

# Native Biodiversity and Golf Courses in Midwestern Landscapes

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## Objectives:

1. Determine what small- and large-scale landscape features within and around golf courses are important to particular species of birds.
2. Determine what small- and large-scale landscape features within and around golf courses are important to particular species of butterflies.
3. Compare and contrast these two taxa to see if design guidelines can be developed to increase the number of native species of both of these groups at golf courses.
4. Compare and contrast the contribution of small-scale and large-scale landscape features in preserving native biodiversity.
5. Develop guidelines for golf course design for both birds and butterflies at both small- and large-scale.

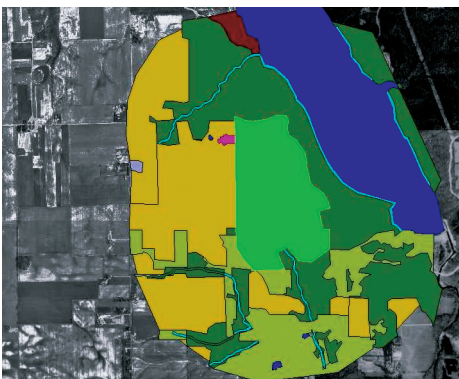
**Start Date:** 2000

**Project Duration:** 3 years

**Total Funding:** \$62,600

This project examines the conservation value of golf courses in the Midwestern landscape by focusing on two indicator taxa: birds and butterflies. The Midwest has more land that is directly manipulated than any other region in the country. This pattern of land use presents a challenge to conservation biologists because they cannot rely solely on public lands in their conservation efforts.

Golf courses have the potential to play a significant role in overall conservation plans. They may directly provide habitat for specific groups of organisms, and they may also provide buffer zones between developed and natural areas. However, some researchers believe that excessive pesticide and fertilizer use on golf courses make them very poor substitutes for natural lands. A major goal of this project is to use bird and butterfly survey data to analyze the effectiveness of golf courses as habitat patches.



Geographic Information Systems (GIS) were used to classify land uses patterns surrounding each course at several scales.

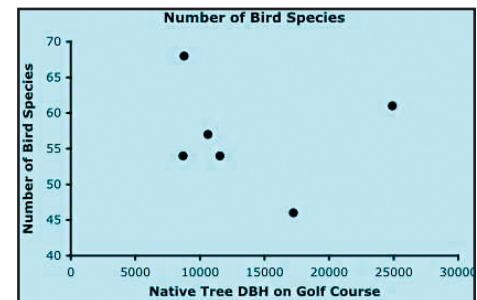
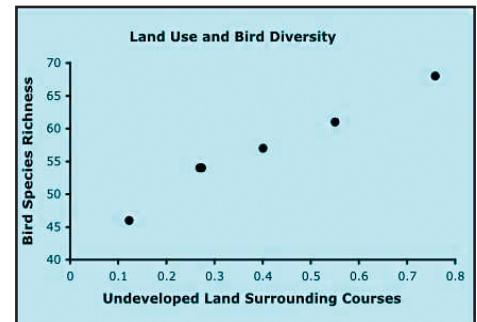
Wildlife can perceive habitat quality at different scales. For instance, a small plot of land may be perfect as a nesting site for some bird species, but if that small plot is surrounded by a large city, then birds may choose to avoid it. Therefore, we are analyzing the response of wildlife distributions to both golf course landscaping practices and land use patterns surrounding the courses.

In the summers of 2000 and 2001, bird and butterfly communities were sampled in six golf courses. We also recorded vegetation characteristics within each course. Finally, we used Geographic Information Systems to classify land uses patterns surrounding each course at several scales. We are in the process of using these data to determine what factors have the greatest influence on bird and butterfly communities.

Our analysis suggests that land use surrounding golf courses most strongly influences bird diversity. While this result indicates that golf course managers can do little to increase bird diversity, golf courses may still serve as important habitats for sensitive bird species.

We are currently analyzing golf course vegetation data to determine whether careful landscaping can improve habitat quality for these threatened species. We are also in the processes of identifying the influence of both local and surround landscapes on butterfly assemblages.

We intend to use our results to provide the golf industry with scientifically rigorous guidelines for golf course management that will create and improve valuable wildlife habitat. These guidelines will focus on techniques that can be imple-



Researchers showed that type of land use surrounding the golf course strongly influences golf course bird diversity (top). However, bird diversity was not strongly related to vegetation characteristics within the golf course (bottom).

mented on existing courses. Our results will also help developers identify new course locations that can most effectively provide quality habitat.

## Summary Points

- Researchers have identified bird and butterfly distribution and abundance for six golf courses in southwestern Ohio.
- Bird diversity is highest on golf courses surrounded by undeveloped lands.
- Vegetation characteristics within golf courses have little influence on bird diversity.
- Researchers will use similar techniques to identify the determinants of butterfly diversity on golf courses.
- Scientifically defensible guidelines will be developed to encourage golf course designs that promote wildlife diversity.