hairy Woodpecker physically flings a persistent Southern Flying Squirrel into the air after its attempt to take over the cavity. In picture 3, at a different cavity, this Southern Flying Squirrel was successful in dragging the roosting Hairy Woodpecker out of the cavity and flinging it away. It then had the cavity for its own use.



Conflict sometimes involves death. Predators, like the Raccoon in picture 1 above, are looking for food. In this picture this Raccoon was able to grab two nestlings from a European Starling nest in an old Red-headed Woodpecker cavity and have its meal. In picture 2, a possible male Southern Flying Squirrel entered this nest and killed all the baby Flying Squirrels. He may not have been the father of these young. One baby is in his mouth. In picture 3, a supposed male Red Squirrel entered this Red Squirrel nest and killed each of the baby squirrels, one of which can be seen in its mouth. The videos are quite graphic.



Over 75% of all the species recorded by the nest cameras were involved in conflict at Red-headed Woodpecker nest cavities. Conflict occurs day and night and all days of the year at these cavities.

Red-headed Woodpecker Nest Cameras

The cameras used at these Red-headed Woodpecker nests and roosts were Reconyx HP 2X Hyperfire 2 Gen 3 No-Glow Infrared models purchased in 2019 and 2020 by the author and the Red-headed Woodpecker Recovery project. The cameras were altered in the factory to have a focal distance of 3 feet. The frames to attach the cameras to the trees were designed and built by the author to hold the cameras 3 feet from the nest hole on usually dead trees. The cameras required 12 ultimate lithium AA batteries and a 128 g memory card. The batteries would last two weeks on an active nest in the summer and 5 months on inactive nests in the winter. Six to nine cameras were in constant action all year for over 6 years.

The author installed the cameras and frames onto nest and roost trees and then changed out batteries and memory cards regularly with work partner Jim Howitz. During the summer and fall months of 2021 April Strzelczyk Haverstock assisted with this work. The memory cards' pictures and videos were downloaded onto the author's home computer, were viewed and analyzed with notes taken on activities observed.



These are all pictures taken at Red-headed Woodpecker nest 319. The upper left picture shows the nest camera mounted to the tree with the adult woodpecker present. There were five eggs in the nest cavity at camera install.

The upper right picture shows the author changing out batteries and the memory card at the same nest. The picture to the left was taken by the nest camera at this nest cavity on April 10th, 2024, with a Hairy Woodpecker inspecting the nest cavity.