

Delaware River and Estuary Angler Log 2005 & 2006

Prepared by

Daryl J. Pierce
Pennsylvania Fish and Boat Commission

and

Jamie L. Myers
National Park Service



Introduction

Since 2001, the Pennsylvania Fish and Boat Commission (PFBC) and the National Park Service, Upper Delaware Scenic & Recreational River (NPS-UPDE), on behalf of the Delaware River Fish and Wildlife Management Cooperative partnered to develop a recreational angler catch reporting system to be used throughout the Delaware River Basin. Our goal was to employ a single catch-logging program for National Park Service licensed guides operating on the Delaware River and for volunteer anglers.

Any angler is welcome to participate in the catch-reporting program. All angler catch statistics inclusive of the occasional angler (1-5 trips per year) to the angler who frequently fishes the Delaware River are all equally important to fishery scientists and managers. Additionally, the number of total fish caught and harvest ranging from a no catch trip to multiple landings are of equal importance for describing angler impacts to the Delaware River fisheries. Reporting is required of fishing guides who operate businesses (Commercial Use Authorization) on the Upper Delaware River. Individual catch information remains strictly confidential for both guides and volunteers. Only consolidated summary information contained in this report is made public.

Background

One goal of this project was to provide a single mechanism to collect angler catch statistics and operate a data collection network through a single point of contact. The logbook format is similar to the Delaware River American Shad Diaries used for American shad population assessments in the 1970's and 1980's.

Although this catch logging program cannot be substituted for comprehensive angler creel surveys, which measure (estimate) total angler catch of important sportfish species, this summary provides a record of catch, harvest and catch rate (catch per hour fished) for popular sportfish species in 2005 and 2006.

Catch trends can be influenced by fishing effort, fish abundance, and fishing conditions. One concept that is important for participating anglers to understand is that submission of minimal and/or no catch trips by anglers or submission of only trip data where catch was especially great, can greatly affect catch rate computations and dramatically influence interpretation of catch trends. Caution should be exercised when interpreting catch trends. Apparent changes may be due to changing angler participation, weather influences, river flow conditions, and in the case of anadromous and catadromous species, ocean conditions, or ocean harvest (directed or bycatch) of these species. We compare catch per hour from 2002 through 2006 for popular sportfish species, which are subject to these influences. Information contained in this summary is tabular and descriptive in nature with limited interpretation.

Summary

Angler Composition and Participation

In 2005 and 2006 a total of 42 and 35 anglers respectively, participated in the "Delaware River and Estuary Angler Log" catch reporting program (Fig 1). Anglers operating as guides (33 each year) within the National Park Service, Upper Delaware Scenic & Recreational River were required to maintain logs as a condition of their Commercial Use Authorization. In both years, reported catch data from commercial guides were primarily (2005: 91.5%; 2006: 95.3%) from the East and West Branches of the Delaware River and mainstem waters in Sections 1 through 4, which are bounded by the upper (River mile (Rm) 330.5) and lower (Rm 258.4) limits of the Upper Delaware Scenic & Recreational River Section of the Delaware River, and Section 7 (Table 1). Volunteer anglers (9 in 2005 and 2 in 2006) were and are welcomed to participate in the catch-logging program. Reported volunteer catch were principally (2005: 51.0%, 2006, 95.5%) from the upper tidal portion of the Delaware Estuary (Section 14), with some activity throughout mainstem waters in Sections 1, 2, 3, 10, 11, 12 and 13 (Table 1). A few American shad anglers (Delaware River Shad Fisherman's Association, 2005: n = 5, 2006: n = 0) and striped bass anglers (PFBC-Striped Bass Log Program, 2005: n = 1, 2006: n=1) participated.

Overall, angler participation has been declining since 2004 (Fig 1). The total number of participants in Delaware River and Estuary Log survey has declined 6.6% in 2005 and 22.2% in 2006 compared to the total number of participants in 2004 (n = 45). The decline of participants in 2005 from 2004 was attributed to fewer (n = 3) licensed guides reporting angler catches. The decreased number of reporting licensed anglers reflects an overall decline in the total number of licensed guides operating on the Delaware River. In both years (2004 and 2005) the same number of volunteers (n =9) reported their catches. In 2006, volunteer angler participation declined 77.7% compared to volunteer angler participation in 2004 and 2005.

Angler Trips

Participating guides and anglers completed some 1,810 and 1,431 trips in 2005 and 2006, respectively. The majority of trips were recorded by boat anglers (2005: n = 1,424; 2006: n = 1,238) with fewer trips (2005: n = 313; 2006: n = 137) being recorded by shore anglers (Table 2). Trips not recorded by mode (boat or shore) were similar for both 2005 (n = 73) and 2006 (n = 56) with 4 percent each. Anglers expended a total of 12,035 and 9,610 angler hours of effort in 2005 and 2006, respectively (Table 3). Seasonally, expenditure of angler trips and effort in 2005 demonstrated that most trips and effort were during spring and summer months, specifically May through September for shore anglers, and April through September for boat anglers (Tables 2 and 3). The total number of trips and effort reported by shore anglers in 2005 however did appear to temporarily decrease in August relative to other spring and summer months within the year. In 2006, the reported shore angler trips and effort expenditures occurred principally during April and May with no trips or effort being reported during the summer to mid-fall months

(July to October). The majority of reported boat anglers trips and effort expenditures in 2006 occurred from spring (April) to mid-fall (October) with over twice the number of trips and effort occurring from April to June relative to trip and effort expenditure during the rest of the year.

The reported total number of angler trips and effort has been declining since 2004 (Figs 2 and 3). The total number of angler trips reported for 2005 ($n = 1,810$) was a decrease of 8.7% compared to 2004 ($n = 1,983$), whereas the total number of angler trips in 2006 ($n = 1,431$) represents a 27.8% decrease from 2004 levels (Fig 2). Similarly, total angler hours expenditure decreased 8.7% and 27.1% in 2005 and 2006, respectively as compared to effort in 2004 ($n = 13,186$; Fig 3). The decrease of angler trips and effort coincide with the reduction of the total number of participants during 2005 and 2006 surveys. Severe flooding in the Delaware River during late June 2006 however, could also potentially account, in part, for decreased reported licensed and volunteer angler trips during that period. This was a major storm system causing flood conditions all along the mainstem reach, significantly limiting access to the river for several days.

Angler Catch

A variety of fishes caught were reported by anglers participating in the log program in 2005 and 2006 (Table 4). Smallmouth bass (2005: $n = 5,147$; 2006: $n = 3,551$) were the most frequently caught fish followed by brown trout (2005: $n = 1,961$; 2006: $n = 2,155$), rainbow trout (2005: $n = 1,236$; 2006: $n = 807$) and redbreast sunfish (2005: $n = 528$; 2006: $n = 290$) in both years (Table 4). In 2005[†], other species consistently reported caught, listed in decreasing frequency, included white perch ($n = 359$), American shad ($n = 330$), fallfish ($n = 280$), rock bass ($n = 194$), channel catfish ($n = 172$), and walleye ($n = 143$). In 2006, walleye ($n = 235$), fallfish ($n = 179$), common carp ($n = 96$), and channel catfish ($n = 74$) were also frequently caught in various quantities. Numerous other fish species were caught as reported in log books that together accounted for less than 5% of the total catch in either year (Table 4).

Angler catch by mode of fishing is reported in Tables 5 and 6. In 2005, shore based anglers most frequently caught striped bass ($n = 530$) and white perch ($n = 344$) followed by brown trout ($n = 194$), redbreast sunfish ($n = 166$), channel catfish ($n = 162$), and smallmouth bass ($n = 121$); whereas in 2006 shore anglers most frequently reported catching redbreast sunfish ($n = 133$), common carp ($n = 95$), smallmouth bass ($n = 86$) and channel catfish ($n = 74$; Table 5). Brown trout (2005: $n = 1,713$, 2006: $n = 2,084$), rainbow trout (2005: $n = 1,103$, 2006: $n = 776$) and smallmouth bass (2005: $n = 3,871$, 2006: $n = 2,893$) were the most frequently caught fish by boat anglers in both 2005 and 2006 (Table 6).

Angler Harvest

The total number of fishes harvested from the Delaware River by participating anglers was minimal, representing less than 2 percent (2005: 0.83% $n = 96$, 2006: 1.61% $n = 124$;

[†] Excludes those fishes that were indicated caught but of undetermined species (i.e., unknown spp. category).

Table 7) of the total number of fishes caught (2005: $n = 11,454$, 2006: $n = 7,703$) in either year (Table 4). Common carp was the most frequently harvested species in both years (2005: 38.5%, $n = 37$; 2006: 76.6%, $n = 95$; Table 7). Shore anglers accounted for 100 percent of the catch and harvest of common carp in both years (Table 8) River herring were the next highest reported species group harvested in 2005 and all were caught by boat anglers. Anglers harvested 10 (15 of 143) and 4 percent (10 of 235) of the total number of walleye caught in 2005 and 2006, respectively, of which boat anglers accounted for 93 (14 of 15) and 100 percent of the walleye harvested. Anglers harvested nearly 4 percent (12 of 330) of the total catch of American shad in 2005. Boat anglers harvested 4 percent (11 of 250) of their catch, and shore anglers harvested 1 percent (1 of 72) of the respective catch. No American shad were harvested by either mode of fishing in 2006. Brown and rainbow trout were only harvested by boat anglers in both reporting years. The percentage of harvest in 2005 and 2006 was very low with respect to the total boating catch and overall catch. Boating anglers kept only 0.12 (2 of 1713) and 0.24 percent (5 of 2084), and 0.18 (2 of 1103) and 0.39 percent (3 of 776) of their respective brown and rainbow trout catch in 2005 and 2006.

Angler Catch Rates (fish/hour)

High mean catch rates were observed for several popular gamefishes, regardless of fishing mode (Table 10). Brown trout (2005: 0.145, 2006: 0.207), rainbow trout (2005: 0.103, 2006: 0.084) and smallmouth bass (2005: 0.338, 2006: 0.346) had the highest mean catch rates in both 2005 and 2006. Additionally, striped bass mean catch rates were only among the highest in 2005 (0.127). Redbreast sunfish (2005: 0.059, 2006: 0.057) in both years and white perch (0.071) in 2005 were not as productive with anglers capturing one (1) fish in approximately 16 hours of fishing effort. Mean catch rates for walleye (2005: 0.017, 2006: 0.029) in both years, and American shad (0.007) and striped bass (0.001) in 2006 were relatively low.

Monthly mean catch rates (fish/hour) were seasonally dependent for most of the caught fishes (Table 10). Smallmouth bass average catch rates peaked during July and August with catch rates over one (1) bass per hour in 2005 and over two (2) bass per hour in 2006. Highest monthly mean catch rates for brown trout (>0.150) occurred in April and May in both 2005 and 2006 and in November in 2005 and June and September in 2006. Highest monthly mean catch rates for rainbow trout (>0.140) however, occurred in May and November in 2005 and June in 2006. For American shad, highest mean catch rates occurred during April and May in 2005 (>0.040) and March and April in 2006 (>0.030).

Highest monthly mean catch rates (fish/hour) differed between fishes depending on the mode of fishing (Tables 11 and 12). For shore anglers in 2005, mean catch per hour fished was greatest for striped bass (0.669) followed by white perch (0.387), redbreast sunfish (0.175), channel catfish (0.162), smallmouth bass (0.126), brown trout (0.087), white crappie (0.063) and bluegill (0.059; Table 11). For boat anglers in 2005, mean catch per angler hour fished was greatest for smallmouth bass (0.385) followed by brown trout (0.158), rainbow trout (0.115), redbreast sunfish (0.033), fallfish (0.027), American shad (0.024), rock bass (0.017), walleye (0.011), and striped bass (0.008; Table 12). In

2006, highest mean catch per hour fished for shore anglers was redbreast sunfish (0.402) followed by smallmouth bass (0.383), white crappie (0.242), common carp (0.226), channel catfish (0.181), and bluegill (0.125); whereas smallmouth bass (0.342), brown trout (0.226), rainbow trout (0.092), fallfish (0.020), redbreast sunfish (0.020), walleye (0.020), and rock bass (0.006) had the highest mean catch rates for boat anglers (Tables 11 and 12).

Comparing monthly mean catch rates (fish/hour) among years for all fishing modes illustrated species-specific trends in angler annual catch rates (Fig 4-9). Mean angler catch rates for smallmouth bass have been increasing since 2003; with the single largest increase (42.0%) from 2004 (0.196) to 2005 (0.338; Fig 4). American shad catch rates were similar between 2004 (0.031) and 2005 (0.031) but catch rates decrease by 77.4% from 2005 to 2006 (Fig 5). In 2005, striped bass mean catch rates increased 84.2% from 2004 and then decreased 99.2% in 2006 (Fig 6). Mean catch rates for brown trout from 2004 to 2005 decreased 15.2% and increased 29.9% from 2005 to 2006 (Fig 7). The opposite trend was exhibited for rainbow trout, which had an increase of 37.8% in mean angler catch rates from 2004 to 2005 but decreased 18.4% from 2005 to 2006 (Fig 8). Mean catch rates for walleye have been increasing since 2004 with a 75.8% increase from 2004 to 2006 (Fig 9). Strong increases in mean catch rates for rock bass and river herring were observed in 2005 and 2006, respectively, whereas, mean catch rates for redbreast sunfish were consist among years (Figs 10-12). Catch rate values reflect both fishing success and fish density. Fishing success might be influenced by weather and flow conditions and density is influenced by numerous river conditions. Case in point, the flooding during late June 2006, changed riverine habitat conditions possibly impacting distribution of popular gamefishes populations due habitat loss or relocation. Regarding anadromous (American shad, striped bass and sea lamprey) and catadromous (American eel) species, ocean harvest and ocean conditions play an important role in fish density.

Angler Targeted Fisheries

In addition to reporting fish species caught, anglers were asked to report fish species that they sought for each angling trip. Trout species (2005: 70.9%, 2006: 80.4%) and black bass (small and largemouth bass; 2005: 11.1%, 2006: 6.8%) were the two most targeted groups of species in both 2005 and 2006, overall (Table 13). Shore anglers who reported trip target species (2005: n = 309 trips; 2006 n = 122 trips) were targeting American shad (2005: 15.5%, 2006: 14.7%), common carp (2005: 22.6%, 2006: 39.3%), trout (2005: 40.1%, 2006: 11.4%) and striped bass (2005: 19.4%, 2006: 22.9%; Table 14). In contrast, boat anglers reporting trip target species (2005: n = 1,286, 2006: n = 1,086) were principally targeting trout (2005: 78.3%, 2006: 88.2%; Table 15). Other fishes frequently listed as targeted for boat anglers included black bass in both 2005 (13.7%) and 2006 (7.5%) and American shad (3.7%) and walleye (1.7%) in 2005 and any fish species (1.9%) in 2006 (Table 15).

Computation of mean targeted catch rates more closely reflected hourly fishing catch rate for anglers targeting a particular species. In general, angling trips reporting targeted

species had good catch rates with nearly half of the species or species groups identified as a target having a mean catch rate greater than 0.5 or 1 fish per 2 hours spent fishing (Table 13). Mean catch rates for shore based anglers targeting trout species (includes all trout species) were 0.334 and 0.248 in 2005 and 2006, respectively, or nearly 1 trout per 3 hours fishing (Table 14). Striped bass mean catch rates for shore anglers exceeded 6 fish an hour in July 2005 whereas mean catch rates for common carp in 2006 were approximately 1 fish per 2 hours fishing (Table 14). Boat anglers targeting trout species average 1 fish in 3 hours fishing; however, mean catch rates for black bass by boat anglers were over 2 fish per hour in 2005 and nearly 4 fish per hour in 2006 (Table 15).

Angler Catch Distribution by Length

Volunteer anglers and NPS-UPDE licensed guides reported measurements of fishes in excess of 1,000 individuals caught in conjunction with catch reporting. More trout (brown and rainbow) were measured in both years than any other species in 2005 and 2006 varying in total length from 5 to 27 inches for brown trout and 4 to 22 inches for rainbow trout (Table 16). Smallmouth bass sizes varied from 4 to 19 inches total length, however, very few ($n = 6$) individuals were measured in 2006 (Table 16). American shad total lengths varied from 13 to 27 inches, with the males being generally smaller than the females. Numerous striped bass ($n = 201$) were measured in 2005 varying in size from 2 to 31 inches (Table 16).

Acknowledgements

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THANK YOU!