

2001), winter (25 January 2002), early spring (30 March 2002), late spring (13 May 2002), and summer (30 June 2002) for a total of 78 point count surveys. All survey routes started at dawn and lasted ca. 4.5 h. We followed the weather protocol for the Breeding Bird Survey (Anonymous 2001). Each station was separated from other stations by at least 250 m and all stations were spaced throughout the site as evenly as possible. The unlimited-radius point count method (Bibby et al. 2000) was employed to estimate species richness and relative abundance. The duration of each point count was 5 min, which is long enough to identify most birds present and short enough to maximize the potential that all points are sampled in the morning hours (Fuller and Langslow 1984). At each point we identified the species present and the number of individuals seen and heard. We also recorded numbers and species of birds observed between points (interpoint data). Two nocturnal surveys were conducted in 2002 on 29 March and 13 May for species which are not diurnally active. Since most point count stations were not located near wetland sites, we also conducted three waterfowl surveys in 2002 on



*The Bufflehead is one of the migratory duck species documented at Green Wing Environmental Laboratory. This Bufflehead was displaying at Lock & Dam 13, Whiteside County 6 March 2004. Photo by Eric Walters.*

16, 23, and 29 March in appropriate waterfowl habitat. We used the non-standardized random area search method for nocturnal and waterfowl surveys (Bibby et al. 2000).

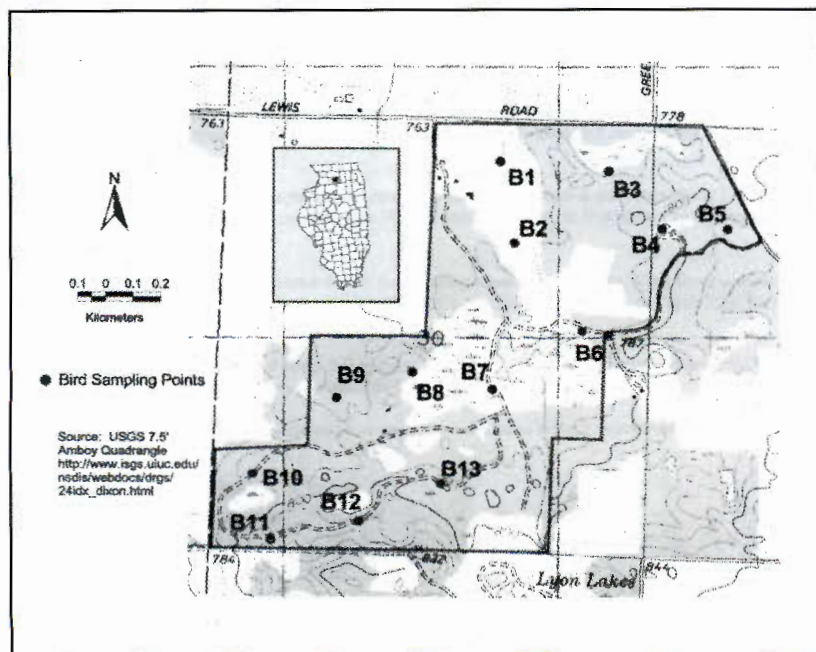
We combined data from all surveys to estimate species richness (# of species observed). Using only point count data, we calculated the frequency of occurrence (the percentage of total points at which a species was

detected). Although this parameter is influenced by locations of survey points, species abundance, detectability, and migratory status, it provides a coarse estimate of how much of GWEL was used by each species. Additionally, relative abundance (the total number of individuals of one species divided by the total number of individuals of all species combined) was estimated for each species within a migratory class [North American Migrant, non-breeders (NAM), North American Migrant, breeders (NAMb), Neotropical Migrant, non-breeders (NTM), Neotropical Migrant, breeders (NTMb), and Permanent Residents (RES) (Bonney et al. 1995)]. We determined species to be breeders and non-breeders according to Bohlen (1989) and National Geographic (2002).

## Results

We identified a total of 4,440 birds of 140 species (Appendix 1) including 62 species of North American Migrants, 59 Neotropical Migrants, and 19 species of Permanent Residents. Richness and abundance were greatest during migration (1,572 individuals of 115 species in spring and 1,954 individuals of 88 species in fall), intermediate during the breeding season (582 individuals of 55 species), and lowest in winter (332 individuals of 27 species).

Thirteen species had a frequency of occurrence greater than 20% (Table 1), which included one NTMb, five



**Figure 1.** Map of Green Wing Environmental Laboratory showing avian point count stations, labeled B1-B13.