THE DELAWARE RIVER

CREEL SURVEY 2002

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FOREWORD

This report has been prepared by Versar, Inc. to present results of the 2002 creel survey conducted from March 17 through October 2002, under Contract No. FP22010046 (Delaware River Creel Survey) from the Pennsylvania Fish and Boat Commission, on behalf of the Delaware River Basin Fish and Wildlife Management Cooperative. The Delaware River Basin Fish and Wildlife Management Cooperative is an organization of resources agencies whose charge is to cooperatively manage the fish and wildlife resources of the Delaware River Basin. Cooperative member agencies include: the Pennsylvania Fish and Boat Commission, the New Jersey Department of Environmental Protection Division of Fish and Wildlife, the Delaware Department of Natural Resources and Environmental Control Division of Fish and Wildlife, the New York Department of Environmental Conservation, United States Fish and Wildlife Service, and the National Marine Fisheries Service.

The Pennsylvania Fish and Boat Commission, the New Jersey Department of Environmental Protection Division of Fish and Wildlife, the Delaware Department of Natural Resources and Environmental Control Division of Fish and Wildlife, and the New York Department of Environmental Conservation developed technical specifications and provided funding for this assessment initiative. The United States Fish and Wildlife Service, and the National Marine Fisheries Service provided valuable administrative and technical guidance. We acknowledge all Cooperative member Agencies for their administrative, technical, and financial contributions and recognize the National Park Service and the Delaware River Basin Commission for their valuable Cooperation.

ABSTRACT

An access point survey in conjunction with an aerial effort survey was used to estimate effort, catch and harvest of American shad, hickory shad, river herring, striped bass, and other species targeted by anglers in the Delaware River during 2002. The study area extended from the Interstate 295 Delaware Memorial Bridge to Downsville, NY. Weekly flights were conducted from March 17 through October to count anglers, following a probability sampling design, with inclusion probabilities for the daily flight intervals being linked to the expected distribution of angler effort. Catch and harvest rates were estimated from 2,353 completed trips based on interviews of anglers at a random sample of access points over time in the tidal and non-tidal portion of the river. Precise estimates of total catch and harvest by species were obtained by expanding the respective catch and harvest rates to the total effort estimated from the aerial survey. We estimated that 120,042 angler trips took place on the Delaware River during the total study period, with close to 80,000 trips being in the non-tidal portion of the river. An estimated 35,281 American shad, 43 hickory shad, 7553 river herring, and 36,328 striped bass were caught during daytime in the total study period. Catch and effort at night was inconsequential compared to daytime estimates for most species. However, an estimated 4,454 striped bass were caught at night during the total study period, exclusively in the tidal river. A catch-and-release fishery dominated for most species. The harvest rates were low for American shad (19%), hickory shad (0), and striped bass (1%), but substantial for river herring (65%). Results show a similar catch rate for American shad but a decline in the total catch as compared to surveys in 1986 and 1995, resulting from a reduction in fishing effort.

EXECUTIVE SUMMARY

The objectives of this survey were to determine the amount of recreational angler fishing effort that occurs on the Delaware River from mid March through October 2002, when and where it occurs, the species and numbers of fish that are caught and released, and the species and numbers of fish kept and harvested. American shad, hickory shad and river herring (which are managed in accordance with an Interstate Fisheries Management Plan), as well as striped bass received special attention, but the survey was designed to provide information on all species pursued and caught by anglers. The survey area included the tidal and non-tidal portions of the river, and extended from the Interstate 295 Delaware Memorial Bridge to Downsville, NY. To achieve the most precise and unbiased estimates, we designed and implemented a statistically rigorous and innovative survey that combines the use of airplanes to estimate the number of anglers that fish on the river, and interviews of anglers intercepted at a wide range of access sites along the river to gain data on fish catch and harvest. Estimates of the number of fishermen who are fishing at a given time were made from regular counts of fishermen that fish from boats and shore on the river during airplane flights over the river. Regular weekly flights were conducted on randomly selected days, alternating between a weekday and a weekend day, and during random time intervals within each selected day. A limited numbed of additional flights were conducted during the time of day with expected peak angler effort to enhance the coverage during the peak shad run in the non-tidal river. In the access survey component, estimates of the amount of time fished, the number of fish caught and the number of fish kept on average by each fisherman were made by interviewing fishermen after they had completed their fishing trips. To ensure representative estimates over time and space, the interviews were conducted by creel survey agents at access points along the river that were randomly selected, on days and times of day that were also randomly selected.

A comprehensive list of 82 access sites (primarily public) along the river were identified with input from the Delaware River Basin Fish and Wildlife Management Cooperative members and included in the survey. Based on information from prior surveys and from fisheries workers from the agencies involved, a majority of the anglers used these access sites to enter the fishery. Only a small proportion of anglers are believed to access the fishery from private docks or by walking to the water from ad-hoc parking lots along roads, close to the river, where they would not be subject to interviews. The access point survey, an on-site intercept design, was therefore particularly suitable for the Delaware River. The access sites included in this survey were categorized according to their expected level of use by anglers in 4-week periods. Access sites in the high and medium usage category were sampled more frequently than low usage sites to achieve a large number of interviews. Over-flights and interviews of fishermen were conducted more often during the peak angler season for American shad. Thus, during the beginning of the shad run, the intensity of interviews was highest in the lower non-tidal river zones, but later shifted towards the upper river zones as the peak of the run moved upstream. The survey was designed to gather information from a wide range of access sites to obtain representative estimates of the typical catch and harvest rates by species throughout the river.

Catch and harvest rates for completed trips were estimated from 2,353 interviews of anglers at a representative selection of access points over time in the tidal and non-tidal portion of the river. Precise estimates of total catch and harvest by species were obtained by expanding the respective catch and harvest rates based on interviews to the total effort estimated from the aerial survey. We estimated that 120,042 angler trips took place on the Delaware River from mid March through October 2002, with close to 80,000 trips being in the non-tidal portion of the river. An estimated 35,281 American shad and 36,328 striped bass were caught during daytime in the total study period. American shad was almost exclusively caught from March to June in the non-tidal portion of the river. Substantial catch of striped bass occurred both in the tidal and non-tidal sections of the river. The fishing effort at night appears to be low compared to daytime fishing (6%), with about 20,000 fishing trips overall, and was approximately evenly distributed between the non-tidal and tidal portions of the river. An estimated 4,454 striped bass were caught at night during the total study period, exclusively in the tidal river. Catfish and eel comprised the major species harvested at night in the non-tidal river. A catch-and-release fishery dominates for most species in the Delaware River, and only 19% of American shad and 1% of striped bass was kept (harvested). An estimated 49% of the harvested American shad were females. Results show similar catch rates, but a decline in the total catch of American shad as compared to surveys in 1986 and 1995, suggesting reduced fishing effort during the shad season. Smallmouth bass was the most commonly caught species (98,393), followed by channel catfish (58,703). Although our study indicates that only a small number of river herring were caught (7,553), it is noteworthy that 65% of these were harvested (kept). The estimated catch of hickory shad was negligible (43), and none of the anglers interviewed harvested this species.

This report documents angler effort, catch and harvest statistics for the primary target fisheries, but also details similar fisheries statistics of other sport-fish in the appendices. Total, as well as temporal estimates are provided for the non-tidal and tidal portions of the river. Results for targeted effort by species are also provided. In some cases, pooling of samples across temporal and spatial strata were required to achieve sufficient sample sizes for meaningful estimates. The rigorous statistical estimation techniques employed in this study, including new innovative methods developed here, generally produced robust and reliable estimates of angler effort and catch and harvest statistics.