

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The impacts of by-catch in nonselective gears, such as shrimp trawls, or untended gears, such as longlines, gill nets or trotlines on fish populations have been argued for years and is currently one of the most contested issues being faced by fisheries managers (NRC 1990). Traditional methods utilized by many commercial fishermen (e.g., shrimp trawls) are being modified through regulation to provide for escape of endangered species (i.e., sea turtles) and to reduce finfish by-catch. However, the by-catch in shallow waters such as Texas bays of recreational fishermen have largely been ignored.

This study has provided a preliminary estimate of recreational by-catch for sport-boat finfish fishermen based on routine sport-boat harvest monitoring data collected by the TPWD and very limited recall data collected by the NMFS MRFSS. It is estimated that magnitude of the by-catch of finfishes may be approximately twice the number of fishes landed for sport-boat fishermen. Using the limited data available on reported disposition and condition of released fishes, about 95 percent of those fishes reported released were released alive. No estimates of post-release mortality were possible with the existing data; however, other studies on hooking and handling mortality indicated that up to 30 percent (depending on the species) of the fish released alive could be expected to die as a result of capture-induced injuries or stress. The TPWD estimates that recreational shrimpers annually capture 60-100 million finfishes as by-catch during shrimping operations in Texas coastal waters. Estimates for Galveston Bay were not available. No estimates were made for recreational by-catch of other shellfishes due to a lack of information.

6.2 Recommendations

Because by-catch occurs during the fishing activity, typical methods such as intercept surveys conducted at the completion of the fishing trip, do not provide verifiable data for estimating the composition and magnitude of the catch. The ability of the individual fishermen to accurately identify the catch to species and the ability of the individuals to accurately recall the number and disposition of the catch can not be assessed using recall methods alone. However, recall data are among the least expensive and easiest to gather within existing sampling frameworks.

1. We recommend that recall data based on a very limited number of species (e.g., red drum, spotted seatrout, black drum) that are currently or proposed for management regulations be the only species considered in a study to examine recall statistics. A program to obtain these data could be implemented within the existing framework of the sport-boat landings program currently used by the TPWD. A sampling scenario is provided in Appendix F (Project 1). The fact that regulations exist on many of the primary species sought or caught by recreational fishermen requires some level of discrimination (i.e., ability to identify the major species, such as red drum, spotted seatrout, etc.) by sport fishermen. Although this assumption has not been tested in

Texas, it could be a special research project used to determine if fishermen can correctly identify key species under management protection. If so, then a program focused on those species may provide a 'better quality' data set.

2. An alternative method for estimating by-catch and obtaining information on species composition would be to use a fisherman's diary. Although ability to identify species cannot be verified, a written log used by volunteer fishermen may provide useful information on magnitude, composition and size of catch. Logbook data have been used in commercial marine fisheries and in inland waters to provide supplemental information to fishery independent data collection. The problems of bias (e.g., prestige bias) can be addressed, but not controlled, by educating participants of the importance of the information. However, as with any self-reporting system, there is no way to verify individual data without incurring prohibitive expenses. Misidentification of species could be reduced if a section of the diary is dedicated to pictures and identification elements which help distinguish among species. A procedure used by the TPWD Inland Fisheries Branch could be easily adapted (Appendix F, Project 2).
3. A third alternative which does not rely on fishermen recall or identification abilities would be for trained professionals to emulate the diverse fishing methods employed by the general public and record catch and release data by species. A program design similar to that employed in the TPWD spotted seatrout tagging program expanded to consider other fishing modes and a limited variety of bait and gear types could be considered. Catch composition and information on species sizes and geographic distribution could also be included (Appendix F, Project 3).
4. By-catch mortality can be estimated using techniques developed to evaluate bait and gear (e.g., hook type) mortality. Success of any retention limit, which ultimately dictates some level of by-catch, depends on survival of released fish. Survival is a function of many factors, including species, fish size and condition, water temperature, depth of capture, hook type, hooking location, bait and handling (Warner 1979, Payer et al. 1989, Wertheimer et al 1989, Matlock et al. in press). Hooking and handling mortality for spotted seatrout and red drum has been reported at less than 30 percent (Hegen et al. 1984, Jordan 1991). These studies generally incorporated into the estimates of mortality the effects of the above factors by releasing various sizes of fishes within a variety of environmental conditions and using various tackle (Matlock et al. in press). Attempts were not made to isolate all the factors. A suggested scenario for conducting survival studies is provided in Appendix F, Project 4).