



Edge Effect

Goes Into the Woods

Forest edges benefit some species of wildlife such as this wild turkey
Photo credit: Jeffrey Jackson



By **JEFFREY Jackson**

Where do you go, if you're in a new place, to look for songbirds, or hunt for local snakes, or look for deer tracks? Where do you and your friends start your search with gun or binoculars? I'll guess that, for a start, assorted "hunters" instinctively head for an edge: the edge of the forest, the fencerow at the edge of the field, the edge of the marsh, the edge of the pond. We know intuitively that the edges are where the action is — where the animals we seek are most likely to be found.



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Early wildlife managers decided that bringing habitats together was a good thing. Aldo Leopold likened habitat to a city. If all of the grocery stores and restaurants were in one quarter, all the residences in another and all the work places in a third, the logistics of living would soon limit population size. These necessities were better dispersed throughout. Likewise if quail, for example, were out in a mile square of never-ending thicket or woods or cropland, they wouldn't do so well. Quail thrive at the intersection where woods, thickets and cropland come together — where they have food and cover close together. Habitat diversity reduces the need to travel. Travel is dangerous for quail. This concept applies to a variety of habitats. A square mile of monotonous cattail marsh is not as good for ducks as a square mile mosaic of cattails and open water, because there the ducks find a better mixture of food and cover. A forest edge that is undulating has more good edge habitat than a straight edge. More edge is better for many kinds of wildlife.

Edge effect is the tendency for a greater variety for organisms to cluster in the boundaries between habitat communities. Edges are meeting grounds where things happen. Think of the edge words that reflect edge action, words such as "leading edge," the "cutting edge," feeling "edgy" or "going over the edge." Edge happenings can be good or bad for an animal, depending on whether it's the hunter or the hunted.

It's easy to increase forest edge. Simply cut openings in the forest. If we cut lanes and openings in a block of forest, the edges will show a wall of tall growth juxtaposed with a zone of clearcut having short vegetation. This simple, cliff-like edge is a high contrast edge. The ecotone,

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or zone of intergradation between the two habitats, is narrow. We can improve on this edge and reduce the "contrast" between the habitats by expanding the edge. We expand the edge by removing some of the trees just inside the forest. The extra sunlight along the edge will allow grasses, forbs, brambles and bushes to invade the edge. These changes will improve habitat for many species. Meanwhile, we keep the adjoining short grass and forb habitat open by fire, mowing or tillage. As the magic of the expanded edge develops, we will have better habitat for cottontail rabbits, quail, indigo buntings, deer and more.

The Tradeoffs of Edges

Such habitat management to increase edge is not good for all animals. There are tradeoffs. Our plan to dissect the forest and increase edge means less habitat for gray squirrels, flying squirrels and other animals that need a mature forest. Less forest means less living space, plain and simple. So, too, for the timber producer — less timber means less money. These simple explanations and management plans were standard fare for wildlife management classes until about 1980.

Then new discoveries began to add further complexity to the edge effect concept. It wasn't game managers who developed these new ideas on edge. Ecologists working on birds were the first ones who noticed that the effects of edge were not as simple as game managers thought.

Ornithologists discovered that edge effects may extend far beyond the edge and into the interior of the forest, where they affect "interior species." These interior animals need to be away from the edge to thrive. A more modern view of how we classify animals according to their response to habitat edges is summarized by Whitcomb, et. al. 1981, in an article titled, "Forest Island Dynamics in Man-dominated Landscapes." They described the effects of forest fragmentation on birds in eastern deciduous forest. They classified forest birds among four categories: forest interior specialists, interior edge generalists, forest edge species and field edge species.

continued on page 29

Forest interior specialists, such as the hooded warbler, prefer to nest only within the interior of the forest and tend to avoid edge habitats. Some birds, such as the northern cardinal, are interior edge generalists. Not surprisingly, cardinals have become a very common species. Forest edge species prefer edges. The indigo bunting is one that increases in abundance when forest edge habitat increases. Birds that nest out away from the edge in the interior of open fields and grasslands are another kind of interior species. They are grassland nesters and have better nesting success in large areas of grassland away from forest edge. Henslows sparrows and dickcissels are a couple of grassland interior species.

To add to this variation in edge preference is the even newer concept of "area sensitivity." Area-sensitive birds need a large area of woods in which to breed. We know the answer to the old riddle ... how far can you go into a forest? The answer is, halfway. In a small forest, halfway may not get you far enough away from the edge. If a vast forest is cut into pieces, area-sensitive birds tend to become scarce or disappear. Small islands of habitat are much less useful to them. The application of the ideas about interior species and area-sensitive species is currently promoted by ecologists of various kinds. They have noted that the effects of forest habitat fragmentation impact on certain lichens, vascular plants, crustaceans, birds and mammals.

Why are edges different from forest interiors? Maybe the difference has to do with vegetation structure or the abundance of prey. There are edge-to-interior gradients in wind velocity, humidity and soil moisture. Cowbirds are a factor in nesting success of certain edge-nesting birds. These nest parasites

lay their eggs in other birds' nests in edge forest habitats. The cowbird population has spread eastward as we have fragmented the eastern forest. They have increased their success at the expense of certain forest songbirds.

Large areas of unbroken forest have values that are not found in fragmented habitat. So what to do? These values need to be considered in forest management plans so as to provide for forest interior and area-sensitive species.

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