

PROJECT REPORT:
PINE CREEK ANGLER SURVEY
2008-2009

Prepared for the:

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and
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Prepared by:

Alan R. Graefe, Andrew S. Purrington, Harry C. Zinn, & Matthew C. McKinney

Penn State University
Department of Recreation, Park & Tourism Management
801 Ford Building
University Park, PA 16802

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EXECUTIVE SUMMARY

This study examined angling effort, catch, and angler opinions among fishermen using Pine Creek in north-central Pennsylvania. The study area included the section of Pine Creek from the U.S. Route 220 bridge upstream to the mouth of Slate Run. Methods included instantaneous counts of anglers combined with on-site and mail angler surveys.

Pine Creek anglers participating in this study were predominately Pennsylvania residents living within 125 miles of Pine Creek Valley. Most of the anglers (64.3%) were visitors to the Pine Creek Valley, with seasonal and year-round residents accounting for approximately one-third of participants (25.2% and 10.5%, respectively). Those who traveled to fish in Pine Creek Valley were more likely to live near the valley (e.g., Lycoming and Clinton counties) or live south or southeast of the valley (e.g., Harrisburg, Reading, Lancaster, or York) than in the northern or western parts of the Commonwealth. As indicated by the median number of days spent fishing in Pennsylvania (28 days) and in the Pine Creek Valley (9 days), many of the survey participants were frequent rather than occasional anglers.

Anglers who participated in the on-site survey were far more numerous on Pine Creek between the traditional opening day of trout season (second Saturday in April) and the end of May than they were later in the season. Consistent with this finding, a large majority of anglers identified trout as their primary quarry and were found fishing in the approved trout waters in the upper segments of the study area. Rainbow trout outnumbered other species that were caught and harvested or caught and released.

Instantaneous counts conducted between April and October, 2008 showed differing numbers of anglers using various reaches of Pine Creek and at different times of the season. The heaviest fishing effort was seen in the northernmost reaches and during April and May.

Anglers spent an average of \$216.84 during their most recent Pine Creek fishing trip, or \$56.82 per angler per day. Food, drink, and vehicle fuel were the most common angler purchases in the valley. A minority of anglers surveyed purchased lodging in the valley, but those who did so spent far more money in the valley than those who did not. Relatively few anglers reported purchasing fishing licenses in the valley.

Pine Creek anglers' primary motivations for fishing were to spend time outdoors in nature and enjoy the challenge of fishing and experience of catching fish. On average, anglers expressed a high degree of satisfaction with their Pine Creek fishing experiences, and they were particularly satisfied with the types of fish they caught and facilities and services in Pine Creek Valley.

Pine Creek anglers showed diverse opinions and beliefs about various fisheries management issues. For example, many survey participants agreed that trout gathering in coldwater refugia should be harvested because they are likely to die anyway, but, at the same time, substantial numbers agreed that coldwater refugia should be off-limits to fishing. Importantly, substantial numbers of anglers also expressed neutrality or uncertainty about both statements.

Pine Creek angler's wildlife value orientations and their consumptive attitudes can be described as *dualist*. In other words, anglers generally expressed beliefs that fish and wildlife should be protected both for human use and for their own sake. Similarly, although anglers wanted to catch fish, they generally did not feel they must catch fish for a fishing trip to be enjoyable, and they were divided about the importance of catching large fish, catching many fish, and keeping the fish they caught.

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INTRODUCTION

Pine Creek Gorge and Valley between Ansonia and Jersey Shore in northcentral Pennsylvania comprise an area of outstanding natural resources, extensive public lands, and abundant opportunities for nature-based recreation and tourism. Pine Creek Gorge begins near Ansonia and extends downstream for approximately 17 miles to Blackwell. The Gorge is undeveloped and largely publicly-owned. The Gorge bottom and Pine Creek can be accessed only by water, the Pine Creek Rail Trail, or steep hiking trails that originate on surrounding highlands. Downstream from the Gorge, Pine Creek Valley is wider and lightly developed. The Creek is paralleled by the Pine Creek Rail Trail and light-duty paved state highways. The majority of the valley floor is privately-owned, but public access points to the creek are numerous, and the surrounding highlands are largely publicly-owned. Opportunities for fishing, hunting, paddling, hiking, bicycling, horseback riding, scenic drives, camping, and other forms of outdoor recreation are abundant in the area. Private camping, lodging, meals, and other services are available in the Pine Creek Valley and near the northern terminus of Pine Creek Gorge.

The majority of Pine Creek Gorge, as well as large parts of Pine Creek Valley and the surrounding highlands, are protected by 2 State Forests, 4 State Parks, 5 State Game Lands, the Pine Creek Water Trail, and the Pine Creek Rail Trail. Area management depends on cooperative agreements among the Pennsylvania Department of Conservation and Natural Resources (DCNR), the Pennsylvania Fish and Boat Commission (PFBC), the Pennsylvania Game Commission (PGC), local governments, and private stakeholder advisory groups.

Since the mid-1990s, these agencies and private organizations have actively promoted development of increased opportunities for nature-based recreation and tourism in the Pine Creek area. These efforts include acquisition of rights to the Pine Creek rail-bed and construction of the Pine Creek Rail Trail, remediation of acid mine drainage in Babb Creek (a major tributary), establishment of the Pine Creek Water Trail, creation of advisory boards, adoption of cooperative agreements, and promotion and development efforts undertaken in connection with the PA Wilds program. In response to these efforts area visitation is increasing.

Pine Creek Fisheries Situation

Pine Creek and its tributaries have been noted fishing destinations for more than 100 years. The main stem of Pine Creek, however, is wide, shallow, and subject to high summer water temperatures. Consequently, the PFBC manages Pine Creek as approved trout water from the confluence with Genesee Forks above Galeton downstream to the mouth of Little Pine Creek at Waterville, a distance of 63.9 miles. A 7.4 mile reach in the Pine Creek Gorge extending from 0.5 miles downstream of Campbell Run to the SR 414 bridge in Blackwell is not stocked by the PFBC due to limited access; thus stocked trout are allocated to 56.5 miles of Pine Creek. Rainbow and brown trout are stocked annually, and the majority of this water is managed under statewide regulations. Two segments of this water are managed under Delayed Harvest Artificial Lures Only (DHALO) regulations. These are a 1.2-mile stretch running downstream from the mouth of Slate Run (Lycoming County) and a 1.0-mile stretch running downstream from the mouth of Darling Run (Tioga County). Below the mouth of Little Pine Creek, Pine Creek is primarily a warmwater fishery containing smallmouth bass, rock bass, walleye, and other species.

Most Pine Creek tributaries are managed for wild trout under statewide regulations. Slate Run and 1.7 miles of its tributary Francis Branch (Lycoming and Tioga counties) retain cold water throughout the year and are managed as Catch-and-Release Fly-Fishing Only waters. For 7.2 miles upstream from Pine Creek, Cedar Run (Lycoming and Tioga Counties) retains cold water throughout the year and is managed under Trophy Trout Artificial Lures Only regulations.

Little Pine Creek and several other Pine Creek tributaries are stocked annually with rainbow and brown trout. These tributaries are managed under a combination of general and DHALO regulations.

It is generally believed that the approved trout waters/general regulation segments of Pine Creek and Little Pine Creek are heavily fished from the traditional April opening day through late May or early June by anglers using a variety of terminal tackle, and that a substantial portion of the trout caught are kept. In contrast, angling effort is thought to be lighter but distributed throughout most of the year on the coldwater tributaries that are managed under catch-and-release fly-fishing only or trophy trout project regulations. As water temperatures in the main stem of Pine Creek warm each summer, trout gather in thermal refugia at springs and the mouths of coldwater tributaries, which are believed to be subject to concentrated fishing effort. This study is designed to shed light on these beliefs by measuring angling effort on selected sections of Pine Creek.

Trout anglers, as well as local business owners that cater to anglers, express conflicting perspectives on how trout fishing in Pine Creek and its tributaries should be managed. Some advocate expansion of general statewide regulations and minimal restrictions on terminal tackle and the use of bait. Others advocate expansion of catch-and-release regulations, extensive restrictions on terminal tackle and the use of bait, and prohibition of fishing in coldwater refugia during the summer months.

Fishing effort on the lower, warmwater portion of Pine Creek is less understood, but anglers are known to target smallmouth bass, rock bass, and walleye, and a significant nighttime fishery may exist. Little is known about warmwater anglers' level of effort or preferences for different fish species. Therefore, this river segment, from Little Pine Creek to the mouth of Pine Creek, was included in this survey of anglers.

Long-term decisions about fishing regulations for Pine Creek and its tributaries have the potential to impact a) native species (e.g., brook trout), naturalized species (e.g., brown trout, walleye), and the general ecology of area waters; b) angler effort, angler satisfaction, angling tourism, and the success of local businesses; and c) fish culture and enforcement operations in the PFBC's Northcentral Region. Because the implications of management decisions are complex and far-reaching, PFBC and DCNR managers seek improved understanding of both biological and social dimensions of Pine Creek watershed management. At the social level, it is important to understand angling effort and the basis for and intensity of anglers' perspectives on different fish species, angling opportunities, and regulations. This understanding will improve managers' ability to predict the effects of management decisions on angling, as well as secondary effects on socioeconomic and biological conditions in the Pine Creek watershed.

Research Goals

To better understand Pine Creek anglers' perspectives on different fish species, angling opportunities, and regulations, this study addressed five research goals:

1. Estimate the temporal and spatial distribution of angling effort and harvest by species;
2. Describe anglers' trip characteristics;
3. Examine angler expenditures and the economic significance of Pine Creek angling;
4. Describe anglers' preferred target species, terminal tackle, regulations, and fishing locations; and
5. Test the relationship of angler preferences to fishing motivations, consumptive orientation, fish and wildlife values, satisfaction, and socio-demographic characteristics such as age, gender, and place of residence.

STUDY METHODS

The study area included Pine Creek from the U.S. Route 220 bridge upstream to the mouth of Slate Run. This reach comprises PFBC fisheries management Sections 11, 12 and 13. From April 5 through October 30, 2008, Pine Creek anglers were counted and a subset of anglers were interviewed using a brief on-site survey. This was combined with an in-depth, follow-up mail survey conducted during summer and fall 2009. This approach made it possible to keep the on-site survey very brief and rely on the in-depth mail survey to ask about topics less subject to recall bias (e.g., consumptive orientation, values, socio-demographic characteristics), as well as topics that are best addressed after the fishing trip is complete (e.g., overall trip satisfaction and expenditures).

Questionnaires for both the on-site and follow-up surveys employed previously tested approaches to measuring angler behavior and catch (e.g. Greene et al., 2004; Green et al., 2005), as well as psychological and behavioral characteristics of interest (e.g., Graefe & Fedler, 1986; Graefe et al., 2008; Kyle et al., 2007; Teel et al., 2005; Wickham et al., 2004; Zinn et al., 1998). In order to minimize intrusion, the on-site questionnaire was designed to be completed by most respondents in less than 3 minutes (Appendix C, p. 47). The in-depth questionnaire was designed to be completed by most respondents in 15-20 minutes (Appendix D, p. 48).

The on-site angler survey was designed to collect instantaneous counts by trained survey clerks on randomly assigned stream segments using randomly assigned starting times and locations (Greene et al. 2004, 2005). Clerks conducted brief interviews (< 3 minutes) with anglers they contacted and collected supporting data on angling methods, catch and effort, trip information, and selected opinions. At the conclusion of each angler survey interview, clerks asked each participant if he/she was willing to complete a follow-up mail questionnaire about his/her Pine Creek fishing trip. Interested anglers were asked to provide their name and mailing address. On-site survey sampling periods were stratified into high-use and low-use days (e.g., weekend days versus weekdays). Sampling frequency (i.e., sample size) was based on resources available to fund data collection.

Follow-up mail surveys were sent to the on stream anglers who had agreed to participate. However, because few anglers (77) interviewed on stream agreed to participate in the follow-up mail survey, the method of distributing the in-depth survey questionnaire was modified. During summer and fall 2009, questionnaires were also made available in Pine Creek Valley at eight locations frequented by anglers, including Venture Inn, Bonner Sports and RV, Waterville Tavern, McConnell's Country Store, Cammal General Store, Black Walnut Bottom camping area, Wolf's General Store and Slate Run Tackle Shop, and the Hotel Manor.

Response Information

The response from on stream anglers agreeing to participate in the follow-up survey was rather good. Of the 73 usable addresses provided, 52 returned completed questionnaires (71.2%). Two additional anglers from this group informed us that they had already completed a survey they acquired while in the valley. Of the surveys available in the valley, 168 completed surveys were returned (17.3% of total picked-up). Table 1 shows that, overall, most of the surveys distributed across various locations in the valley were picked up. The two locations at which fewer surveys were picked-up were both located at the southern end of the valley; these locations may not attract as many Pine Creek anglers. It is not possible to determine at which location the completed surveys were picked up by the responding anglers.

Location	Total Available	Total Picked-Up	Percent of Surveys Picked-Up
Venture	120	79	65.8
Bonner RV	30	10	33.3
Waterville Tavern	137	135	98.5
Glenn's General Store	130	118	90.8
Cammal General Store	113	113	100.0
Black Walnut Bottom	181	169	93.4
Wolf's Tackle	194	194	100.0
Hotel Manor	175	151	86.3
	1080	969	

Combining the surveys received from both methods resulted in a usable sample of 220 completed mail questionnaires. To guard against the possibility of including multiple surveys from the same respondent, an inspection was done on the completed surveys. Only one suspect survey was identified, and it was removed from the database. In addition, a comparison of survey responses from the anglers who were contacted in the field versus those picking up a survey in the valley showed few differences between the two groups. Respondents who had picked up the questionnaire at a store in the valley were more likely to be visitors rather than permanent or seasonal residents of Pine Creek Valley, and to fish both Pine Creek and other waters in the area rather than just Pine Creek.

Results of Instantaneous Angler Counts

From April 5 through October 30, 2008, counts of the numbers of anglers fishing Pine Creek were conducted. At randomly scheduled times and locations, researchers in the field recorded the number of shore or wade anglers, boat anglers, and boats visible within a given reach and strata, if applicable. Often, multiple observations were made at the same location throughout a given day. The information provided in this section provides the mean angler counts per observation period.

Table 2 presents the mean number of anglers per observation period for each reach of Pine Creek. The angler counts for Reach 1 are separated for the Trout Stocked (TS) and the Delayed Harvest (DH) sections. Reach 2 had more anglers (5.28), on average, than the other reaches. The TS section of Reach 1 had a comparable number of shore and wade anglers. Overall, the TS section of Reach 1 had more anglers of all types than the DH section. Reaches 4 and 5 had comparatively few shore and wade anglers per observation period (0.58 and 0.35, respectively). Boat anglers were generally less common than shore or wade anglers. Boat anglers were most likely to be seen on Reach 2 (0.67), followed by Reach 3 (0.32). Boats were also more common on Reaches 2 (1.52) and 3 (0.71). Interestingly, the mean number of boats on Reaches 4 and 5 were comparable to the other reaches, though there were fewer boat anglers in these reaches.

	Shore/Wade Anglers	Boat Anglers	Boats
Reach 1			
Strata: TS	5.09	0.27	0.44
Strata: DH	3.19	0.14	0.34
Reach 2	5.28	0.67	1.52
Reach 3	2.84	0.32	0.71
Reach 4	0.58	0.14	0.59
Reach 5	0.35	0.12	0.41
	2.92	0.28	0.67

Table 3 presents the mean anglers per observation for each reach separated by month. According to the data, most anglers were on Pine Creek during the months of April, May, and June. All reaches had more anglers per observation in April than in any other month. Following April, the number of anglers in each reach also steadily declined throughout the summer. Interestingly, the average number of anglers in Reaches 1, 3, and 4 increased from September to October, though the number of anglers is relatively small. It is worth noting that the highest densities of anglers observed were in Reach 2 (31.3) and the TS section of Reach 1 (26.38) during April.

Table 3. Mean anglers per observation by month on Pine Creek

	Shore/Wade Anglers	Boat Anglers	Boats
<i>Reach 1: TS</i>			
April*	26.38	1.81	0.95
May	10.06	0.41	1.19
June	4.15	0.15	0.79
July	0.53	0.00	0.20
August	0.50	0.00	0.03
September	0.00	0.00	0.00
October	0.67	0.00	0.00
<i>Reach 1: DH</i>			
April [†]	7.18	0.10	0.51
May	7.97	0.35	0.68
June	3.39	0.39	0.88
July	0.33	0.03	0.07
August	0.77	0.00	0.13
September	0.64	0.00	0.00
October	1.40	0.00	0.00
<i>Reach 2</i>			
April	31.3	3.59	4.48
May	5.80	0.77	2.66
June	2.13	0.23	2.17
July	0.70	0.36	1.42
August	0.42	0.11	0.28
September	0.30	0.04	0.04
October	0.27	0.00	0.00
<i>Reach 3</i>			
April	13.61	1.48	1.39
May	4.13	0.80	1.63
June	2.23	0.07	1.30
July	0.41	0.06	0.56
August	1.52	0.12	0.27
September	0.13	0.03	0.03
October	0.63	0.00	0.00

Table 3, continued.

	Shore/Wade Anglers	Boat Anglers	Boats
Reach 4			
April	0.50	0.11	0.14
May	0.83	0.27	1.00
June	0.70	0.48	1.67
July	0.85	0.15	0.88
August	0.48	0.03	0.48
September	0.21	0.00	0.00
October	0.52	0.00	0.00
Reach 5			
April	0.30	0.00	0.11
May	0.23	0.19	0.12
June	0.61	0.32	1.74
July	0.61	0.24	0.55
August	0.23	0.00	0.10
September	0.30	0.10	0.20
October	0.15	0.00	0.00

* Data collection for the TS section began on April 12.

† Data collection for the DH section began on April 5.

Boat anglers tend to fish Reaches 2 and 3 during the early months, while boat anglers were more common on Reaches 4 and 5 during June and July. Boaters were more likely to be on Reaches 1, 2, and 3 in the early months. Likewise, boaters in Reach 4 were more numerous during May (1.00) and June (1.67) and were most common in Reach 5 during the month of June (1.74).

RESULTS OF ON-SITE ANGLER SURVEY

Participant and Trip Profiles

A total of 400 anglers participated in the on-site survey. The majority of these participants (95.4%) were male, and they ranged from a minimum of 8 years old to a maximum of 103 years old, with an average age of 46.0. The youngest quartile group ranged from 8 to 29 years old; the second quartile ranged from 30 to 46 years old; the third quartile ranged from 47 to 59 years old; and the fourth quartile group ranged from 60 to 103 years old.

Slight differences were observed in the gender and age of anglers fishing different sections of Pine Creek. All but one of the 17 female anglers interviewed were fishing in Section 12, with the remaining one female found in Section 11. Anglers fishing in Section 11 (DHALO regulations) tended to be older (mean age = 48.4) than those fishing Section 12 (stocked trout waters, mean = 45.9) and Section 13 (warm and cool water fishery, mean = 37.3).

The majority (93.5%) of anglers interviewed on-site were Pennsylvania residents. Of the Pennsylvania residents, most (71.7%) were from the Williamsport or North-central region and Harrisburg-York-Lancaster region of the state (Table 4). Non-resident anglers came from New Jersey (5), New York (4), Maryland (2), Virginia (2), Massachusetts (2), California (1), Delaware (1), Illinois (1), Idaho (1), Nebraska (1), New Hampshire (1), and Wisconsin (1).

Table 4. On-site survey participant residence based on ZIP code.

Region	n	% of PA	% of Total
Southwest — Pittsburgh-Johnstown	14	3.9	3.6
Northwest — Erie-New Castle-Altoona	22	6.1	5.7
Harrisburg area	59	16.3	15.3
York-Lancaster area	41	11.4	10.6
Williamsport — Northcentral	159	44.0	41.2
Northeast — Allentown-Scranton	12	3.3	3.1
Southeast — Philadelphia-Reading	54	15.0	14.0
	361		

A total of 363 survey participants reported where they purchased their 2008 Pennsylvania fishing licenses. Of these, 6.1% (n = 22) purchased their licenses in Pine Creek Valley, and 93.9% (n = 341) purchased their licenses outside Pine Creek Valley.

The median number of days survey participants reported fishing in Pennsylvania during the preceding 12 months was 28 (Table 5). This compared to 43.99 mean days fishing in Pennsylvania. The difference between the median days and mean days demonstrates that the data are skewed by a relatively small number of very avid fishermen. A small minority of anglers (21) reported fishing 150 days or more, whereas most anglers fished far less often. This skewness can be seen in all the data in Table 5, and this is typical of most outdoor recreation participation data.

The median number of days spent fishing at Pine Creek during the preceding 12 months was 9, whereas the mean number of days was 17.77. The median number of days spent at Pine Creek without fishing during the preceding 12 months was 1.75, whereas the mean number of days was 13.70. The median fishing trip length was 1.5 days, demonstrating that half of all trips were one-day trips, while the mean trip length was 2.56 days. The median party size was 1.5 people, demonstrating that half of the survey participants were fishing alone, while mean party size was 2.24 people.

Table 5. On-Site angler fishing profile.

Characteristic	Mean	Standard deviation	Median	Minimum	Maximum
Days fished in Pennsylvania, last 12 months	43.99	43.97	28	0	200
Days fished at Pine Creek, last 12 months	17.77	25.52	9	0	150
Days visiting Pine Creek without fishing, last 12 months	13.70	36.99	1.75	0	365
Length of this fishing trip in days	2.56	1.84	1.5	1	8
Party size for this fishing trip	2.24	1.13	1.5	0	6

Two of the trip profile variables differed significantly across the management sections of Pine Creek (Table 6). Those fishing Section 11 (DHALO regulations) tended to be on longer fishing trips (mean = about 4 days) than those fishing Section 12 (mean = 2.28 days) or Section 13 (mean = 1.0 days). Conversely, anglers using Section 11 spent far fewer days in Pine Creek valley without fishing (mean = 3.29 days) during the previous 12 months than those fishing Sections 12 (mean = 16.70 days) or Section 13 (mean = 16.64 days). It appears that Section 11 attracts more serious or specialized anglers who take longer fishing trips to Pine Creek Valley and who concentrate on fishing, rather than other pursuits, during their trips to Pine Creek Valley.

Table 6. Fishing profile, by Section of Pine Creek.

	Section 11 DHALO	Section 12 Stocked Trout	Section 13 Warm and Coolwater Fishery
Length of this fishing trip in days*	3.97	2.28	1.00
Days visiting Pine Creek without fishing during the last 12 months**	3.30	16.70	16.64

*F = 40.1, p < .001

**F = 3.6, p < .05

Interviewing began on April 11, 2008 and concluded on October 30, 2008. Between April 11 and May 31, 88.3% of all interviews were conducted. A majority of anglers were interviewed on the upstream reaches of Pine Creek that were included in this survey, with 40.8% being intercepted in the Slate Run reach and 33.0% being intercepted in the reach immediately below Slate Run. Seventy-five anglers (20.3%) were intercepted in Section 11 (DHALO regulation area), 275 anglers (74.3%) in Section 12 (statewide regulations, stocked with trout by PFBC), and 20 anglers (5.5%) in Section 13 (statewide regulations; no PFBC trout stocking) between the confluence with Little Pine Creek and the U.S. Route 220 bridge.

Wading (82.5%) was the most widespread fishing mode on Pine Creek. Another 16.7% of anglers fished from shore. Less than 1.0% fished from boats. Over one-third of anglers used bait (38.0%); over one-third used flies (36.7%); and the remainder (25.3%) used lures. As expected, the mode of fishing and terminal tackle used varied sharply by stream section. Nearly all of those fishing Sections 11(89.0%) and 12 (77.0%) were wading, while the majority of those in Section 13 (59.1%) were fishing from shore (Table 7). Over two-thirds of the anglers in Section 11 (69.4%) used flies, with most of the remaining anglers (27.8%) using lures (Table 8). Choice of tackle was more evenly divided in Section 12, with 30.5% using flies, 23.7% using lures, and 45.9% using bait. The majority of anglers in Section 13 used bait (62.5%), with most of the remaining anglers using lures (29.2%).

Table 7. Mode of fishing, by Section of Pine Creek

	Section 11 DHALO	Section 12 Stocked Trout	Section 13 Warm and Coolwater Fishery
Shore	4.1%	15.9%	59.1%
Wade	89.0	77.0	40.9
Boat	0.0	1.1	0.0
Unknown	6.8	5.9	0.0
Total	100.0	100.0	100.0

Chi Square = 39.215, $p < .01$

Table 8. Terminal tackle used, by Section of Pine Creek

	Section 11 DHALO	Section 12 Stocked Trout	Section 13 Warm and Coolwater Fishery
Flies	69.4%	30.5%	8.3%
Lures	27.8	23.7	29.2
Bait	2.8	45.9	62.5
Total	100.0	100.0	100.0

Chi Square = 61.223, $p < .01$

More than 9 out of 10 (91.5%) anglers reported that they were fishing for trout. Three percent reported fishing for bass, 1% for walleye, and 2.1% for trout and bass or walleye. The remaining 2.4% reported that they were fishing for any species.

A total of 418 responses to the question, “Why did you choose this particular spot?” have been grouped into six categories (some anglers provided more than one reason). One hundred forty two responses (34.0%) were categorized as social reasons (e.g. tradition, someone else decided, recommendation); 121 responses (28.9%) were access-related (e.g. proximity to cabin/camp, easy access); 62 responses (14.8%) were related to natural setting (e.g. preferred location, enjoy Pine Creek, deep hole/water); 53 responses (12.7%) were fish-related (e.g. previous success, population of fish, quality of fish habitat); 21 responses (5.0%) were related to special regulations (e.g. delayed harvest, DHALO); and 19 responses (4.5%) were categorized as “miscellaneous” (e.g. new location, starting point). A complete list of responses to this question can be found in Appendix A, p. 35.

Trip Length and Catch Statistics

Trip lengths in hours and minutes were calculated from anglers' self-reported start times and interviewers' recorded interview start times. Three out of four anglers (75.9%) reported that their fishing trips were not yet complete when they were interviewed. Trip length statistics were computed separately for those who had finished fishing at the time of their interview and those who were continuing to fish. There was little difference in the reported trip lengths for those who had completed their fishing and those reporting on incomplete fishing trips (Table 9). For those with completed trips, the median trip length was 2 hours 12 minutes. The mean trip length was 3 hours 11 minutes with a standard deviation of 2 hours 16 minutes. The difference between the median and mean (skewness) is attributable to the fact that a small number of anglers' trips had lasted many hours (e.g., 10 anglers' trips were more than 10 hours long).

Table 9. Trip length (hours)

	Complete Trips	Incomplete Trips	All Anglers
Mean	3.11	3.12	3.12
Median	2.12	2.08	2.10
Standard Deviation	2.16	2.55	2.48

To collect catch statistics, interviewers asked survey participants for permission to see the fish they had caught and kept and identified and tallied each species. Interviewers then asked anglers how many of each species they had released and how many of the fish they had released were of legal length. Catch statistics reported in Table 10 are not adjusted for trip length.

Rainbow trout were caught far more often than any other species. Nearly half of all survey participants (46.5%) reported catching one or more rainbow trout, and the mean number caught per angler was 1.98 fish. Brown trout were caught by 16.5% of survey participants, smallmouth bass by 6.5%, and walleye by 1.5%. Nongame species including carp, channel catfish, chub, fallfish, and rock bass were caught by 7.0% of participants.

Table 10. Catch statistics by species.

Species	Mean number caught (SD)	Mean number of legal fish caught (SD)	Mean number harvested (SD)	Maximum number caught by 1 angler	Percent who caught ≥ 1 fish
Rainbow trout	1.98 (4.21)	1.46 (2.25)	0.47 (1.26)	56	46.5
Brown trout	0.30 (0.95)	0.30 (0.95)	0.04 (0.32)	10	16.5
Brook trout	0.01 (0.11)	0.00 (na)	0.00 (na)	2	0.5
Trout, species not specified	< 0.01 (0.10)	0.00 (na)	0.00 (na)	2	0.2
Smallmouth bass	0.14 (0.75)	0.08 (0.39)	0.01 (0.11)	10	6.5
Walleye	0.04 (0.39)	0.04 (0.33)	0.04 (0.33)	6	1.5
Other (carp, channel catfish, chub, fallfish, rock bass)	0.23 (1.70)	na	na	30	7.0

Anglers' Orientations to Coldwater

Three items on the on-site questionnaire addressed anglers' orientations toward water temperature and the coldwater areas where trout congregate as overall stream temperature increases during the summer (Table 11). Fewer than one-third (29.6%) of survey participants agreed or strongly agreed that they "pay close attention to water temperature" when fishing for trout. Fifty percent agreed or strongly agreed that trout that have moved into pockets of cold water during the summer should be harvested "because most will die anyway." Nearly half (46.1%) agreed or strongly agreed that pockets of cold water "where trout gather in summer should be off-limits to fishing."

Similar percentages of survey participants agreed or strongly agreed with statements b) and c) in Table 11, yet these statements seem to conflict with each other. One would expect that individuals who agreed with one statement would have been more likely to disagree with the other statement. A cross-tabulation of collapsed data and Fisher's Exact Test confirm that individuals who agreed with one statement were likely to disagree with the other statement (Table 12). For example, over two-thirds of those who agreed that "trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway" disagreed with the statement, "the cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing." It is also noteworthy that few fishermen expressed strong opinions on these statements (only about 20% indicated strongly agree or strongly disagree).

Table 11. Anglers' orientations to coldwater

Item	Percent				
	Strongly agree	Agree	Neither	Disagree	Strongly disagree
a) When I fish for trout, I pay close attention to the water temperature.	5.3	24.3	18.2	41.7	10.6
b) Trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway.	11.3	38.7	16.6	27.1	6.3
c) The cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing.	8.2	37.9	14.7	26.1	13.2

Table 12. Distribution of anglers' orientations to coldwater and Fisher's Exact Test

		b) Trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway.		Fisher's Exact Test probability
		Agree ^a	Disagree ^a	
c) The cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing.	Agree ^a	40.3%	59.7%	<.001
	Disagree ^a	69.5%	30.5%	

^a For clarity, *Strongly Agree* and *Agree* responses have been collapsed into a single category, *Strongly Disagree* and *Disagree* responses have been collapsed into a single category, and *Neither* responses have been omitted from this analysis.

Anglers' orientations to cold water did vary by the Section of Pine Creek where they were interviewed. Generally, those fishing in Section 11, or the northern portion of Reach 1 near Slate Run, where delayed harvest (DHALO) regulations were in effect, were more likely to agree that trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway (Table 13). Likewise, these anglers using the delayed harvest section were more likely to disagree that the cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing (Table 14).

Table 13. Angler response to, “Trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway,” by Section of Pine Creek.

	Section 11 DHALO	Section 12 Stocked Trout	Section 13 Warm and Coolwater Fishery
Strongly Agree	17.8%	9.3%	13.0
Agree	46.6	36.9	34.8
Neither	15.1	14.9	39.1
Disagree	16.4	31.0	13.0
Strongly Disagree	4.1	7.8	0.0
Total	100.0	100.0	100.0

Chi Square = 21.929, $p < .01$

Table 14. Angler response to, “The cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing,” by Section of Pine Creek.

	Section 11 DHALO	Section 12 Stocked Trout	Section 13 Warm and Coolwater Fishery
Strongly Agree	12.3%	7.5%	0.0%
Agree	13.7	44.0	39.1
Neither	15.1	13.8	26.1
Disagree	37.0	24.3	26.1
Strongly Disagree	21.9	10.4	8.7
Total	100.0	100.0	100.0

Chi Square = 29.592, $p < .001$

Other Activities

In addition to fishing, many anglers participated in other activities during their trips. When asked, “Besides fishing, what else are you doing during your Pine Creek Valley trip?” anglers provided a total of 377 responses. These responses have been grouped into five categories. Nearly half of the responses (48.8%) were categorized as other outdoor recreation activities (e.g., camping, bicycling, hiking); 65 responses (17.2%) were related to lifestyle (e.g., relaxing, spending time at my cabin, vacationing with family); 62 responses (16.4%) involved hunting (e.g., turkey hunting); 36 responses (9.5%) were related to food and beverage (e.g., cooking, dining); and 30 responses (8.0%) were wildlife-related (e.g., turkey scouting, bird watching). A complete list of categorized responses can be found in Appendix A, p. 35.

RESULTS OF IN-DEPTH, FOLLOW-UP SURVEY

Participant Profile

A total of 220 anglers participated in the follow-up survey. The majority of participants (96.8%) were male and, on average, 57 years old. Most anglers (64.3%) were visitors to the Pine Creek Valley. Seasonal and year-round residents accounted for approximately one-third of participants (25.2% and 10.5%, respectively). The vast majority of participants (86.4%) were Pennsylvania residents, with only 13.6 percent of participants coming from outside Pennsylvania. More specifically, most of the participants live in the Williamsport and the Harrisburg-York-Lancaster areas (Table 15). Most participants (68%) stayed overnight on their most recent trip to Pine Creek. The average overnight stay for seasonal residents was about 13 nights while visitors to Pine Creek stayed for an average of about 7 nights. There was, however, considerable variation in the length of stay (seasonal residents st. dev. = 16.3; visitors st. dev. = 15.7). The majority of anglers surveyed (63%) were aware of the PA Wilds designation, though only 10.4 percent stated that designation influenced their decision to visit the Pine Creek Valley.

Table 15. In-depth, follow-up survey participant residence based on ZIP code.

Region	n	% of PA	% of Total
Southwest — Pittsburgh-Johnstown	10	5.4	4.7
Northwest — Erie-New Castle-Altoona	20	10.8	9.3
Harrisburg area	35	18.9	16.4
York-Lancaster area	36	19.5	16.8
Williamsport — Northcentral	47	25.4	22.0
Northeast — Allentown-Scranton	21	11.4	9.8
Southeast — Philadelphia-Reading	16	8.7	7.5
	185		

In terms of fishing behavior, most participants fish Pine Creek itself. Only 6.6% of participants fished only on other (non-Pine Creek) waters. The majority of anglers (66.8%) fished only Pine Creek while 26.5% of anglers fished both Pine Creek and other waters. About one-third of anglers surveyed (31.6%) fished the tributaries at least half of the time. The remaining two-thirds of anglers fish the tributaries sometimes (33.0%) or almost never (35.4%). Use of the DHALO area is fairly evenly distributed among anglers surveyed. About half of the participants (46.9%) fished the DHALO half the time or more. One quarter of participants (23%) almost always fish the DHALO waters. At the same time, half of the anglers fish the DHALO area only sometimes (25.8%) or almost never (27.3%). Most anglers (63.7%) do not fish Pine Creek at night, though 33.5 percent of anglers surveyed do night fish occasionally. Further, approximately half of the participants (58.2%) fish in the Pine Creek Valley during the warm periods of the summer months.

Angler Motivations

Anglers were given a list of possible reasons for fishing and asked to indicate how important each reason is to them personally. Responses were grouped into major themes or underlying dimensions based on a series of factor and reliability analyses (Table 16).

Motivations related to being outdoors in nature and relaxation and escape from the regular routine were the most important reasons for fishing. These four items comprised a strong theme (Cronbach's alpha reliability = .71), with being outdoors and experiencing natural surroundings showing the highest importance rating among all items measured (mean = 4.4 on a 5 point scale for both items). Closely following these reasons were relaxation (mean = 4.3) and getting away from the regular routine (mean = 4.2).

Pine Creek anglers attached much importance to the challenge or sport of fishing (mean = 4.0), but relatively less importance to other items within the challenge/skill motivation dimension. The items within this theme included learning about the area (mean = 3.1), developing skills (mean = 3.0), physical exercise (mean = 3.0), and testing equipment (mean = 1.9). These five items formed a reasonable motivational theme with a reliability coefficient of .72.

Similarly, the anglers placed relatively great importance on the experience of the catch (mean = 3.7) but less importance on other catch-related aspects of fishing. Only a small minority indicated much interest in seeking trophy fish (mean = 2.1) and even fewer were seeking to obtain fish for eating (mean = 1.5), which was the lowest rated among all items measured. The alpha reliability for the catch-related dimension was .58, but increases to .70 if obtaining fish for eating is deleted. On Pine Creek, catching fish for eating appears to be a different consumptive aspect that is not related to the other experiential aspects of the catch.

Social elements of angling were assessed through two items asking about the importance of being with friends and family recreation. The alpha reliability (.36) for these social motivations was low, reflecting that these items were not strongly correlated. Apparently, among Pine Creek anglers, being with family and being with friends, although both social in nature, are two separate things sought by different groups of anglers.

Table 16. Importance of motivations (reasons) for fishing.

Motivation dimensions and items	Not at all Important	Somewhat Important	Moderately Important	Very Important	Extremely Important	Mean ^a
Nature/Relaxation-Related Motivations (Cronbach's alpha=.71)						
To be outdoors	.5	1.4	4.6	42.6	50.9	4.4
To experience natural surroundings	.9	1.4	7.9	38.6	51.2	4.4
For relaxation	.5	2.8	8.4	43.3	45.1	4.3
To get away from the regular routine	1.4	4.6	12.0	39.8	42.1	4.2
Social Motivations (Cronbach's alpha=.36)						
To be with my friends	7.5	6.3	22.9	35.5	24.8	3.6
For family recreation	12.3	10.0	28.9	30.8	18.0	3.3
Challenge/Skill Related Motivations (Cronbach's alpha=.72)						
For the challenge or sport	3.2	5.6	19.0	31.5	40.7	4.0
To learn about the area	8.5	19.4	31.3	30.8	10.0	3.1
To develop my skills	14.3	20.9	28.9	25.1	10.9	3.0
For physical exercise	14.0	23.8	27.1	22.4	12.6	3.0
To test my equipment	49.1	22.6	17.5	9.9	.9	1.9
Catch-Related Motivations (Cronbach's alpha=.58)						
For the experience of the catch	4.7	10.2	23.3	32.6	29.3	3.7
For the promise of the catch	16.3	16.3	27.0	22.8	17.7	3.1
To obtain a trophy fish	45.3	20.6	19.2	6.5	8.4	2.1
To obtain fish for eating	74.5	11.1	6.0	3.2	5.1	1.5

^a Response scale: 1 = "not at all important" to 5 = "extremely important"

Angler Satisfaction

Anglers were asked a series of questions dealing with their feelings about their most recent Pine Creek fishing trip. As was done with the motivational items, the responses were grouped into major themes or underlying dimensions based on a series of factor and reliability analyses (Table 17).

Table 17. Satisfaction ratings for Pine Creek fishing trips.

Satisfaction dimensions & items	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Mean ^a
Overall Satisfaction (Cronbach's alpha=.85)						
I thoroughly enjoyed that fishing trip	53.6	39.8	3.3	2.4	.9	1.57
That fishing trip was less enjoyable than I expected ^b	1.9	14.0	12.1	43.7	28.4	3.83
I cannot imagine a better fishing trip than that one	7.0	21.9	39.5	27.0	4.7	3.00
I do not want to go on any more fishing trips like that one ^b	1.4	2.8	7.0	28.4	60.5	4.44
I was disappointed with some aspects of that trip ^b	1.4	24.0	21.6	38.0	14.9	3.41
That trip was well worth the money I spent on it	34.6	48.1	11.7	4.2	1.4	1.90
Satisfaction with Catch (Cronbach's alpha=.79)						
I succeeded catching the types of fish I hoped to	33.8	43.3	6.7	10.5	5.7	2.11
I succeeded catching the numbers of fish I hoped to	9.9	26.9	25.0	27.8	10.4	3.02
Satisfaction with Environment/Setting (Cronbach's alpha=.38)						
Weather conditions were ideal	15.2	42.9	24.0	16.1	.8	2.47
The landscape in that area is very attractive	68.5	29.1	1.9	.5	0	1.34
That was a wonderful opportunity to be outdoors	58.1	36.7	1.9	1.5	1.9	1.52
The natural environment in that area was in poor condition ^b	.9	2.8	6.1	48.6	41.5	4.27

Table continued next page.

Table 17 continued.

Satisfaction dimensions & items	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Mean ^a
Satisfaction with Facilities/Services (Cronbach's alpha=.62)						
Access areas and parking were readily available	34.1	46.1	7.8	10.6	1.4	1.99
Services like meals, lodging, and tackle shops were easy to find	35.7	51.6	9.9	2.8	0	1.80
Facilities in the area were poorly maintained ^b	.9	1.9	19.2	53.5	24.4	3.99
Road and trail conditions were excellent	21.0	53.3	17.8	6.1	1.9	2.14
Informational signs and directions were not adequate ^b	1.0	9.1	21.2	47.6	21.2	3.79
Accurate, easy-to-use maps for the area were readily available	12.7	47.6	30.7	7.5	1.4	2.37
Satisfaction with Conflict/Crowding (Cronbach's alpha=.72)						
The behavior of other people nearby bothered me	5.2	12.2	21.6	39.9	21.1	3.60
There were too many other people nearby	5.7	16.3	23.4	40.7	13.9	3.41

^a Response scale: 1 = "strongly agree" to 5 = "strongly disagree"

^b Item reverse scored for computation of alpha reliability coefficient

Several items in this section of the survey focused on anglers' overall satisfaction with their fishing experience. The six statements dealing with overall fishing satisfaction showed a consistent pattern of responses, as reflected by an alpha reliability coefficient of .85 for the overall satisfaction dimension. For example, over 90% of anglers surveyed agreed that they thoroughly enjoyed their fishing trip and over 80% felt it was well worth the money they spent on it. However, about one-fourth (25%) of the anglers were disappointed with some aspect of their fishing trip, only 29% reported that they cannot imagine a better fishing trip. There is reason to look further into the factors that may influence Pine Creek anglers' perceptions of fishing quality. (See the following section for a further analysis of this topic.)

Two items in this series of questions formed a strong theme reflecting anglers' satisfaction with their catch (alpha = .79). Anglers were more likely to report that they succeeded in catching the types of fish they had hoped to (77% agreed) than that they succeeded in catching the numbers of fish they had hoped to (37% agreed).

Several items related to the setting and natural environment showed varying responses. These items did not coalesce into an underlying theme ($\alpha = .38$), but rather seem to represent different aspects of the angling environment. Anglers did respond favorably to the environmental quality of the area, with over two-thirds (68.5%) strongly agreeing that the landscape in the area is very attractive and about 90% disagreeing with the statement that the natural environment is in poor condition. The vast majority of anglers surveyed enjoyed the opportunity to be outdoors, although they were less likely to report that the weather conditions were ideal. Due to the low inter-item correlations between these measures, it seems reasonable to consider these various aspects of the setting separately rather than as an underlying construct.

A series of questions focused on angler reactions to facilities, services and information in the area. Overall, the pattern of responses indicated relatively high satisfaction with the services and facilities available on Pine Creek. The vast majority of anglers felt that access areas and parking were readily available, and services like meals, lodging, and tackle shops were easy to find. The anglers also generally felt the facilities were well maintained. These items formed a reasonable facilities/services theme ($\alpha = .62$), although responses varied somewhat for different topics.

Finally, two questions focused on the potential impacts of crowding and conflicts with other people in the area. These questions formed a reasonable conflict/crowding factor ($\alpha = .72$). Relatively few anglers (around 20%) were bothered by either the behavior or number of other people on the river. Crowding/conflict does not appear to be a major problem on Pine Creek.

Factors Affecting Angler Satisfaction

To further understand perceptions of fishing satisfaction among Pine Creek anglers, overall satisfaction was regressed against a series of potential predictor variables. The dependent variable for this analysis was a satisfaction index (comprised of the six overall satisfaction items shown in Table 17). The independent variables included the other, specific perceptions of fishing quality, also shown in Table 17.

Results of this multiple regression analysis showed that 53% of the variance in overall angler satisfaction was accounted for by a combination of six predictor variables representing various specific aspects of the fishing experience (Figure 1). The catch-related outcomes of satisfaction were strong contributors to the satisfaction model; satisfaction with the number of fish caught was the strongest predictor variable ($\text{Beta} = .32$), followed by satisfaction with the type of fish caught ($\text{Beta} = .23$). The index for satisfaction with facilities and services available in the area also contributed to overall satisfaction with the fishing experience ($\text{Beta} = .23$). Two of the items within the Environment/Setting dimension contributed significantly to the satisfaction model (the Environment Setting index was not included in this analysis due to its low reliability). Those placing more value on the opportunity to be outdoors ($\text{Beta} = .19$) reported greater satisfaction, while those who perceived the environment to be in poor condition ($\text{Beta} = -.13$) showed reduced satisfaction. Finally, the conflict/crowding index composed of two items influenced overall satisfaction, with those who were bothered by too many people or the behavior of other people reporting lower overall satisfaction scores ($\text{Beta} = -.18$).

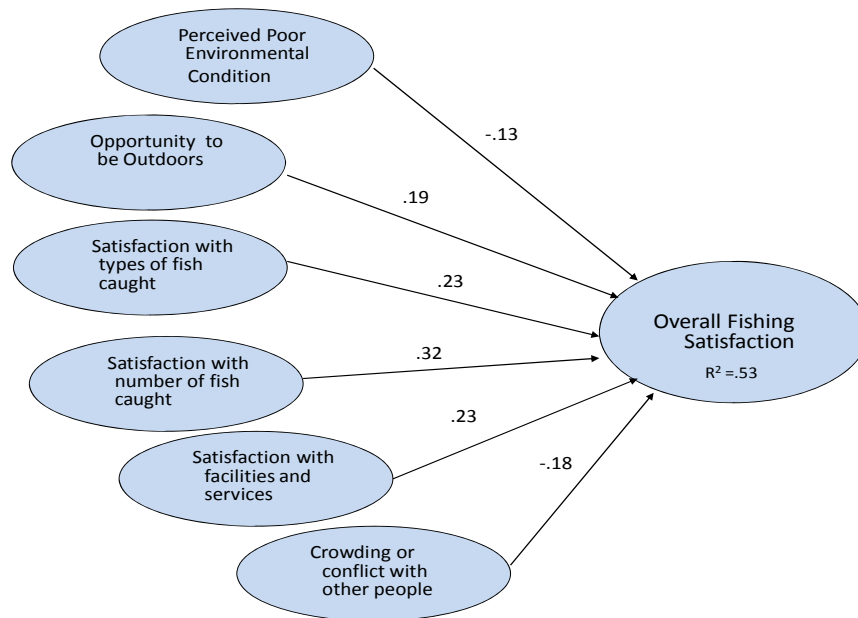


Figure 1. Pine Creek angler satisfaction model.

Anglers' Wildlife Value Orientations

Anglers were asked a series of questions to assess deeply-held beliefs about appropriate relationships between humans and fish and wildlife. The questions reflect a contrast between materialistic and mutualistic orientations toward fish and wildlife (Teel et al., 2005; Zinn & Pierce, 2002). A materialistic orientation emphasizes the value of fish and wildlife as a resource for human and/or benefit or threat to humans' physical or economic well-being. In contrast, a mutualistic orientation emphasizes respect for fish and wildlife and a belief that fish and wildlife have intrinsic value and/or intrinsic rights independent of those assigned to them by humans.

Survey participants generally believe that fish and wildlife should be protected (Table 18). For example, 84% of anglers agreed or strongly agreed that we should strive for a world where there are abundant fish and wildlife for hunting and fishing (mean = 1.9). The goal of protecting fish and wildlife appears to be motivated; primarily by a desire for abundant game for fishing and hunting, but partially by a belief that humans and fish and wildlife can co-exist, i.e., "a world where humans and fish and wildlife can live side by side without fear" (mean = 2.6).

Anglers were somewhat ambivalent with respect to the primary use of fish and wildlife, though they generally agree that fish and wildlife should be protected for their own sake. Only 27 percent of anglers strongly agreed (16.2%) or strongly disagreed (10.5%) that fish and wildlife populations should be managed so that humans benefit (mean = 2.8). Anglers were also largely neutral with respect to the idea that fish and wildlife are on earth primarily for people to use (mean = 3.2). Two-thirds of anglers (69%), however, disagreed or strongly disagreed that the

needs of humans should take priority over fish and wildlife protection (mean = 3.8). Meanwhile, two-thirds of anglers (68%) agreed or strongly agreed that fish and wildlife should be protected for their own sake, not just to meet human needs (mean = 2.4). The results further suggest that anglers believe humans and fish and wildlife are connected as 61% agreed or strongly agreed that all living things are part of one big family (mean = 2.5).

Table 18. Anglers' wildlife value orientations.

Materialism versus Mutualism (Cronbach's alpha = .76)	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Mean^a
Humans should manage fish and wildlife populations so that humans benefit ^b	16.2	29.0	22.4	21.9	10.5	2.8
We should strive for a world where humans and fish and wildlife can live side by side without fear	21.3	30.4	23.7	12.6	12.1	2.6
The needs of humans should take priority over fish and wildlife protection ^b	2.4	12.0	16.3	40.7	28.7	3.8
I view all living things as part of one big family	22.1	38.9	19.2	11.1	8.7	2.5
We should strive for a world where there are abundant fish and wildlife for fishing and hunting ^b	34.1	49.8	11.4	3.8	.9	1.9
Animals should have rights similar to the rights of humans	5.2	11.4	22.9	31.4	29.0	3.7
Fish and wildlife are on earth primarily for people to use ^b	10.0	19.1	23.9	30.1	16.7	3.2
Fish and wildlife should be protected for their own sake, not just to meet human needs	18.1	49.5	15.7	10.5	6.2	2.4
Wildlife are like my family and I want to protect them	8.7	26.9	34.1	17.3	13.0	3.0

^a Response scale: 1 = "strongly agree" to 5 = "strongly disagree".

^b Item reverse scored for computation of alpha reliability coefficient.

Despite the desire to protect fish and wildlife for their own sake and not only human use, the anglers surveyed generally appear to make a distinction between the level of protection afforded fish and wildlife compared to humans. Most anglers (78.3%) were somewhat ambivalent to the idea that wildlife are like family and should be protected (mean = 3.0). Only 22 percent strongly agreed (8.7%) or strongly disagreed (13.0%) with this statement. The majority of anglers (60.4%), disagreed or strongly disagreed that animals should have rights similar to the rights of humans (mean = 3.7).

Anglers' Consumptive Attitudes

Anglers were asked another series of questions dealing with their attitudes toward the consumptive aspects of fishing. As was done in the previous sections, the responses were grouped into major themes or underlying dimensions based on a series of factor and reliability analyses (Table 19).

Several questions dealt with the role of the catch as part of the overall fishing experience. These three items formed a reasonable "catch not needed" dimension with a reliability of .75. Almost 80% of the Pine Creek anglers agreed or strongly agreed a fishing trip can be enjoyable even if no fish are caught. Likewise, most disagreed (60%) with the idea they must catch fish for the fishing trip to be enjoyable. They were less likely, however, to agree that they are just as happy if they don't catch fish (29%). It appears that catching fish enhances the experience, but is not a prerequisite for a quality fishing experience for most anglers.

Two items addressed feelings about the number of fish caught. Pine Creek anglers were somewhat divided on these two questions, with about half agreeing that the more fish they catch, the happier they are. Fishermen were more likely (43%) to disagree than to agree (29%) with the notion that a successful fishing trip is one in which many fish are caught, with 28% ambivalent on this item.

Pine Creek anglers also showed mixed reactions to the statements about the size of the fish caught. About one-third (34%) agreed that the bigger the fish they catch, the better the fishing trip, with 38% disagreeing and 27% ambivalent. The anglers surveyed were almost evenly divided on whether they would rather catch one or two big fish than five (or ten) smaller fish.

The anglers surveyed showed strong opinions on the catch and release-related items in this section of the survey. Two-thirds (66.8%) strongly agreed that they are just as happy if they release the fish they catch, and a similar proportion (71.7%) strongly disagreed with the statement that they must keep the fish they catch for the trip to be successful.

The final set of items in this section focused on water temperature and feelings about harvesting fish during the summer when water temperature rises. The majority of Pine Creek anglers surveyed reported that they pay close attention to the water temperature (25% strongly agreed and 44% agreed). Almost 70% disagreed that trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway. They were more evenly divided on whether cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing, with 36% agreeing and 42% disagreeing with this idea.

Table 19. Pine Creek anglers' consumptive attitudes.

Attitude dimensions and items	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Mean ^a
Catch Not Needed (Cronbach's alpha=.75)						
A fishing trip can be enjoyable even if no fish are caught	26.7	52.9	8.6	7.1	4.8	2.10
I am just as happy if I don't catch fish	10.0	19.0	29.4	30.8	10.9	3.14
I must catch fish for the fishing trip to be enjoyable ^b	3.3	14.7	22.3	40.8	19.0	3.57
More Fish (Cronbach's alpha=.73)						
The more fish I catch, the happier I am	12.9	36.7	28.6	19.0	2.9	2.62
A successful fishing trip is one in which many fish are caught	5.7	23.7	28.0	33.6	9.0	3.17
Big Fish (Cronbach's alpha=.78)						
I would rather catch one or two big fish than five smaller fish	14.6	31.6	24.1	23.1	6.6	2.75
I would rather catch one or two big fish than ten smaller fish	10.4	23.2	27.5	28.9	10.0	3.05
The bigger the fish I catch, the better the fishing trip	5.2	29.2	27.4	27.4	10.8	3.09
Catch and Release (Cronbach's alpha=.46)						
I am just as happy if I release the fish I catch ^b	66.8	22.7	4.7	2.4	3.3	1.53
I must keep the fish I catch for the trip to be successful	4.7	1.9	5.2	16.5	71.7	4.49
Water temperature (Cronbach's alpha=.53)						
When I fish for trout, I pay close attention to the water temperature	24.6	44.0	19.4	7.4	4.6	2.23
Trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway ^b	4.0	8.7	17.9	34.1	35.3	3.88
The cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing	27.7	8.7	22.0	28.3	13.2	2.91

^a Response scale: 1 = "strongly agree" to 5 = "strongly disagree".

^b Item reverse scored for computation of alpha reliability coefficient.

Angler responses to the coldwater-related items differed noticeably from the on-site anglers' responses to the same items (see table 11, p 14). The mail survey respondents were much more likely to indicate that they pay close attention to water temperature. They were more likely to disagree that trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway, and they more strongly agreed with the idea of making cold water near tributary mouths or spring seeps off-limits to fishing. These differences likely reflect the differences in the sampling approaches for the on-site and mail surveys in this study. The on-site sample is a more representative sample of all Pine Creek anglers, whereas the mail survey respondents likely represent a more specialized and involved segment of the fishermen.

Relationships Among Anglers' Wildlife Value Orientations and Fishing Preferences

Correlations between eight variables or indices were examined in order to assess the relationships among anglers' wildlife value orientations and other fishing attitudes and reported behaviors. Bivariate correlations were measured between the variables using Pearson's correlation coefficient (r). The analysis primarily utilized composite (average) scores of the dimensions reported previously (Table 20).

The composite wildlife value orientation (WVO) index was computed using the mean score of the nine wildlife value items presented previously. A low score (1) on the index indicates a mutualistic orientation while a high score (5) on the index indicates a materialistic orientation. Similar to the WVO index, composite scores were calculated using the mean score for the items of the Catch Not Needed, More Fish, Big Fish, Catch and Release, and Water Temperature dimensions (see Table 10, p. 18, for interpretations of these variables).

Overall, the composite WVO index correlated with the other measures as expected. Individuals with a higher tendency towards materialistic views generally had preferences for catching more fish (correlation = $-.278$), keeping the fish they caught (correlation = $-.255$), placed more importance on the catch for a good experience (correlation = $.290$), and believed the cold water areas should be open to more fishing (correlation = $.336$). There was also a tendency for materialistic anglers to fish the tributaries less frequently (correlation = $.157$).

In general, anglers who placed more importance on catching fish for an enjoyable trip also had stronger preferences for catching more fish (correlation = $-.504$). To a lesser degree, these anglers also placed importance on catching big fish (correlation = $-.152$) and keeping the fish they caught (correlation = $.215$). Further, anglers who desire more fish also tend to want big fish (correlation = $.155$) and fish the tributaries less often (correlation = $-.147$). Similarly, anglers who prefer to keep their catch tend to prefer that cold water areas be open to fishing (correlation = $-.310$) and are less likely to fish the delayed harvest areas (correlation = $-.227$).

As expected, anglers who prefer that cold water areas be open to fishing are less likely to fish the delayed harvest areas (correlation = $.399$) or the tributaries (correlation = $.205$). Similarly, anglers who are less likely to fish the tributaries are also less likely to fish the delayed harvest areas (correlation = $.335$).

Table 20. Correlations among wildlife value orientation (WVO) and other attitudes.

	WVO	Catch Not Needed	More Fish	Big Fish	Catch and Release	Water Temp.	Fish DHALO	Fish Tributaries
WVO^a	1.00							
Catch Not Needed^b	.290 ($< .001$)	1.00						
More Fish^c	-.278 ($< .001$)	-.504 ($< .001$)	1.00					
Big Fish^d	-.024 (.727)	-.152 (.027)	.155 (.025)	1.00				
Catch and Release^e	-.255 ($< .001$)	-.215 (.002)	.125 (.070)	-.107 (.120)	1.00			
Water Temp.^f	.336 ($< .001$)	.046 (.547)	-.093 (.219)	.170 (.024)	-.310 ($< .001$)	1.00		
Fish DHALO^g	.121 (.089)	.011 (.881)	-.011 (.876)	.063 (.371)	-.227 (.001)	.399 ($< .001$)	1.00	
Fish Tributaries^g	.157 (.028)	.121 (.087)	-.147 (.038)	-.052 (.459)	-.056 (.429)	.205 (.008)	.335 ($< .001$)	1.00

Statistics: Correlation = Pearson's r, followed by probability in parentheses.

^a Index scale: 1 = mutualism orientation to 5 = materialistic orientation

^b Index scale: 1 = catch not needed for enjoyable trip to 5 = catch needed for enjoyable trip

^c Index scale: 1 = preference for more fish to 5 = no preference for more fish

^d Index scale: 1 = preference for big fish to 5 = no preference for big fish

^e Index scale: 1 = preference for keeping catch to 5 = no preference for keeping catch

^f Index scale: 1 = cold water areas should be protected to 5 = cold water areas should be open to fishing

^g Response scale: 1 = "almost always" to 5 = "almost never"

Angler Expenditures in Pine Creek Valley

In the final section of the follow-up/mail survey, anglers were asked how much they spent *in Pine Creek Valley* for various categories of expenditures on their most recent fishing trip to Pine Creek. They were also asked whether they are a permanent resident of Pine Creek Valley, a seasonal resident, or a visitor to the Valley, the length of their trip (for seasonal residents and visitors), and how their expenses were shared with other fishermen (if applicable). Answers to all of these questions were used to gain a better understanding of the spending patterns and economic significance of Pine Creek anglers.

Most of the survey respondents classified themselves as visitors to Pine Creek Valley (64.3%), with about one fourth indicating they were seasonal residents (25.2%) and only one in ten year-round residents (10.5%). The vast majority of seasonal residents (94.3%) and visitors (74.8%) stayed overnight in the area during their recent fishing trip.

On average, Pine Creek anglers reported spending a total of \$216.84 on their most recent fishing trip (Table 21). This total represents the per-angler cost for a fishing trip averaging 7 days. The largest amounts were spent on lodging (e.g. \$50.41 for camp or house rentals), food and drink at restaurants and bars (\$43.73) and gasoline and oil (\$32.52). The proportion of anglers spending any money in a given category varied widely for different expenditure categories. Nearly two thirds of anglers reported expenditures for gas and oil (64.1%) and food/drink at restaurants and bars (62.6%). Conversely, very few survey participants reported expenditures on other transportation (2.7%), activities (4.5%) or entry, parking, or user fees (1.4%).

Converting the reported trip costs to a per day basis shows that the anglers surveyed spent an average of \$56.82 per day of fishing on Pine Creek (Table 21). This figure can be extrapolated to the full population of fishing days on Pine Creek to determine the economic significance of fishing on Pine Creek.

Table 21. Summary of trip spending patterns of Pine Creek anglers.

Economic Expenditure Items	Percent of anglers spending something in Pine Creek Valley	Average amount spent on most recent trip (per angler)	Average amount spent per angler per day
Overnight lodging			
State Forest or State Park Campground	5.4	\$3.18	\$2.00
Private Campground	8.6	\$9.31	\$2.49
Hotel/motel	7.2	\$13.76	\$3.70
Rented a private camp or house	16.7	\$50.41	\$8.08
Food/drink at restaurants and bars	62.6	\$43.73	\$12.08
Other food and beverages	53.6	\$26.42	\$6.41
Gasoline and oil	64.1	\$32.52	\$9.85
Other transportation (shuttle vehicle, rental car, etc.)	2.7	\$2.21	\$.48
Activities (including guide fees and equipment rental)	4.5	\$4.44	\$1.61
Entry, parking, or recreation use fees	1.4	\$.77	\$.12
Souvenirs/clothing	23.6	\$12.95	\$4.45
Any other expenses	27.1	\$17.14	\$5.55
Total		\$216.84	\$56.82

As expected, angler expenditures varied widely by residence category (Table 22). The year-round Pine Creek Valley residents spent far less (mean = \$30.73) on their recent fishing trip than the seasonal residents (\$214.79) or visitors (\$260.30).

Table 22. Pine Creek angler trip expenditures by residence category.

Economic Expenditure Items	Year-round Resident	Seasonal Resident	Visitor to Pine Creek Valley
Overnight lodging			
State Forest or State Park Campground	0	\$2.25	\$4.34
Private Campground	\$2.73	\$3.49	\$12.68
Hotel/motel	0	\$7.55	\$19.67
Rented a private camp or house	0	\$37.85	\$66.92
Food/drink at restaurants and bars	\$5.68	\$52.54	\$48.75
Other food and beverages	\$3.18	\$33.71	\$29.43
Gasoline and oil	\$6.14	\$35.45	\$36.79
Other transportation (shuttle vehicle, rental car, etc.)	\$.32	\$.94	\$3.02
Activities (including guide fees and equipment rental)	0	\$2.39	\$6.36
Entry, parking, or recreation use fees	0	0	\$1.27
Souvenirs/clothing	\$11.36	\$5.77	\$16.95
Any other expenses	\$1.32	\$32.85	\$14.12
Total	\$30.73	\$214.79	\$260.30

CONCLUSIONS

Pine Creek anglers who participated in these two surveys were predominately Pennsylvania residents living within 125 miles of Pine Creek Valley. Most of the anglers (64.3%) were visitors to the Pine Creek Valley, with seasonal and year-round residents accounting for approximately one-third of participants (25.2% and 10.5%, respectively). Those who traveled to fish in Pine Creek Valley were more likely to live near the valley (e.g., Lycoming and Clinton counties) or live south or southeast of the valley (e.g., Harrisburg, Reading, Lancaster, or York) than in the northern or western parts of the Commonwealth. As indicated by the median number of days spent fishing in Pennsylvania (28 days) and in the Pine Creek Valley (9 days), many of the survey participants were frequent rather than occasional anglers.

Anglers who participated in the on-site survey were far more numerous on Pine Creek between the traditional opening day of trout season (second Saturday in April) and the end of May than they were later in the season. Consistent with this finding, a large majority of anglers identified trout as their primary quarry and were found fishing in the approved trout waters in the upper segments of the study area (Sections 11 and 12). Because fishing was concentrated during the first seven weeks of the season and a large majority of anglers specifically sought trout in the approved trout water segments of Pine Creek, it is not surprising that rainbow trout greatly outnumbered other species that were caught and harvested or caught and released.

Anglers' spent considerable amounts of money on various types of expenditures in Pine Creek Valley. Food, drink, and vehicle fuel were the most common purchases in the valley. A minority of anglers surveyed purchased lodging in the valley, but those who did so spent far more money in the valley than those who did not. The average expenditures by anglers reported in this study could be used to estimate the economic impact of Pine Creek angling if combined with a valid estimate of the total number of Pine Creek anglers or fishing trips.

Few anglers reported purchasing fishing licenses in the valley, presumably because most were Pennsylvania residents who purchased their licenses near home and because online purchasing is becoming more common.

The in-depth, follow-up survey revealed that Pine Creek anglers' primary motivations for fishing were to spend time outdoors in nature, enjoy the challenge of fishing, and catch fish. On average, anglers expressed a high degree of satisfaction with their Pine Creek fishing experiences, and they were particularly satisfied with the types of fish they caught and facilities and services in Pine Creek Valley.

Both the on-site survey and the in-depth, follow-up survey demonstrated that most Pine Creek anglers have diverse, but not highly polarized, beliefs about managing trout when they retreat to pockets of coldwater in summer. Substantial numbers of survey participants agreed that trout gathering in coldwater refugia should be harvested because they are likely to die anyway, but, at the same time, substantial numbers agreed that coldwater refugia should be off-limits to fishing. Importantly, substantial numbers of anglers also expressed neutrality or uncertainty about both statements.

Consistent, perhaps, with this finding, the average Pine Creek angler's wildlife value orientations and their consumptive attitudes can be described as *dualist*. In other words, anglers on average expressed beliefs that fish and wildlife should be protected both for human use and for their own sake. Similarly, although anglers wanted to catch fish, they generally did not feel they must catch fish for a fishing trip to be enjoyable, and they were divided about the importance of catching large fish, catching many fish, and keeping the fish they caught. Although a subset of Pine Creek Valley anglers undoubtedly hold strong beliefs regarding fishing practices and fisheries management, average motivations, wildlife value orientations, and consumptive attitudes combine to suggest that Pine Creek Valley anglers hold moderate beliefs about these issues.

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APPENDICES

Appendix A: Responses to Open-Ended Questions — Pine Creek On-Site Survey

Appendix B: Responses to Open-Ended Questions — Pine Creek In-Depth Survey

Appendix C: Pine Creek On-Site Survey Instrument

Appendix D: Pine Creek In-Depth Survey Instrument

Appendix E: Study Limitations

Appendix A

Responses to Open-Ended Questions — Pine Creek On-Site Survey

1. Why did you choose this particular spot? (418)

- Social (142)
 - Tradition (81)
 - Someone else decided (25)
 - Recommendation (22)
 - Popular location (7)
 - Solitude (4)
 - Swimming hole (2)
 - Advice of US angler surveys (1)
- Access (121)
 - Proximity to cabin / camp (65)
 - Easy access (25)
 - Proximity to home (16)
 - Proximity to campsite (7)
 - Proximity to friends home (5)
 - Proximity to bed and breakfast (1)
 - Proximity to rails to trails (1)
 - Proximity to relatives home (1)
- Natural Setting (62)
 - Preferred location (42)
 - Enjoy Pine Creek (7)
 - Deep hole / water (6)
 - Ideal weather (2)
 - Slower water (2)
 - Ideal water flow level (1)
 - Large creek (1)
 - Scenic qualities (1)
- Fish Related (53)
 - Previous success (26)
 - Population of fish (7)
 - Quality of fish habitat (5)
 - Stocked area (5)
 - Observed trout (3)

- Helped stock area (2)
- Ideal fly-fishing location (2)
- Bass population (1)
- Observed fish rising (1)
- Size of fish (1)
- Special Regulations (21)
 - Delayed harvest area (17)
 - DHALO area (2)
 - Catch and release area (1)
 - Fly-fishing only area (1)
- Miscellaneous (19)
 - Random (11)
 - New location (5)
 - Starting point (3)

6. Besides fishing, what else are you doing during your Pine Creek Valley trip? (377)

- Recreation (184)
 - Camping (72)
 - Bicycling (34)
 - Hiking (24)
 - Boating (20)
 - Canoeing (13)
 - Kayaking (4)
 - Rafting (3)
 - Sightseeing (16)
 - ATV (3)
 - Playing cards (3)
 - Shooting (3)
 - Winter Recreation (3)
 - Cross country skiing (1)
 - Skiing (1)
 - Snowmobiling (1)
 - Photography (2)
 - Swimming (2)
 - General recreation (1)
 - Metal Detecting (1)
- Lifestyle (65)

- Relaxing (26)
- Cabin (11)
- Live here (9)
- Vacations (6)
- Family vacation (2)
- General vacation (4)
- Working (4)
- Time with friends (3)
- Shopping (2)
- Cabin maintenance (1)
- House maintenance (1)
- Driving (1)
- Real estate shopping (1)
- Hunting (62)
 - General hunting (52)
 - Turkey hunting (7)
 - Archery hunting (2)
 - Trapping (1)
- Food and Beverage (36)
 - Dining (17)
 - Drinking (17)
 - Cooking (2)
- Wildlife (30)
 - Turkey scouting (22)
 - Bird watching (3)
 - Bear watching (1)
 - Eagle watching (1)
 - Fish stalking (1)
 - Turkey calling (1)
 - Wildlife watching (1)

Appendix B

Responses to Open-ended Questions — Pine Creek In-Depth, Follow-Up Survey

1. If you checked OTHER WATERS, where? (167)

- Slate Run (36)
- Little Pine Creek (33)
- Cedar Run (28)
- Kettle Creek (28)
- Young Woman's Creek (10)
- Cross Fork Creek (5)
- Fishing Creek (4)
- Pine Creek (4)
- Babb Creek (2)
- Callahan Run (2)
- Loyalsock Creek (2)
- Lyman Run (2)
- Spring Creek (2)
- Bear Creek (1)
- Bohem Run (1)
- English Creek (1)
- Larry's Creek (1)
- Lycoming Creek (1)
- Millers Run (1)
- Penn's Creek (1)
- Susquehanna River (1)
- White Deer Creek (1)

2a. What do you like most about fishing in the Pine Creek DHALO area? (162)

- Fish Related (89)
 - Population of fish (42)
 - Size of fish (20)
 - Slate Run Fly Shop stocking initiative (7)
 - Quality of fish (6)
 - Fly-fishing opportunity (5)
 - Quality of fish habitat (5)

- Insect hatches (3)
- Bass and walleye population (1)
- Natural Setting (20)
 - Pristine environment (9)
 - Scenic value (9)
 - Song birds (1)
 - Wildlife (1)
- Social (20)
 - Not crowded (11)
 - Overall experience (5)
 - No bait fishermen (4)
- Special Regulations (19)
 - Catch and release ethic (12)
 - Early season fishing (4)
 - No bait fishing (3)
- Access (14)
 - Easily accessible (8)
 - Location (6)

2b. What do you dislike most about fishing in the Pine Creek DHALO area? (68)

- Special Regulations (33)
 - Needs year-round catch and release designation (6)
 - Bait fishing prohibited (5)
 - Catch and release designation (3)
 - DHALO section too small (4)
 - General special regulations (3)
 - Tailored toward fly-fishing / special interests (3)
 - Artificial lures only designation (2)
 - Size regulation increase (2)
 - Poaching (2)
 - Night fishing prohibited (1)
 - Spinning lures allowed (1)
 - Trout stamp required (1)
- Social (20)
 - Crowded (15)
 - Boaters (2)
 - Unable to fish with friends who bait fish (1)
 - Boaters bait fishing through section (1)

- Swimmers (1)
- Access (13)
 - Limited parking (9)
 - Limited parking along lower section of DHALO area (1)
 - Limited parking along middle section of DHALO area (1)
 - Limited parking along Naval Run Road (1)
 - Limited parking along upper section of DHALO area (1)
- Natural Setting (2)
 - Lack of tree cover (1)
 - Water warm in summer (1)

3a. What do you like most about fishing the tributaries? (156)

- Fish Related (76)
 - Native and wild trout (36)
 - Smaller streams (18)
 - Alternative to Pine Creek during high water (4)
 - Light fishing pressure (4)
 - Quality of fish habitat (4)
 - Insect hatches (3)
 - Quality of fish (3)
 - Colder water (1)
 - Fly-fishing opportunity (1)
 - Population of fish (1)
 - Year round fishing opportunity (1)
- Natural Setting (50)
 - Scenic value (27)
 - Remoteness (13)
 - Pristine environment (7)
 - Wildlife (3)
- Social (25)
 - Quiet and solitude (11)
 - Not crowded (10)
 - Overall experience (4)
- Special Regulations (3)
 - Catch and release ethic (1)
 - General special regulations (1)
 - Protected area (1)
- Access (2)

- Easily accessible (1)
- Parking access (1)

3b. What do you dislike most about fishing the tributaries? (77)

- Fish Related (27)
 - Difficult to catch (10)
 - Small fish population (6)
 - Fish too small (5)
 - Heavy fishing pressure (4)
 - Decline of Slate Run trout population in upper section (1)
 - Limited number of stocked trout (1)
- Access (16)
 - Difficult access (12)
 - Too much vegetation (3)
 - No facilities (1)
- Natural Setting (15)
 - Small streams (13)
 - Loud motorcycles (1)
 - Litter (1)
- Special Regulations (12)
 - General special regulations (4)
 - Catch and release designation needed (2)
 - Artificial lures only area (1)
 - Fish size limits (1)
 - Fly-fishing only sections (1)
 - Posted special regulations (1)
 - Slate Run DHALO area (1)
 - Trophy water designations (1)
- Social (6)
 - Crowded (5)
 - Bait fishermen (1)
- Wildlife (1)
 - Rattlesnakes (1)

3c. What do you like most about fishing Pine Creek itself? (183)

- Natural Setting (83)
 - Size of creek (42)
 - Scenic value (28)

- Pristine environment (7)
- Clear water (4)
- Wildlife (2)
- Fish Related (70)
 - Insect hatches (15)
 - Quality of fish habitat (9)
 - Population of fish (8)
 - Quality of fishing (8)
 - Variety of fish species (8)
 - Fly-fishing opportunity (5)
 - Size of fish (5)
 - Challenge of fishing (4)
 - Easy to cast (4)
 - Bass and walleye fishing (3)
 - Slate Run Fly Shop stocking initiative (1)
- Social (17)
 - Not crowded (9)
 - Overall experience (3)
 - Solitude (3)
 - Remoteness (1)
 - Social atmosphere (1)
- Access (10)
 - Easily accessible (7)
 - Location (2)
 - Canoe accessible for fishing (1)
- Special Regulations (3)
 - DHALO section (1)
 - Live bait fishing (1)
 - Year round fishing (1)

3d. What do you dislike most about fishing Pine Creek itself? (82)

- Fish Related (27)
 - Too few stocked trout (14)
 - Difficult to catch (5)
 - Stocked trout (2)
 - Catching chubs (1)
 - Fish too small (1)
 - Short season (1)

- Small insect hatches (1)
- Too many trout (1)
- Trout stocked too early (1)
- Social (23)
 - Boaters (11)
 - Crowded (7)
 - Bait fishermen (3)
 - Swimmers (2)
- Natural Setting (17)
 - Too wide and shallow (5)
 - Water warm in summer (5)
 - Litter (2)
 - Black flies (1)
 - Development of area (1)
 - Inconsistent stream flow (1)
 - Loud motorcycles (1)
 - Posted property (1)
- Special Regulations (14)
 - Need additional DHALO areas (4)
 - DHALO area (2)
 - Fish harvesting (2)
 - Needs addition delayed harvest areas (2)
 - DHALO section too small (1)
 - Lack of special regulations to support natural reproduction (1)
 - Needs year-round catch and release designation (1)
 - Unprotected mouth of tributaries (1)
- Access (1)
 - Lack of access from Blackwell to Slate Run (1)

4. When you fish Pine Creek, what species do you fish for most and why? (251)

- Trout (203)
 - General trout (177)
 - Brown trout (15)
 - Rainbow trout (7)
 - Brook trout (3)
 - Wild trout (1)
- Bass (36)
 - General bass (19)

- Smallmouth bass (16)
- Rock bass (1)
- Walleye (10)
- Catfish (1)
- Carp (1)

6. If you night fish in Pine Creek, what species do you fish for? (115)

- Trout (69)
 - General trout (60)
 - Brown trout (9)
- Bass (19)
 - General bass (13)
 - Smallmouth bass (4)
 - Rock bass (2)
- Walleye (14)
- Catfish (8)
- Carp (1)
- Chub (1)
- Sucker (1)

7. Which of these types of fishing do you prefer? (16)

- Walleye (9)
- Catfish (2)
- Carp (2)
- Bass (1)
- Pickerel (1)
- Trout (1)

1D. If YES, what do you think of Pennsylvania Wilds designation? (132)

- Worthwhile program (56)
- Like environmental enhancement and protection (15)
- Don't know much about it (6)
- Promotes crowding (6)
- Dislike (5)
- Great public relations (5)
- Mistake to de-emphasize hunting (5)
- Waste of money (5)

- Politically motivated (4)
- Apathetic (3)
- Concern about drilling (3)
- Hope of local economic boost (3)
- Spurs commercial development - negative (3)
- Needs expansion (2)
- Undistinguishable (2)
- Best place on earth (1)
- Confusing (1)
- Creates pollution and litter (1)
- Dislike limited access to area (1)
- Educational opportunity on environmental stewardship (1)
- Enjoyable environment (1)
- Fishing opportunities (1)
- Great wildlife (1)
- Preserves heritage (1)

3D. Please list other expenditures here: (88)

- Fishing Gear (81)
 - Fly-fishing gear (46)
 - Flies (21)
 - General fly-fishing equipment (15)
 - Fly-fishing leader (5)
 - Fly-fishing fly floatant (1)
 - Fly-fishing fly tying supplies (1)
 - Fly-fishing line (1)
 - Fly-fishing tippet (1)
 - Magnifying glasses (1)
 - General fishing gear (35)
 - Fishing equipment (25)
 - Bait (5)
 - Fishing license (2)
 - Trout stamp (2)
 - Bug repellent (1)
- Miscellaneous (7)
 - Stocking donation (2)
 - Batteries (1)
 - Books (1)

- Button supporting Slate Run delayed harvest section (1)
- Charcoal (1)
- Filled propane tank (1)

Appendix C — Pine Creek On-Site Survey Instrument

2008 Pine Creek Angler Survey Clerk _____ Survey ID # _____ (Copy # to mail label)

Reach _____ Subsection _____ Site _____

Regulation area (check one) DHALO regs Stocked trout statewide regs Warmwater/coolwater statewide regs

Date (mm/dd/yy) ____ / ____ / ____ Interview start time (2400 format) _____

Start fishing time (2400 format) _____ Trip complete? (1 = Yes; 2 = No) _____

Fishing mode Shore Terminal tackle Flies
 Wade Lures
 Boat Bait (type: _____)

Have you been interviewed before on Pine Creek this year? (1 = Yes; 2 = No) _____
 If YES, stop questioning after "SPECIES CAUGHT TODAY."

What are you fishing for today? _____

Why did you choose this particular spot? _____

Angler's gender (1 = M; 2 = F) _____ Angler's Year of Birth _____

Home Zip Code _____ Home county (or state if not from PA) _____

SPECIES CAUGHT TODAY	Total # harvested	Total # released	How many released were legal length?
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

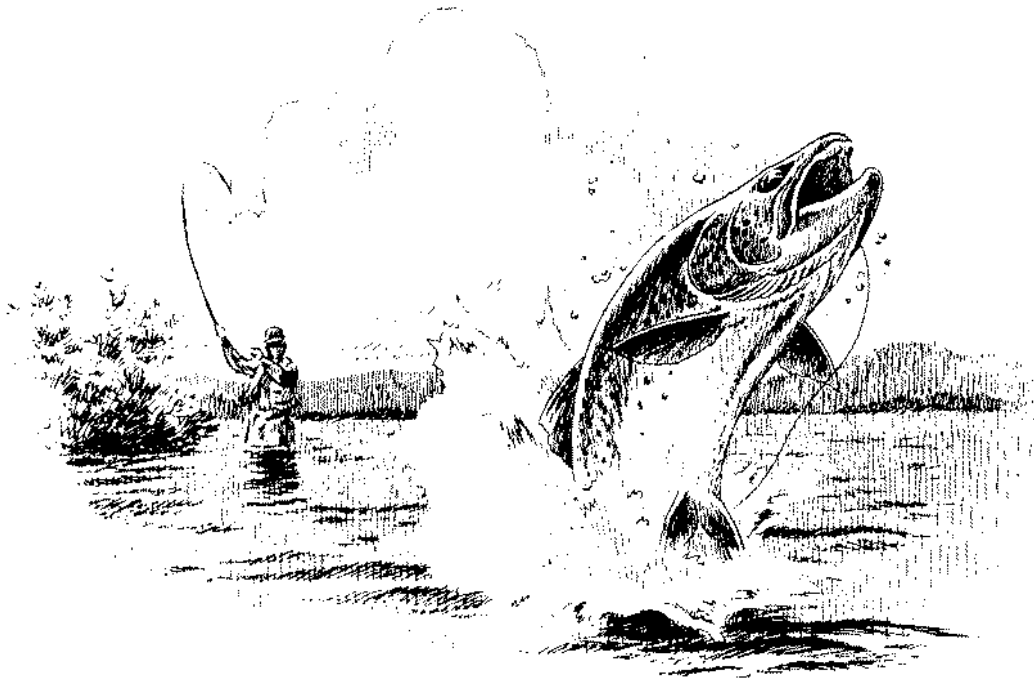
QUESTIONS ABOUT TODAY'S TRIP

- How many days will you be fishing during this trip? _____
- How many anglers rode in your vehicle today? _____
- About how many times have you fished Pine Creek during the last 12 months? _____
- About how many days did you visit Pine Creek Valley without fishing in the last 12 months? _____
- About how many times have you fished in Pennsylvania during the last 12 months? _____
- Besides fishing, what else are you doing during your Pine Creek Valley trip? _____
- Where did you purchase your 2008 Pennsylvania fishing license? _____
- To finish up, I am going to read 3 statements about fishing. Please tell me how strongly you agree or disagree with each one.

a) When I fish for trout, I pay close attention to the water temperature.	Strongly agree	Agree	Neither	Disagree	Strongly disagree
b) Trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway.	Strongly agree	Agree	Neither	Disagree	Strongly disagree
c) The cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing.	Strongly agree	Agree	Neither	Disagree	Strongly disagree

That concludes my questions; thank you.
 Remember to ask for permission to mail a follow-up questionnaire. If YES, ask participant to complete a mail label.

Pine Creek Angler Survey 2009



Conducted cooperatively by:

Pennsylvania Department of Conservation & Natural Resources

Pennsylvania Fish & Boat Commission

Penn State University



PENNSTATE



ABOUT THE 2009 PINE CREEK ANGLER SURVEY AND THIS QUESTIONNAIRE

This questionnaire is being distributed by Penn State University in cooperation with the Pennsylvania Department of Conservation and Natural Resources and the Pennsylvania Fish and Boat Commission. If you are a Pine Creek angler, completing a questionnaire will help us understand anglers' preferences and expectations for Pine Creek Valley fishing, now and in the future.

Your opinion is important to us. To get an accurate understanding of Pine Creek anglers' preferences and expectations, we need to hear from as many Pine Creek anglers as possible, including year-round residents, seasonal residents, and visitors to Pine Creek Valley. Please complete a questionnaire even if you already participated in the creel survey conducted last year by the DCNR and Fish and Boat Commission.

Participation is voluntary and confidential. Your participation in this research is completely voluntary. You may choose not to complete a questionnaire, you may skip any question, and you may quit at any time. Your participation in this survey is confidential. To help protect your privacy, do not write your name on the questionnaire. You will not be asked for any information that could identify you personally, and all data will be grouped for reporting purposes. Completing a questionnaire implies that you have read the information on this page and consent to take part in the research.

You must be 18 years old or older to participate in this survey. Completing a questionnaire takes 15-20 minutes.

FILLING OUT THE QUESTIONNAIRE

For each item in the questionnaire, please choose the answer that is most true for you. Return your questionnaire in the pre-addressed, postage-paid envelope provided.

If you have questions about the survey or you lose track of the postage-paid return envelope, you can contact Dr. Harry Zinn at Penn State University:

Dr. Harry Zinn
Penn State University
Pine Creek Angler Survey
801 Ford Building
University Park, PA 16802
814-863-7849
hzinn@psu.edu

THANK YOU FOR YOUR HELP!

SECTION A: Please start by answering some questions about your most recent fishing trip to Pine Creek.

1. On this trip where did you fish? (Please check all that apply.) Pine Creek Other waters

If you checked OTHER WATERS, where? _____

2. When you fish Pine Creek, how often do you fish in the Delayed Harvest Artificial Lures Only area?
 Almost always Most of the time About half the time Some-times Almost never

What do you like or dislike most about fishing in the Pine Creek DHALO area? _____

3. When fishing in Pine Creek Valley, how often do you fish the Pine Creek tributaries? (Examples: Slate Run or Cedar Run)
 Almost always Most of the time About half the time Some-times Almost never

What do you like or dislike most about fishing the tributaries? _____

What do you like or dislike most about fishing Pine Creek itself? _____

4. When you fish Pine Creek, what species do you fish for most and why? _____

5. Please read the following statements and think about your most recent trip fishing trip to Pine Creek. For each statement, circle one number to show how strongly you agree or disagree.

STATEMENTS	Strongly agree	Agree	Neither	Disagree	Strongly disagree
I thoroughly enjoyed that fishing trip.	1	2	3	4	5
I succeeded catching the types of fish I hoped to.	1	2	3	4	5
I succeeded catching the numbers of fish I hoped to.	1	2	3	4	5

STATEMENTS, CONTINUED	Strongly agree	Agree	Neither	Disagree	Strongly disagree
That fishing trip was less enjoyable than I expected.	1	2	3	4	5
Access areas and parking were readily available.	1	2	3	4	5
The behavior of other people nearby bothered me.	1	2	3	4	5
I cannot imagine a better fishing trip than that one.	1	2	3	4	5
Weather conditions were ideal.	1	2	3	4	5
The landscape in that area is very attractive.	1	2	3	4	5
I do not want to go on any more fishing trips like that one.	1	2	3	4	5
That was a wonderful opportunity to be outdoors.	1	2	3	4	5
There were too many other people nearby.	1	2	3	4	5
I was disappointed with some aspects of that trip.	1	2	3	4	5
Services like meals, lodging, and tackle shops were easy to find.	1	2	3	4	5
Facilities in the area were poorly maintained.	1	2	3	4	5
That trip was well worth the money I spent on it.	1	2	3	4	5
The natural environment in that area was in poor condition.	1	2	3	4	5
Road and trail conditions were excellent.	1	2	3	4	5
Informational signs and directions were not adequate.	1	2	3	4	5
Accurate, easy-to-use maps for the area were readily available.	1	2	3	4	5

6. Do you night fish in Pine Creek? No Occasionally Regularly

If you night fish in Pine Creek, what species do you fish for? _____

7. When Pine Creek water temperatures become warm in summer, gamefish such as smallmouth bass predominate in the main stem and cold water fishes such as trout are mostly available in cold water tributaries.

Do you fish Pine Creek Valley during warm water periods in summer? Yes No

If YES, which of the following types of fishing do you participate in during summer? (Please check all that apply.)

- Smallmouth bass fishing in the main stem of Pine Creek
- Trout fishing in the main stem of Pine Creek
- Trout fishing in Pine Creek’s coldwater tributaries
- Other

If you checked “Other,” please explain: _____

Which of these types of fishing do you prefer? _____

SECTION B: Why you go fishing

1. Please read the following reasons people go fishing and indicate how important each reason is to you personally.

REASONS	Not at all important	Somewhat important	Moderately important	Very important	Extremely important
To be outdoors	1	2	3	4	5
For relaxation	1	2	3	4	5
To get away from the regular routine	1	2	3	4	5
For the challenge or sport	1	2	3	4	5
For family recreation	1	2	3	4	5
To obtain fish for eating	1	2	3	4	5
For physical exercise	1	2	3	4	5
To be with my friends	1	2	3	4	5
For the experience of the catch	1	2	3	4	5
To obtain a trophy fish	1	2	3	4	5
To experience natural surroundings	1	2	3	4	5
For the promise of the catch	1	2	3	4	5

REASONS, CONTINUED	Not at all important	Somewhat important	Moderately important	Very important	Extremely important
To test my equipment	1	2	3	4	5
To develop my skills	1	2	3	4	5
To learn about the area	1	2	3	4	5

SECTION C: Your overall perceptions about fishing and the outdoors.

1. For each of the following statements about fishing and the outdoors, please circle one number to indicate how strongly you agree or disagree.

STATEMENTS	Strongly agree	Agree	Neither	Disagree	Strongly disagree
The more fish I catch the happier I am.	1	2	3	4	5
A fishing trip can be enjoyable even if no fish are caught.	1	2	3	4	5
A successful fishing trip is one in which many fish are caught.	1	2	3	4	5
When I fish for trout, I pay close attention to the water temperature.	1	2	3	4	5
I would rather catch one or two big fish than five smaller fish.	1	2	3	4	5
I would rather catch one or two big fish than ten smaller fish.	1	2	3	4	5
I am just as happy if I release the fish I catch.	1	2	3	4	5
Trout that move into cold water near tributary mouths or spring seeps in summer should be harvested because most will die anyway.	1	2	3	4	5
I must keep the fish I catch for the trip to be successful.	1	2	3	4	5
When I go fishing, I'm just as happy if I don't catch fish.	1	2	3	4	5
The bigger the fish I catch, the better the fishing trip.	1	2	3	4	5
The cold water near tributary mouths or spring seeps where trout gather in summer should be off-limits to fishing.	1	2	3	4	5
I must catch fish for the fishing trip to be enjoyable.	1	2	3	4	5
It doesn't matter to me what type of fish I catch.	1	2	3	4	5

STATEMENTS, CONTINUED	Strongly agree	Agree	Neither	Disagree	Strongly disagree
Humans should manage fish and wildlife populations so that humans benefit.	1	2	3	4	5
We should strive for a world where humans and fish and wildlife can live side by side without fear.	1	2	3	4	5
The needs of humans should take priority over fish and wildlife protection.	1	2	3	4	5
I view all living things as part of one big family.	1	2	3	4	5
We should strive for a world where there are abundant fish and wildlife for fishing and hunting.	1	2	3	4	5
Animals should have rights similar to the rights of humans.	1	2	3	4	5
Fish and wildlife are on earth primarily for people to use.	1	2	3	4	5
Fish and wildlife should be protected for their own sake, not just to meet human needs.	1	2	3	4	5
Wildlife are like my family and I want to protect them.	1	2	3	4	5

SECTION D: More about Pine Creek Valley and your most recent Pine Creek fishing trip.

1. Are you familiar with the PA Wilds designation in North Central Pennsylvania? Yes No

If YES, what do you think of this designation? _____

2. Which of the following best describes you? Year-round resident of Pine Creek Valley
 Seasonal resident of Pine Creek Valley
 Visitor to Pine Creek Valley

If you checked SEASONAL RESIDENT or VISITOR, did the Pennsylvania Wilds designation influence your decision to visit Pine Creek Valley? Yes No

If you checked SEASONAL RESIDENT or VISITOR, did you stay away from home overnight on your most recent trip fishing trip to Pine Creek. Yes No

If YES, how many nights did you stay in Pine Creek Valley? _____

3. Trip expenditure profile for your most recent trip fishing trip to Pine Creek.

First, indicate how expenses were shared (or not) on your most recent trip fishing trip. Were you ...

Second, if you checked YES on the left ...

- | | |
|--|---|
| <input type="checkbox"/> Sharing expenses with other people? | Report just what you spent. |
| <input type="checkbox"/> Paying for just your own expenses? | Report just what you spent. |
| <input type="checkbox"/> Paying for yourself and others?
If YES, how many others? _____ | Report what you spent for all these people. |
| <input type="checkbox"/> Being paid for by someone else? | Report your portion of the total spent. |

Third, for each of the categories below, please estimate the amount spent in Pine Creek Valley during your most recent fishing trip.

<u>Category</u>	<u>Amount spent</u>
a) Overnight lodging (Check one box and estimate amount spent if applicable.)	
<input type="checkbox"/> State Forest or State Park campground	\$ _____
<input type="checkbox"/> Private campground	\$ _____
<input type="checkbox"/> Hotel/motel	\$ _____
<input type="checkbox"/> Rented a private camp or house	\$ _____
<input type="checkbox"/> Spent nothing for lodging, stayed at my own place or with friends	
b) Food/drink at restaurants and bars	\$ _____
c) Other food and beverages	\$ _____
d) Gasoline and oil	\$ _____
e) Other transportation (shuttle vehicle, rental car, etc.)	\$ _____
f) Activities (including guide fees and equipment rental)	\$ _____
g) Entry, parking or recreation use fees	\$ _____
h) Souvenirs and clothing	\$ _____
i) Any other expenditures (please list below)	\$ _____

Please list other expenditures here: _____

4. What is your gender? Man Woman

5. What year were you born? _____

6. What is your home ZIP code? _____

Thank you for completing the questionnaire.
Please return it to a survey collection box or in the postage-paid envelope provided.

Appendix E

Study Limitations

It is important to understand the limitations of the sampling processes that were used for both the on-site survey and the in-depth, follow-up survey. During the on-site survey, field clerks made every attempt to interview a random sample of anglers, but the nature of the area and the nature of fishing as an activity made it impossible to fully achieve this goal. Some anglers were fishing in locations where they could not be accessed, and, in all cases, when approached by a clerk, an angler may or may not have agreed to be interviewed. Therefore, the representativeness of the on-site survey sample is unknown.

An additional challenge was present during the in-depth, follow-up survey. Because few anglers interviewed during the on-site survey agreed to be sent a follow-up survey, the method was changed, and questionnaires were made available to anglers and businesses and camping area in Pine Creek Valley. Although every possible effort was taken to prevent duplicate surveys or multiple surveys from the same individual, the representativeness of this method is unknown. Statistical comparisons of survey responses from the on-site follow up surveys versus the surveys picked up in stores found few differences between the two groups.

In both surveys, it is possible that avid anglers are over-represented and casual anglers are under-represented and that individuals who had particularly strong feelings about one of more fishing-related issues were more likely to participate than individuals without strong feelings. The results of these angler surveys should be seen as depicting general patterns of angler behavior, beliefs, preferences, but should not be seen as precise estimates of population characteristics.

Finally, catch data were gathered through a combination of approaches. The species identification and number of fish harvested were observed by trained fisheries clerks and, thus, should be very accurate. The numbers of fish released and fish of legal length released were self reported by the sampled anglers, and may be more subject to error or bias.