

Effects of logging on breeding success of Acadian Flycatchers

By Donald Winslow,

Yesterday evening a friend and I took a walk up a dry streambed at IU's Research and Teaching Preserve at Moore's Creek. We heard a few migrant birds calling—Wood Thrush and Scarlet Tanagers, both species that breed in the woods of southern Indiana. We heard the water-drop calls of Swainson's Thrushes, who summered further north and are on their way to the Neotropics for the winter months. Then we heard the sharp, two-syllable song of a male Acadian Flycatcher, singing over the streambed where he likely defended his territory for the last few months. He's finished with the breeding season now, preparing to make the long journey south.

My colleagues and I have studied the breeding ecology of Acadian Flycatchers and other migrant birds in southern Indiana forests for the last decade. As part of this program, I employed a crew of seasonal birdwatchers to monitor breeding success in Yellowwood State Forest. My motivation to undertake this study stemmed from the large body of research on the effects of forest fragmentation and habitat edges on avian nesting success.

Many researchers have found that levels of nest predation by various predators are higher in forest fragments surrounded by agricultural land than in large, contiguous blocks of forest. Also, birds breeding in fragmented forests suffer higher levels of brood parasitism by Brown-headed Cowbirds—who lay their eggs in the nests of other birds for the host birds to raise. But it is not as clear the extent to which nest success decreases with internal fragmentation—such as the roads, logyards, and timbercuts that result from logging on state forests. Some studies have found negative effects of habitat edges on breeding success, but the results have not been consistent and there has been relatively little attention given to understanding the underlying mechanisms.

For these reasons we are not able to predict with certainty when edge effects on nesting success will occur, or the magnitude of effects. My goal is to investigate the mechanisms of edge effects, so the public and decision makers can anticipate the results of various policy options. Because there is an ongoing timber program with little public oversight on state forests, it was

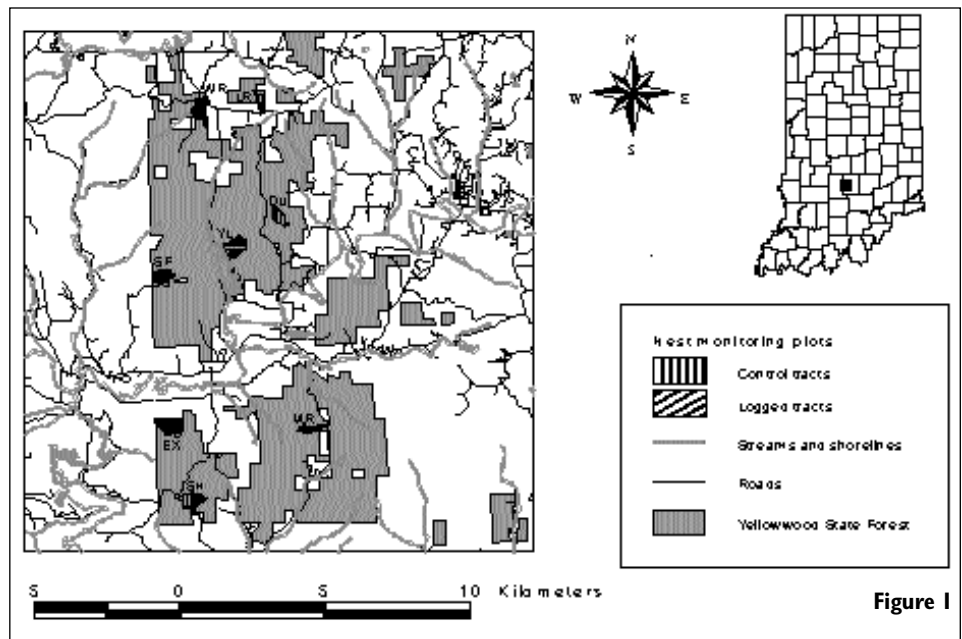


Figure 1

possible for me to employ an experimental approach in this study.

We measured nest success and cowbird parasitism levels in eight tracts in Yellowwood in 1995 and 1996 (Figure 1). The DNR marked timber sales at four of these tracts, which were cut in between the two breeding seasons. The other four tracts were close to rotation age but remained uncut during that time and thus served as controls. The results show an interesting pattern, but not one that is straightforward to interpret.

Overall success rate of Acadian Flycatcher nests increased from 1995 to 1996 at control sites, but was similar at treatment sites before and after logging (Figure 2). Cowbird parasitism decreased from 1995 to 1996 at control sites, but was similar at treatment sites before and after logging (Figure 3). Bootstrap analysis indicates statistically significant interaction effects of condition (treatment or control) and year on both nest success and brood parasitism. If factors responsible for between-year variation

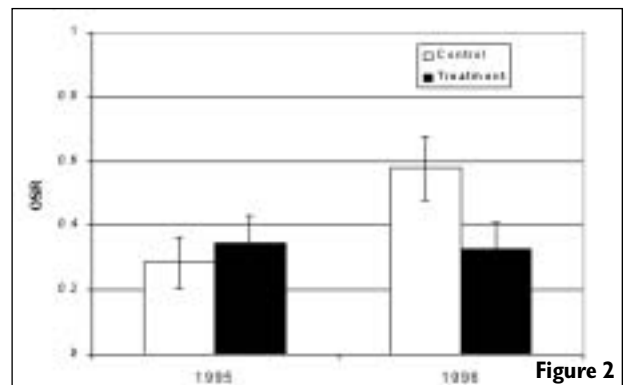


Figure 2

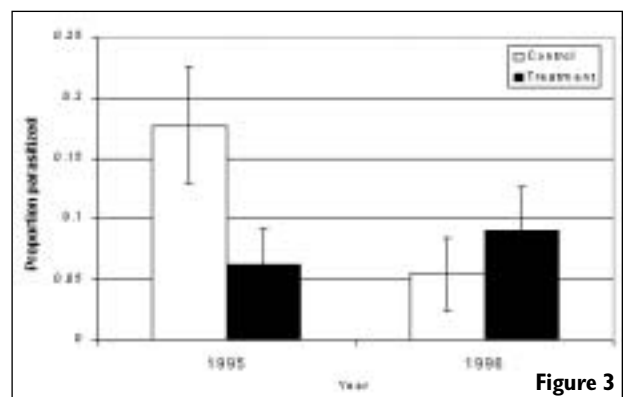


Figure 3

operated similarly at all sites, this suggests that logging decreased breeding success at the treatment sites relative to that at the control sites. However, it is also possible that site-specific factors at one or more control sites influenced the results.