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Comparison of Interval and Aerial Count Methods for Estimating Boating Effort in Lake Michigan Statistical District MM-6

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Abstract.–Interval and aerial angler creel survey counting methods were compared for Lake Michigan Statistical District MM-6 to evaluate potential underestimation of the interval method in 2000 and 2001. Two, 0.5-h interval boat counts were made per sample day at all five access ports. On the same sample days, boats in 3 out of 18 MM-6 grids were counted from aircraft. Both seasonal and monthly estimates of boating effort were compared. Seasonal boating effort estimates based on aerial and interval counts during open water periods in 2000 and 2001 were not significantly different ($P > 0.17$). Estimated boating hours using the interval count method were 247,117 in 2000 and 219,097 in 2001. Estimated boating hours using the aerial count method were 250,387 in 2000 and 177,532 in 2001. Similarly, comparisons of boating effort by month within each year did not detect significant differences ($P > 0.01$). Aerial estimates were more precise than interval estimates. Interval precision (2 SE/estimate) was 21.42% in 2000 and 24.54% in 2001. Aerial precision was 14.84% in 2000 and 15.53% in 2001. Similarly, predicted power ($1-\beta$) was greater for aerial estimates than interval estimates. Potential power of future interval estimates to detect a 25% change with $\alpha = 0.05$ was 0.38 based on 2000 data and 0.30 based on 2001 data. Aerial estimates provided power estimates of 0.66 based on 2000 data and 0.62 based on 2001 data. At least four, 0.5-h interval counts per sample day are needed to match the precision and power of three aerial counts. While both count types were made on the same sample days and at approximately the same (random) times each sample day, each method relied on unique estimation methods. Comparable, independent estimates establish reliability of these two methods.

Introduction

Fisheries Division of the Michigan Department of Natural Resources conducts direct contact, complemented, angler creel surveys on the Great Lakes annually to estimate angling effort, harvest,