

Department of Applied Mathematics and Statistics
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SEMINAR

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Friday, October 7, 2005
304 Whitehead Hall
Refreshments: **10:30 a.m.**
Seminar: **11:00 a.m.**

**COMPARING AND COMBINING EFFORT AND CATCH ESTIMATES
FROM AERIAL-ACCESS DESIGNS, WITH APPLICATIONS TO
A LARGE-SCALE ANGLER SURVEY IN THE DELAWARE RIVER**

ABSTRACT

We used an access point survey in conjunction with an aerial effort survey to estimate effort, catch, and harvest of American shad and striped bass by recreational anglers in the Delaware River and upper estuary from March through October in 2002. A probabilistic design was used to schedule sampling of anglers across 82 access points and flights over the river weekly throughout the study period. Time intervals within the core aerial survey days were selected with probabilities proportional to the observed distribution of daily effort in a prior aerial-access survey. During the peak shad run we scheduled additional, independent, weekly flights during the time of day with expected maximum effort. Results suggest that counts near or at peak angler effort can produce more precise effort estimates than randomly scheduled counts. However, the non-random schedule resulted in biased effort estimates unless current estimates of daily effort distribution from the access survey were used for extrapolating instantaneous counts from each flight. We also estimated effort directly from the probability-based access survey. The aerial and access surveys produced similar estimates of effort for boat anglers; we used a composite estimator, with a higher weight assigned to the more precise survey estimate, to combine these estimates. For shore anglers, the access survey produced significantly higher estimates of effort than the aerial survey, especially in the tidal portion of the river, most likely due to flight restrictions enforced after September 11, 2001. The use of a composite estimate of effort for boat anglers and an access-based effort for shore anglers improved the precision of the total catch estimates. We achieved the target of 20% in relative standard error (RSE) for estimated recreational catch of American shad (29,662; RSE = 18%) and striped bass (51,106; RSE = 15%).

(This is joint work with Kenneth H. Pollock of the Department of Zoology at North Carolina State University and William R. Richkus of Versar, Inc.)