BIRD POPULATIONS IN WESTERN NEW YORK STATE: INSIGHTS FROM THE ANNUAL COUNTS OF THE BUFFALO ORNITHOLOGICAL SOCIETY

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The recently published *Second Atlas of Breeding Birds in New York State* (McGowan and Corwin 2008) provides an informative picture of the geographical distribution of the breeding birds in New York State, but this work does not really tell us much about relative or absolute abundance. Each positive atlas block could indicate the presence of only one or two birds of the particular species or it could represent thousands. This weakness is mitigated to some extent by comparisons between the atlas results and data from the Breeding Bird Survey (Sauer et al. 2008), a more quantitative measure of actual populations based on series of point counts, but the efficacy of the BBS approach varies greatly among regions and species, and point counts are by no means a perfect means of estimating abundance (Confer et al. 2008). The Buffalo Ornithological Society (BOS) conducts annual counts that provide another, complementary view of bird populations over a fairly large portion of western New York State.

Conducted on a single day each April, May, and October, these counts provide a sample of all of the birds present in the BOS territory on that day. Table 1 compares some of the geographical atlas data from *Kingbird* Region 1 with averaged values of the Annual May Count for six selected species. *Kingbird* Region 1 overlaps closely with the New York State portion of the BOS territory. There are obviously some similarities and some differences. The strong increases and decreases in the atlas data correlate with strong increases and decreases in the May count data, and the magnitudes of the changes are roughly

Table 1. Comparison of Atlas Region 1 data with the BOS May count data for selected species.

Species	1st Atlas # blocks	2nd Atlas # blocks	% change	BOS May Avg. 80-85	BOS May Avg. 00-05	% change
Bald Eagle	2	39	+1,850	0.3	12.2	+3,586
Carolina Wren	14	134	+857	1.0	22.2	+2,116
D. C. Cormorant	0	10	∞	14.2	2228.3	+15,637
Red-head. Woodp.	132	36	-72	29.2	19.0	-35
Vesper Sparrow	119	65	-45	15.8	4.3	-73
Blue-wing. Teal	74	26	-64	59.2	26.2	-56

similar. However, there is little correspondence between the number of blocks recorded for the atlas and the average number of birds observed on the May count. Plots of the April, May and October data for each individual species can give us an even more detailed history of each species.

One advantage that the BOS counts have is the potential to define several parameters that represent the area's bird community as a whole: the overall number of birds observed; the species richness (number of species observed); and the species diversity index, reflecting both species richness and relative abundance. Figure 1 shows the total individuals observed each year on the May count from 1965-2008. The trend line for all of these plots is a Lowess regression with the parameter $f = 0.5$. This gives a smooth damped regression. Other higher or lower values of f that are typically used would give a smoother or a more jagged appearance to the regression line but would not change the basic conclusions stated below. Clearly the trend from 1980-85 to 2000-05 is upward. However, it is not clear if changes in the collection of the count data, for example an increase in the effort, or actual population changes are the cause of this trend.

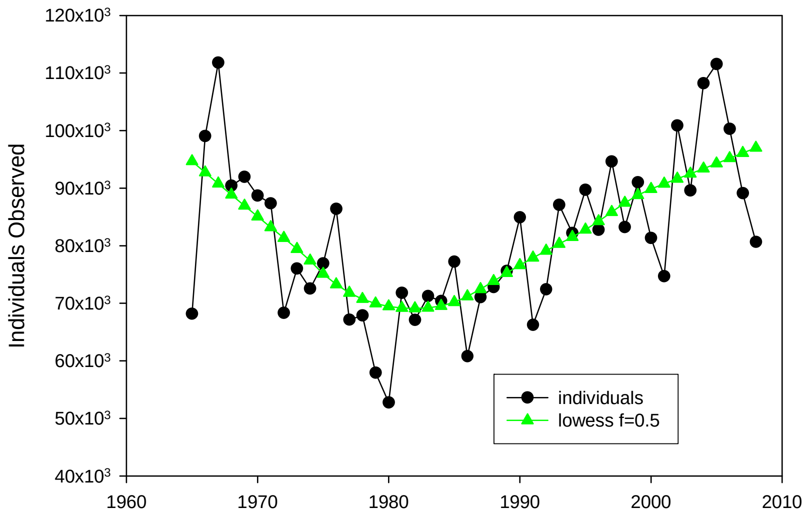

Figure 1. Total individuals observed on the May count for 1965-2008.

Figure 2 shows a plot of the species richness for each year of the May count from 1965-2008. It also shows an upward trend in going from 1980-85 to 2000-05 with the same caution as to the origin of the trend. Finally in Figure 3, the Shannon diversity index *H'* (Shannon 1948, Weaver and Shannon 1949) is plotted and defined. The Shannon diversity index is a measure of the diversity of the bird population. For example, it can be intuitively recognized that a bird population that has ten birds each of ten species is more diverse than one that has one bird each of nine species and 91 starlings, even though they both have the same number of individuals and the same number of species. For the first case, the Shannon diversity index would be its maximum value and for the second its minimum value, for bird communities consisting of ten species. The diversity index has the advantage that it is not dependent in the first order on the count effort. The trend of the diversity index is clearly downward in going from 1980-85 to 2000-05, although there is considerable scatter in the data. This trend would indicate increases in the more populous species at the expense of some of the rarer species. Clearly the BOS counts can provide a wealth of information about the local bird populations that is not available from any other source.

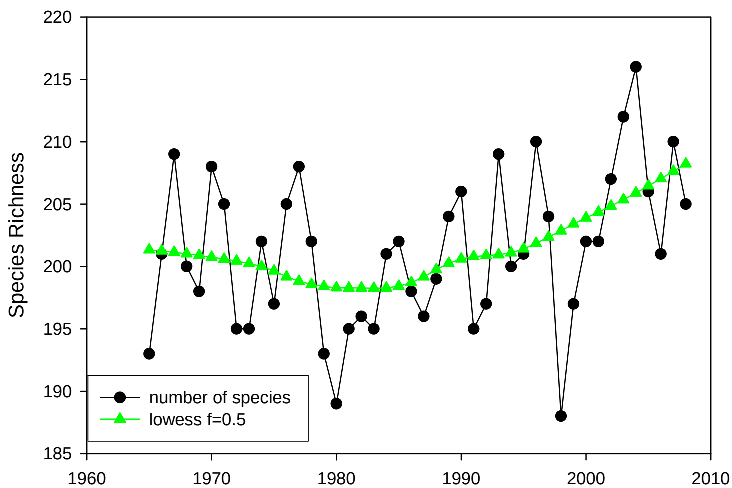

Figure 2. Species richness for the May count 1965-2008.

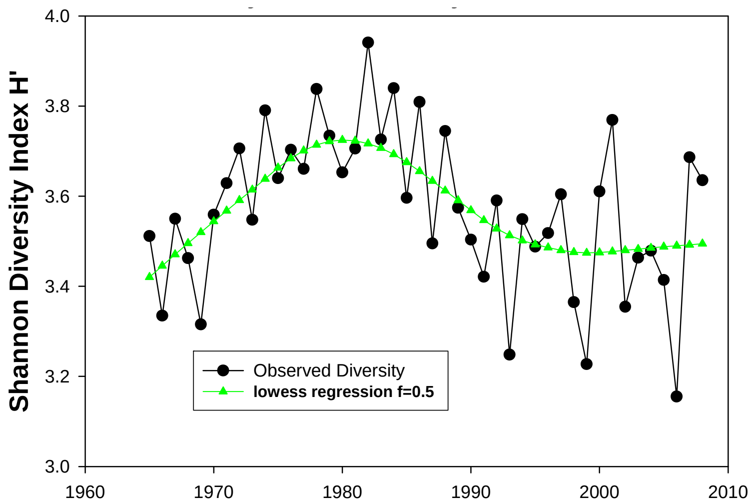

Figure 3. Shannon diversity index (**H'**) for the May count 1965-2008. **$H' = -\Sigma (p_i \ln p_i)$**, where p_i is the proportion of total individuals belonging the **i**th species, and $p_i \ln p_i$ is summed over all species.

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