

# A Bird's-Eye View: How Birds Select Habitat<sup>1</sup>

Mark E. Hostetler<sup>2</sup>

If you were to look at Florida from an airplane, you would see urban environments expanding into natural areas. Thousands of people are moving into Florida each year. To make room for people moving to Florida, vast areas of wildlife habitat are affected. Habitat is an area that has sufficient amount of food, cover, water, and space for a particular animal. When humans change the land to suit their needs, they can decrease the amount of habitat available for wildlife. In particular, this changing environment is affecting where birds occur in Florida. When humans move in, some bird species move out. However, some bird species are still living in these human-dominated landscapes. Why do some birds stay and others move out? This question is only answered if we know how birds select habitat. Understanding habitat selection is important if we are trying to design and manage landscapes to benefit and attract birds.

Imagine a Carolina Wren (*Thryothorus ludovicianus*) and a Red-tailed Hawk (*Buteo jamaicensis*) flying over your neighborhood (Figures 1 and 2). Both species are found in certain areas of an urban environment. Take any Florida city, and certain neighborhoods will contain more Carolina Wrens or Red-tailed Hawks than other neighborhoods.

Both birds are responding to something within a landscape that attracts them to one area versus another. Thus, opportunities exist for people to design and manage their yards, neighborhoods, and hometowns for our feathered friends. But what is good habitat for a Carolina Wren versus a Red-tailed Hawk? How does each select a habitat for foraging or breeding? Do they have different criteria when

selecting a particular area? Why would a bird select one yard versus another yard?



Red-Tailed Hawk, ©Dan Sudia  
Figure 1. Red-tailed Hawk (*Buteo jamaicensis*).  
Credits: Dan Sudia.

Birds respond to landscape structure across several *scales*. For example, let's say a bird is attracted to trees when it is searching for good habitat. The bird may respond to trees both in your yard *and* in your neighborhood. These are two different scales. The scales at which a bird responds to landscape structure is an important part of habitat selection.

1. This document is WEC 163, one of a series of the Wildlife Ecology and Conservation Department, UF/IFAS Extension. Original publication date January 2003. Revised October 2012. Reviewed August 2015. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

2. Mark E. Hostetler, wildlife Extension specialist and professor, Department of Wildlife Ecology and Conservation, UF/IFAS Extension, Gainesville, FL 32611.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. For more information on obtaining other UF/IFAS Extension publications, contact your county's UF/IFAS Extension office.

U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.



Figure 2. Carolina Wren (*Thryothorus ludovicianus*)

“Scale” essentially means the size of an area. When a bird “responds to” an area, it is attracted to that area and the landscape structures within it. “**Landscape structures**” are the actual objects (such as trees, bushes, fields) within a given area.

## A Bird’s-Eye View

If a hawk appears in your yard, it is there not only because of what you have in your yard, but what surrounds your yard. The types of habitat that are in your yard, neighborhood, and on your side of town are all important. At each scale (yard, neighborhood, town), the hawk is responding to certain structures in the landscape. Within the yard, it may be responding to large trees in which to nest or roost. In the neighborhood, it could be the amount of forested area and open space. Forested areas provide roosting spots, and open spaces provide areas to catch rodents. At the scale of the town, it also responds to the amount of forested versus open areas. One side of town may have more open areas (that contain more prey items) than the other. The hawk may prefer this side of town. In this example, the yard, neighborhood, and town represent the *range of scales* at which the hawk responds to objects within a landscape. Each scale is important to whether the hawk locates itself in a particular area.

Different bird species respond to different objects within a landscape. As mentioned previously, these objects can be trees, grass, or shrubs. The type of object a bird prefers is dependent on its natural history: what it eats, what it needs for nesting, etc. For example, one bird species could prefer tree patches. Another bird species prefers flowering plants. Others prefer woods along streams (riparian habitat). Some

prefer natural, open fields. Some even prefer the actual homes (buildings) and others prefer lawns. In addition, the size of these objects is important too. Different species may respond to different sizes of a particular object in the landscape. Let’s say two species like open areas (e.g., lawn). One species, such as a robin, may be attracted to a front yard. Another species, say a hawk, may prefer large expanses of lawn (e.g., golf courses). They both respond to lawn. However, the *area* of lawn is much bigger on a golf course than a front yard.

Each bird species may respond to habitat structure at different ranges of scale. Let’s go back to the Carolina Wren (Figure 2) and Red-tailed Hawk (Figure 1). As you would imagine, the small wren operates at much smaller scales than the hawk. The size of the bird limits the scales at which it responds to habitat structure. Think of a wren and a hawk flying over a landscape in search of habitat (see Figure 3). Both birds respond to habitat structure across a range of scales. A Carolina Wren probably responds to small areas and small objects. A Red-tailed Hawk responds to large areas and large objects. Look at the sizes of the home ranges for the two species (Figure 3). They occur at different scales. The area evaluated by a hawk includes whole subdivisions and large open/forested areas. The area evaluated by a wren is a portion of a yard.

## Scale-dependent Decisions of a Wren and a Hawk

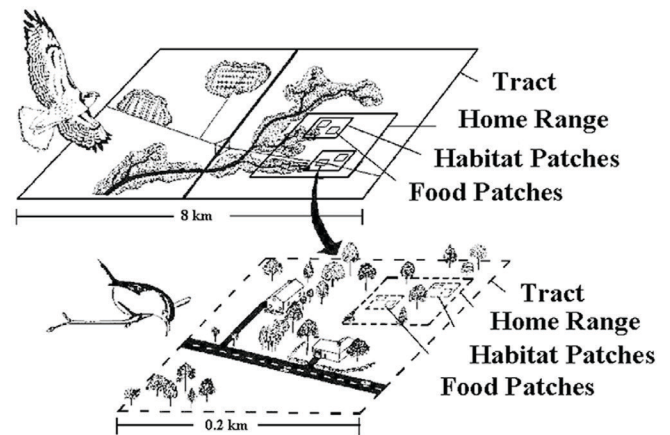


Figure 3. This is a theoretical representation of a Carolina Wren and a Red-tailed Hawk responding to landscape structures as they search for habitat. The wren searches a tract of land to establish a home range. At the next scale, the wren searches its home range for suitable habitat patches for nesting or foraging for food. Then, within these habitat patches, the wren locates areas where food items (e.g., insects) are abundant. At the smallest scale, the wren searches for food in those habitat patches where food items are abundant. The hawk has a similar set of decisions, but it selects much larger areas and objects at each comparable scale. Notice that the only overlap in scales is at the food patch level for the hawk and at the tract level for the wren. Credits: Mark E. Hostetler

In terms of habitat selection, one scale may be more important than another. Landscape structure at *broad scales* is probably most important. What does “broad scales” mean? Using Figure 3, for example, the broad scale equals the “Tract” level. Landscape structure at broad scales probably *first* determines whether a bird appears in a given area. Thus, a bird may roost in a tree in your yard because the tree is there. *However*, the bird first appeared in the general area because of habitat existing beyond the scale of your yard.

## Scale and Landscaping for Wildlife

Consider talking with your neighbors about creating backyard wildlife habitat. The combination of several different yards with wildlife habitat will draw more species into the neighborhood and thus more to your own yard. Many wildlife species prefer large patches of their preferred habitat (such as open meadow, shrubs, or mixed forest). Some species primarily respond to one type of habitat whereas other species are attracted to a mixture of different habitats. In particular, larger species respond to landscape structure (such as tree canopy) at much broader scales than do smaller species. For example, a Red-tailed Hawk will respond to landscape structure across a whole neighborhood. A Carolina Wren will probably respond to landscape structure within one or two backyards.

If you can design “wild” areas with your neighbors, try creating habitat along property lines or on adjacent corners of your properties where people traffic is low. This will create larger habitat patches for wildlife. Even creating wildlife habitat with neighbors that are *not adjacent* to your property creates a number of different habitat patches that are valuable to wildlife. Overall, this would make your neighborhood attractive to various species.

In summary, if the bird is large, you have to consider creating habitat beyond the boundaries of an individual yard. If the bird is small, your yard may contain enough habitat. In general, though, larger habitat patches created in neighborhoods attract more bird species. For tips on landscaping for wildlife, see <http://www.wec.ufl.edu/extension/landscaping>

## Monitor Birds?

Do you like attracting birds to your yard? The [Department of Wildlife Ecology and Conservation's Wildlife Extension office](#), in conjunction with UF/IFAS Information Technologies, developed the [Florida Bird Monitoring Program](#). The objective of the Florida Bird Monitoring Program is to provide a website where you can enter bird survey data

you've collected, and view data collected by other participants around the state. Homeowners and participants from natural resource, Cooperative Extension, and education programs are encouraged to participate.

Which types of birds are visiting your yard or neighborhood? Through this website, you can track which birds occur in your yard and community over time. If you are a property owner who is landscaping to attract birds, you can monitor which landscaping strategies and management techniques worked best. By participating in this bird-monitoring program, you can see how these landscaping techniques affected birds in your yard. You can also monitor the quantity and types of birds that visit any area throughout the state from month to month and year to year. For more information on how to join, visit <http://bird.ifas.ufl.edu>.

## Further Reading

Hostetler, M.E., and Holling, C.S. 2000. Detecting the scales at which birds respond to structure in urban landscapes. *Urban Ecosys.* 4, 25-54.

Hostetler, M. 1999. Scale, birds, and human decisions: A potential for integrative research in urban ecosystems. *Landscape and Urban Planning* 45, 15-19.

Hostetler, M. E. 2012. *The Green Leap: A Primer for Conserving Biodiversity in Subdivision Development*. University of California: Press. Berkeley, California <http://www.ucpress.edu/book.php?isbn=9780520271111>

Holling, C.S. 1992. Cross-scale morphology, geometry and dynamics of ecosystems. *Ecol. Monogr.* 62, 447-502.

Kotliar, N.B., and Wiens, J.A. 1990. Multiple scales of patchiness and patch structure: A hierarchical framework for the study of heterogeneity. *Oikos* 59, 253-260.