

two years following the removal (Table 1); an average increase of 24% following the tree removal at the site. Savannah Sparrow showed the next biggest change increasing from 19 birds in 2001 to an average of 28 birds/year for 2002-2003 (Table 1), an increase of 47%. Grasshopper Sparrow was, on average, three times as abundant in the two years following tree removal (average of 12 birds/year) than they were in the year preceding the tree removal (4 birds in 2001; Table 1). Brown-Headed Cowbird showed the biggest drop in abundance at the site following tree removal, declining from 7 birds in 2001 to no birds being encountered in either 2002 or 2003. Other species recorded in 2001 prior to tree removal but not observed in either 2002 or 2003 included Common Grackle, Mourning Dove, House Wren, Common Yellowthroat, Brown Thrasher, Tree Swallow, and American Crow (Table 1).



**Figure 2.** Picture looking down one of the former tree row lines at Bartel Grasslands, Cook County, Illinois. Picture taken in the first breeding season following treeline removal (June 18, 2002).

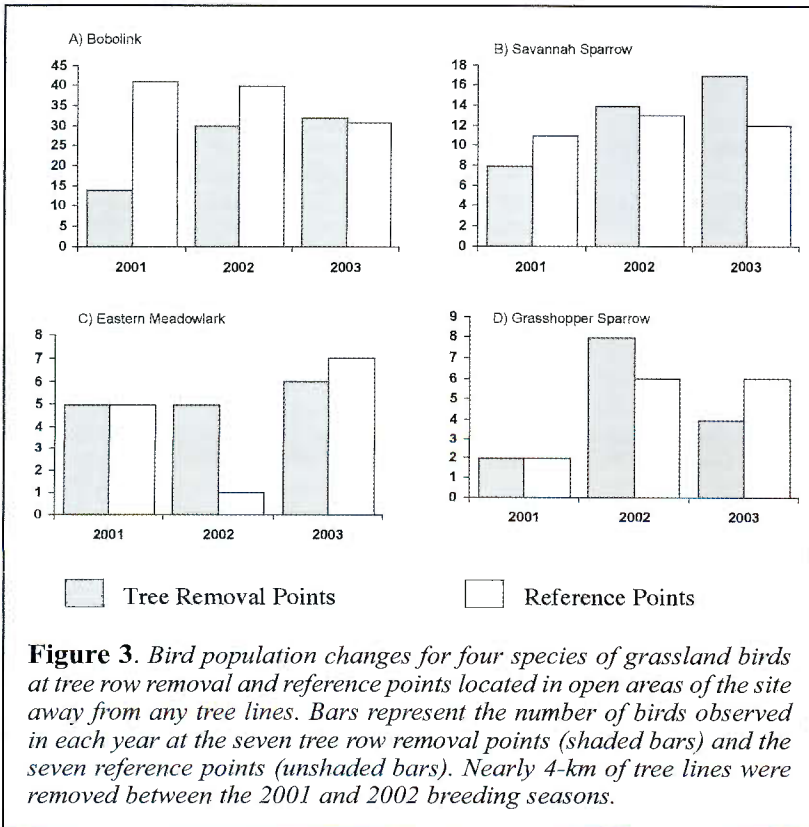
The comparison of population changes at points located on tree lines to the changes observed at reference points located in open areas of the site, showed that Bobolink, grasshopper Sparrow and Savannah

Sparrow numbers all increased more on tree line points than they did on points located in open areas of the site (Figure 3). Bobolink numbers at the seven tree line points increased from 14 to 30 birds between 2001 and 2002 whereas on points located in the open areas of the site Bobolink numbers declined by one bird, 41 birds in 2001 and 40 birds in 2002 (Figure 3). Between 2001 and 2002, Savannah sparrow numbers on the tree line points increased from 8 to 14 birds and Grasshopper Sparrow numbers increased from 2 to 8 birds on the tree line points (Figure 3).

## DISCUSSION

Tree line removal appeared to impact breeding bird numbers at the Bartel Grassland site. Populations of several grassland bird species especially Bobolink, Savannah Sparrow, and Grasshopper Sparrow showed an immediate increase the year following tree removal at the site, with those increases also being greatest in the areas where the tree lines formerly occurred. Tree removal also appeared to result in the elimination of several species typically associated with trees and/or shrubland areas of the site (Table 1).

The bird population responses observed at Bartel Grasslands were generally consistent with previous observations of grassland bird species avoidance of woody edges and linear tree rows. Bobolink and Grasshopper Sparrow are the two grassland bird species that have most often been associated with reduced densities or nest avoidance near woody edges and woody tree rows (Johnson and Temple 1986, Delisle and Savidge 1996, Helzer 1996, O'Leary and Nyberg 2000, Fletcher and Koford 2003, Bollinger and Gavin 2004) and both increased substantially in response to tree row removal at Bartel. The Savannah Sparrow, a species that has also been shown to avoid setting up territories and placing nests near woody edges (O'Leary and Nyberg 2000),



**Figure 3.** Bird population changes for four species of grassland birds at tree row removal and reference points located in open areas of the site away from any tree lines. Bars represent the number of birds observed in each year at the seven tree row removal points (shaded bars) and the seven reference points (unshaded bars). Nearly 4-km of tree lines were removed between the 2001 and 2002 breeding seasons.