Population and Community Responses of Reptiles to Golf Courses

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Objectives:

1. Examine diversity, distribution, and relative abundance of reptiles living on three golf courses varying in age, location, and surrounding housing density.
2. Implant radio transmitters into Gila monsters to examine movement patterns, habitat use, and survival in response to varying features of golf courses.
3. Inform residents, golfers, and golf course personnel about local reptiles via interactions, presentations, and the development and distribution of a field guide booklet.
4. Engage golfers in monitoring reptiles by writing down wildlife observations in a logbook available in each clubhouse.
5. Develop recommendations for golf course designers and managers that can be used to retrofit existing courses and design new courses to maximize benefits to reptiles.

Start Date: 2008
Project Duration: two years
Total Funding: $59,994

The demand for golf course communities in Arizona has steadily increased as baby boomers transition into retirement. Presently, there is a lack of information on the potential role that golf courses can play in maintaining native reptile populations and communities, especially in arid environments like the southwestern United States. The more information we have on how to design and manage golf course communities, the better we will be at maximizing the benefits that golf courses can provide for wildlife.

During the past year, we used mark-recapture to determine relative abundance and distribution of reptiles using golf courses in Arizona. To date, we have documented literally thousands of tortoises, snakes, and lizards using various features of golf courses. Using high-resolution imagery, we are analyzing distribution and abundance data in the context of landscape structure. We are finding that certain aspects of the golf course are used by certain species, while others are avoided. For example, irrigated vegetation along fairways and surrounding greens and tee boxes are used well out of proportion to their availability, while open fairways appear to be avoided, especially by snakes. Areas of the golf course where natural desert has been incorporated into the design of the course correspond to areas of greater relative abundance of most species.

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We have been radio tracking Gila monsters to gain a better understanding of how they are responding to the golf course and its surroundings. We have observed a clear pattern of use by Gila monsters characterized by general avoidance of open fairways and other areas of turf. However, Gila monsters tend to spend more time on the edges of fairways and greens, presumably searching for prey in the dense, irrigated vegetation.

We have observed individual Gila monsters changing the location and use of their home ranges as newly constructed homes become more common. Interestingly, the Gila monsters have started to concentrate more of their activity in areas immediately adjacent to the golf course that are off limits to development.

Although radiotelemetry is an excellent tool for tracking the movements of Gila monsters, you can only obtain information on the animal's location by physically following its signal. In 2008, we began using a new technique that allows us to quantify the exact movement path taken by a Gila monster. The technique involves the use of florescent powder that we apply to the Gila monster by gluing rabbit fur onto its belly and loading up the fur with the powder. After allowing the Gila monsters some time to move about, we come back after dark with a UV light and follow its exact track. This technique allows us to determine if Gila monsters are avoiding certain features of their habitat, such as fairways and roads.

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Using radiotelemetry, we only get the straight-line distance between successive fixes, but florescent powder allows us to determine the exact distance moved. So far, we have found that Gila monsters typically move two to three times farther than their straight-line distances would indicate.

Summary Points

- Reptile species vary in their use of golf course features, but most species tend to avoid open fairways.
- We have observed a greater abundance of reptiles using thick, irrigated vegetation adjacent to fairways and greens.
- The placement and layout of the golf course helps to determine the distribution of reptiles, and certain species alter their distributions to take advantage of irrigated vegetation and natural areas that are incorporated into the golf course as hazards or rough.
- Using radiotelemetry and florescent powder tracking, we have determined that Gila monsters tend to avoid open fairways, and tend to utilize irrigated areas along the edges of the golf course out of proportion to their availability.