Utilization of Golf Courses and Other Urban Green Spaces as Amphibian Refugia

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Abstract

The objective of this study was to examine amphibian use of urban greenspaces such as golf courses as indicators of habitat quality. The survey focused on two golf courses, one well established (~45 yr) and one relatively new (5 yr). Since amphibians are frequently viewed as bio-indicators of habitat quality, their density and diversity at our study sites will help us understand how these areas play a role in providing adequate habitat in an urban setting. Species present at the new course are of particular interest in order to comprehend how it is functioning as habitat in a successional fashion. Results indicate several frog and toad (anuran) species are utilizing habitat provided by both courses—supporting the hypothesis that habitat conditions are minimally suitable for some amphibian species. Additional species were located at control sites indicating that, while course habitat may be conducive to housing some species, it appears that others may be excluded for reasons still under investigation. Data collected allows us to determine quality of current habitat and provides benchmark evidence for future research on urban amphibian communities.

Introduction

Current rates of urban expansion have taken a toll on natural areas utilized by wildlife around the world. Golf courses and other urban greenspaces have been found to serve as critical areas of interest for some species of plants and animals. As urbanization continues, these areas may be relied upon more heavily to serve as critical habitat areas for displaced organisms. The goal of this study is to better understand how urban green spaces in north central Iowa play a role in providing suitable habitat for amphibians. Diversity of amphibian populations should indicate habitat quality and availability provided by these areas. Research on amphibian populations has increased since global declines in amphibian species were first noted in the 1980’s (Nickels, 2003; Lannoo, Lange, Waller, and Phillips, 1994). In order to try to unravel the mystery behind this phenomenon, as well as define possible problems and responses, this decline may imply, studies have focused on assessing existing amphibian populations and their habitat. Multiple theories, ranging from anthropogenic causes to natural extinction cycles attempt to explain why this decline may be occurring. This observed decline in amphibian species on a global scale may be indicative of a shift in world climate, weather patterns, or overall environmental health (Laverty, White, Silsbee, and Mann, 2003).

“Using bioindications as an early warning of pollution or degradation in an ecosystem can help sustain critical resources” (Biological Indicators, 2003). Due to the sensitive aquatic and terrestrial lifespans of amphibians, many scientists believe habitat quality may be determined based on their presence or absence in specific ecosystems (Copenhaver & Maitz, 2003; Halder, 1987). In this sense, amphibians are viewed as reliable bioindications of habitat quality.

Materials and Methods

Sites were surveyed during spring and summer 2004. Survey sites for the project included: Centennial Oaks Golf Course, Waverly Municipal Golf Course, Babcock Woods and Three Rivers Pond. All were located within Waverly city limits, Bremer County, Iowa. Centennial Oaks Golf Course and Waverly Municipal Golf Course served as the experimental sites of the project, while Babcock Woods and Three Rivers Pond served as control sites due to their proximity to the experimental sites, record of continued establishment, and relatively natural state.

Methods

Surveys were conducted every three to five weeks during the summer months (June-August). An initial auditory survey was conducted for all species and an additional overall survey was conducted for the remaining species (approx. 5-15 min. in length) for permanent record purposes. Tape recordings were later analyzed in the laboratory using call comparisons from an auditory CD (Biodiversity of Iowa Aquatic Habitats, 2001) to positively identify and account for any species not noted in the field.

Results

Results across all survey sites were analyzed together (Table 1). A special thank you to Dr. David McCullough for his time and efforts in advising and assisting me throughout this project. Thank you to Centennial Oaks Golf Course, Waverly Municipal Golf Course, Bremer County Conservation Board, Waverly Light and Power and the City of Waverly for allowing me to utilize their properties as study areas. Thanks also to Dr. Stephen Main, Dr. Roy Ventullo, Ryan Goetz, Erin Wright and Erin Wright for their help throughout this project.

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