

1-1-2010

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Denae Buzzell

Clay Evans

Hannah Shirley

Lin Lin Zhao

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Recommended Citation

Buzzell, Denae; Evans, Clay; Shirley, Hannah; and Zhao, Lin Lin, "The Effect of the Lake Restoration Project on Habitat Use by Waterfowl" (2010). *Furman Lake Restoration Book Gallery*. 17.
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The Effect of the Lake Restoration Project on Habitat Use by Waterfowl

Denae Buzzell, Clay Evans, Hannah Shirley, and Lin Lin Zhao

SUMMARY



When waterfowl numbers dwindled because of over-hunting (MDNRE 2010), the Migratory Bird Treaty Act of 1918 and other protective laws were established to protect bird species such as Canada geese (Silberberg 1996; USFWS 2010). Canada geese prefer calm bodies of water with lush, short, grassy shorelines, since these shorelines make it more difficult for potential predators to hide (MDNRE 2010). These ponds are common elements of suburban neighborhoods, golf courses, and corporate landscapes. Legislation, purposeful land management to increase waterfowl

populations, and the dramatic expansion of suburbia, have caused a population explosion in the last 50 years. Large populations in suburban landscapes have caused many environmental problems for the eastern US, including poor water quality due to higher levels of *E. coli* bacteria in water from deposited feces (Kullas et al. 2002). Furman's Swan Lake has been negatively impacted by this trend, as well. Managed in a fairly typical way since its construction in the mid-50's, the lakeside vegetation was mown right to the waterline--creating ideal Canada geese habitat. In addition, "feeding the ducks at Furman" became a popular family activity for the Greenville community. By July 2006, there were 362 waterfowl on the lake-- 250 Canada geese and an assortment of 92 muscovy, domestic, and mallard ducks--well in excess of the 50 waterfowl that a 28-acre lake should support.

In 2007, Furman implemented the Lake Restoration Project. An important component was to reduce waterfowl populations and decrease the input of feces and *E. coli* bacteria. In addition to direct removal of Canada geese by the South Carolina Department of Natural resources, the university initiated a public relations campaign to discourage people from feeding ducks and geese, and the university began to restore shoreline vegetation to make the habitat less attractive to geese. Our current study evaluates the success of these efforts and studies the preference of Canada geese for mown, naturally regrown, and restored habitats.

We conducted two surveys to measure habitat preferences of waterfowl on Swan Lake. The lake shoreline was divided into categories of mown, regrown (unmown), and restored habitats. Canada geese, swans, and ducks were counted in each region. The observations consisted of 16 total bird counts made over four days, making observations at 7:30 AM, 10:30 AM, 1:30 PM, and 4:30 PM each day. A fecal count was also conducted by setting up two 25 m plots in each of the three habitats (six plots total), sampling every other 0.5 m with 0.25 m² squares. Canada

geese, swans, and other waterfowl all displayed significant differences in the frequency distributions among the three shoreline habitats, with all preferring the mown areas (Table 1). The frequency distribution of waterfowl fecal matter was also analyzed among the different shoreline habitats; these results confirm a preference for mown areas ($\chi^2 = 15.6$, $p < 0.0004$). Indeed, geese, swans, and feces were only observed in the mown areas. Other variables such as the disproportionate length of mown over other shoreline types as well as the freedom of Canada geese to fly to locations outside the Furman Lake, such as the Furman University Golf Course, were difficult to address by the limitations of our study. For future studies, observing waterfowl presence over longer periods of time and making observations during consistently warm weather could potentially yield more reliable results. Overall, our study supported the effectiveness of the Furman's Lake Restoration Project in discouraging and limiting Canada geese populations through reduction of favorable habitat size. With time, this will hopefully improve water quality and reduce *E. coli* bacteria to healthy levels in Swan Lake.

Table 1. The number of waterfowl observed in different regions of the shoreline, summed over 16 observation periods.

	Canada Geese	Swans	Ducks
MOWN	40	13	239
REGROWN	0	0	18
RESTORED	0	0	9
Total	40	13	266
Chi-square, p	$\chi^2 = 80.0$, $p = 0.0001$	$\chi^2 = 26.0$, $p < 0.0001$	$\chi^2 = 382.8$, $p < 0.0001$

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