

North American Journal of Fisheries ManagementArticle: pp. 787–809 | [Full Text](#) | [PDF \(510K\)](#)

DOI: 10.1577/M02-105

North American Journal of Fisheries Management 2003;23:787–809**An Evaluation of an Electronic Logbook as a More Accurate Method of Estimating Spatial Patterns of Trawling Effort and Bycatch in the Gulf of Mexico Shrimp Fishery**

Benny J. Gallaway, John G. Cole, and Larry R. Martin

LGL Ecological Research Associates, Inc., 1410 Cavitt Street, Bryan, Texas 77801, USA

James M. Nance

National Marine Fisheries Service, Galveston Laboratory, 4700 Avenue U, Galveston, Texas 77551-5997, USA

Michael Longnecker

Department of Statistics, Texas A&M University, College Station, Texas 77843-3143, USA

Abstract.—Penaeid shrimp trawling effort in the Gulf of Mexico is not measured directly but is estimated from landings and interview data gathered by port agents of the National Marine Fisheries Service (NMFS). The total pounds landed from each trip are assigned to one or more of the 219 statistical area–depth zone cells for which a catch rate (pounds per nominal day fished or catch per unit effort [CPUE]) is also obtained. Each month, the total landings in pounds for each cell are divided by the CPUE of the cell to determine effort or days fished. These values are summed across all cells and months to provide an estimate of total effort. The accuracy of total effort estimates is directly proportional to the accuracy of the landings allocations and estimated CPUE values. It has been assumed that allocation errors are random and that directional bias is negligible. In a previous paper, we described an electronic logbook (ELB) that enables accurate measurement of the spatial patterns of fishing effort. Herein, we provide comparisons of actual areas fished, pounds landed, and catch rates as measured with ELBs to the corresponding estimates made by NMFS port agents. The results show that directional bias occurs and that CPUE is often underestimated. Based on 135 trip comparisons, midshelf effort in 2000 was greatly overestimated, whereas nearshore and deepwater effort was substantially underestimated. If our effort results are representative, present estimates of the bycatch of midshelf species may therefore be greatly overestimated, whereas the converse may be true for nearshore and deepwater species. We suggest that a cooperative program involving both NMFS and industry should be implemented based on ELB technology and the port agent network to obtain more precise and accurate estimates of shrimp trawling effort with minimal impact on the fishers.

Received: July 3, 2002; Accepted: November 13, 2002