New York State Department of Environmental Conservation Division of Fish and Wildlife



Department of Environmental Conservation

# Esopus Creek Creel Report

Results from Year 1



Bureau of Fisheries January 2023

Kathy Hochul, Governor | Basil Seggos, Commissioner

Bureau of Fisheries Report #: cr1943

#### Background

The Esopus Creek upstream of Ashokan Reservoir sustains one of the renowned wild trout fisheries in southeastern New York. Wild populations of brook trout, brown trout and rainbow trout are found within the watershed, with the fishery for the latter species as one the best in the Catskills (Capossela 1989, Van Put 2007). The most recent statewide angler survey (Responsive Management 2019) estimated roughly 49,000 angler days were spent on the Upper Esopus Creek in 2017, placing the creek in the top 20 of trout streams in New York State and in the top 10 for non-Great Lakes tributaries.

Specific information on angling characteristics, catch rates, and harvest rates for the Upper Esopus Creek trout fishery were last estimated in 2012, predating significant changes in the fishery, including the 2021 change in management designation from a stocked stream to a *Wild-Quality* stream per guidelines in the New York State Trout Stream Management Plan (NYSDEC 2020). Updated creel data are needed to support a comprehensive, adaptive management plan for the creek.

#### **Goals and Objectives**

This survey characterizes current angler use and attitudes associated with the Upper Esopus Creek trout fishery to inform the development of a revised Fishery Management Plan (FMP) for the creek and will serve as a baseline for future creel surveys. The study also documents changes that have occurred in the fishery since the 2010-2012 Upper Esopus Creel Survey (Angyal 2017). As with the prior Angyal creel survey, the following metrics are evaluated for the entire managed reach as well as within defined sub-sections:

- Angler effort
- Species-specific catch rates
- Species-specific harvest rates
- Species-specific size structures of creel
- Angler demographics
- Angler expectations

### **Study Area**

The Upper Esopus managed reach spans 17.9 miles from Chimney Hole (Boiceville, NY) upstream to Lost Clove Creek (Big Indian, NY). Situated roughly 12 miles upstream of Chimney Hole, the Shandaken Tunnel Outlet (Portal) splits this reach into two vastly different sections. This NYC drinking water aqueduct delivers up to 600 million gallons a day of mostly cold water from the Schoharie Reservoir near Gilboa, NY to the Esopus Creek just downstream of the Town of Shandaken. Conditions below the Portal are heavily influenced by these releases, especially during the dry season. The creek below the Portal has mean widths ranging from 70-90 feet, with much of the surface exposed to sunlight. Extensive runs, deep pools, and swiftmoving riffles are found in this stretch. The section of creek upstream from the Portal to Lost Clove Creek appears as a more traditional Catskill trout stream. Here, the creek has mean widths of 30-40 feet, over-hanging vegetation, medium-sized pools, undercut banks, riffles, and shallow runs.

Because of the potential for vastly different fishing conditions above and below the portal, Angyal (2017) treated the section of the managed reach above the portal as a separate subsection in the creel. Below the Portal, the creek was divided again at the town of Phoenicia, creating three total sub-sections: Chimney Hole to the Town of Phoenicia; Town of Phoenicia to the Portal in Allaben; and Portal to Lost Clove Road bridge. Results from the 2010-12 survey indicated differences in catch rates, species compositions, and angling pressure among these three sections; therefore, the current creel survey uses the same methodology (see Figure 1).



Figure 1. The managed reach of the Upper Esopus Creek

### Timeframe

The 2022 portion of the survey was conducted from April 1 through December 15, while the 2023 survey will take place from March 1 through December 15 to better capture the fishery on spawning-run rainbow trout. A two-year survey will better evaluate angler use and attitudes on the creek as anglers become familiar with the new *Wild-Quality* management approach and the associated fishing regulations. In addition, the two-year survey buffers against unexpected influences on the fishery such as extreme weather patterns, unfavorable stream conditions, and drinking water supply actions by NYC Reservoir managers.

### **Survey Design-Methods**

The 2022 creel followed similar protocols to the 2010-2012 Upper Esopus Creel Survey (Angyal 2017), which was a "roving-roving" survey (Pollock 1994; Lockwood 1999). Every weekend day and holiday was sampled throughout the survey year, along with two randomly selected weekdays from each administrative week (Thursday – Wednesday). If a holiday fell on a weekday, it was sampled, and then only one random weekday was chosen within the remainder of the administrative week. Each workday was ten hours, with eight hours of time spent on the creek and the remaining two hours on the commute. Random pressure counts took place between sunrise and sunset, while angler interviews extended to dusk (one-half hour after sunset). For simplicity sunrise, sunset, and dusk times were rounded to the nearest quarter hour.

**Estimation of fishing pressure:** Two, 1.5-hour pressure counts were conducted each surveyed day, with the second run starting 2.5 hours after the end of the first. The counts were done via a predetermined 'bus route' (Robson and Jones 1989) which is a mix of stops at wide-ranging viewpoints of the creek and roads with clear visibility of the creek while driving. The 'bus routes' by sub-section are shown in Figures 1 through 3 in Appendix A.

Counts were of anglers only, with parked vehicles used solely to inform the creel agent that anglers may be nearby. For the purposes of the count, an angler was defined as someone who was fishing, actively heading towards the creek, packing/unpacking fishing gear at their vehicle, or waiting on the bank to ascertain fishing conditions.

To reduce any temporal biases, the time and direction of pressure counts was randomized as follows:

- The first creel day of each administrative work week was randomly designated as "early" or "late", alternating among subsequent creel days. On an early day, the creel agent arrived on the creek at sunrise and left the creek eight hours later. A late day formally ended thirty minutes after sunset, with the agent arriving on the river eight hours earlier.
- To ensure full temporal coverage, the start times of the first pressure counts of each day were systematically rotated among three start times based on the time arriving at the creek and the mandatory 2.5 hours between creel runs.
  - The first count on an "early" day began (a) at sunrise (b) 1.25 hours after sunrise, or (c) 2.5 hours after sunrise
  - The first count on a "late" day began (a) upon arrival to creek (b) an hour after arrival to creek, or (c) two hours after arrival to creek
  - Subsequent start times of the first pressure counts of each early/late day throughout the season followed in sequential order ('a' follows 'c')
  - Daily start times and end times were adjusted to account for changing sunrise/sunset times throughout the season.
- The first creel day of each administrative work week was randomly designated an "up" direction pressure count (start at Chimney Hole) or "down" direction (start at Lost Clove Road bridge). The direction of count was the same within each workday. The daily direction of the count alternated for the remainder of the administrative work week.

The 2022 Creel Schedule is found in Appendix B.

**Estimation of angler catch rates:** The creel agent conducted angler interviews when not collecting pressure counts. The primary locations for interviews were the angler parking areas (see Figures 1-3 in Appendix C); however, the creel agent interviewed anglers anywhere along the creek where access was viable. All anglers were interviewed regardless of the targeted species. As shown on the 2022 Creel Schedule in Appendix B, the creel agent had between 4.5 and 5 hours of designated angler interview time per day, with time blocks falling before the first angler count of the day, between angler counts, and after the second angler count, depending on travel time and the start-time of the first angler count. Where possible, the creel agent attempted equal interview coverage of all sub-sections. When interview blocks took place after angler counts, the observed angler distribution informed the amount of time to be spent on interviews in each sub-section.

When approaching anglers, creel clerks made all attempts to limit disturbance of the fishing experience. The majority of interviews were taken from the shoreline or in angler parking lots. If the angler was on a guided trip and the guide was not fishing, then the guide was not interviewed; however, in some instances the guide provided the information for their clients. Where expedient, the creel clerk interviewed a group of anglers collectively, then denoted the responses onto separate datasheets on the completion of the interview.

In 2022, the following information was recorded for each interview:

- Unique ID: assigned by the creel clerk as the current date (mm/dd/yy) plus a sequential number. The sequential number is reset at the beginning of each survey day. For example, 040122-001 equates to the first interview on April 1<sup>st</sup>, 2022.
- Location of interview (ACCESS LOCATION AND SUB-SECTION)
- Time started fishing (IN THAT SUB-SECTION)
- Was the trip complete at the time of interview? (IN THAT SUB-SECTION) (Y/N)
- Break time (minutes)
- Target species
- Angling technique: i.e fly fishing, bait fishing, etc.
- Angler origin, determined by zip code
- Total number of trout harvested, by species (IN THAT SUB-SECTION)
  - With angler permission, all harvested trout were measured for total length (nearest mm) and scales were removed for aging
- Total number of released trout in by size ranges and species (IN THAT SUB-SECTION)
- Whether the angler fished in another sub-section that day show map (Y/N)
- Was a creel card issued (Y/N)

In 2022, a portion of anglers who were not finished fishing for the day were requested to fill out a creel card summarizing their total catch and harvest information in the sub-section where they were interviewed. The unique ID number assigned to each interview by the creel clerk was transposed to the creel card. The creel clerk provided brief instructions to the angler on how to document the remainder of a fishing trip in the sub-section; including the ending time, number of trout caught and either released or creeled, and all fish lengths. Along with the creel card, anglers received a printed listing of drop boxes and pencil, all placed into a Ziploc bag. Anglers were encouraged to return creel cards to the nearest drop-box. Creel cards were collected from the drop-boxes at the end of each survey week.

As was the case in previous creel surveys, some anglers moved fishing locations within the upper Esopus and were interviewed different sub-sections on the same day. In this case, the creel agent marked 'Y' in the 'Fished another sub-section that day' field on the datasheet and then, if the angler was willing, the creel clerk began a new completed trip interview for the previous effort. The creel clerk was not to solicit, or record recalled interviews from previous days or ask anglers to fill out a creel card for efforts in other sub-sections than the one where the interview took place.

**Angler opinion:** In 2021, the Upper Esopus Creek was assigned a 'Wild-Quality' designation under the New York State Trout Stream Management Plan. This marked a dramatic shift in the fishery by eliminating the annual stocking of 20,000-30,000 brown trout and encouraging wild production. Two additional questions (see Appendix D) offered an opportunity to assess angler preferences for their ideal trout fishery. Responses from 2022 will inform the development questions for the 2023 season, and results from both years serving as a baseline for comparison with future creel surveys. A copy of the interview datasheet and creel card are shown in Appendix D.

*Environmental Conditions:* The Upper Esopus and Schoharie watersheds are geologically predisposed to high fluctuations in temperature, flow, and turbidity. The Portal (Shandaken Tunnel Outlet) complicates these conditions further. Summer-time releases from the Portal are often necessary to provide the ample flow and cool temperatures needed to support trout populations downstream; however, they may also exacerbate unfavorable conditions during large storm events or when turbidity near the Schoharie Reservoir aqueduct intake is high. Thus, there can be dramatic differences in seasonal fishing conditions above and below the portal (Angyal 2017).

#### **Data Analysis**

In 2022, angler data was spatially summarized by the entire reach and by subsections and temporally summarized for the entirety of the survey period (April 1 – December 15) and by season. Seasons are defined as follows:

- Spring:
- Summer:
- Fall:
- Fall Catch and Release Season:

The stream sub-sections are defined as:

- 'Chimney Hole to Phoenicia': the 8-mile section from just below Chimney Hole (NYCDEP regulatory boundary between the Ashokan Reservoir and Esopus Creek) upstream to the Route 28 bridge in the hamlet of Phoenicia
- 'Phoenicia to the Portal: the 3.5-mile section from the Route 28 bridge in Phoenicia upstream to Shandaken Tunnel outlet (Portal) at Allaben
- 'Portal to Lost Clove': the 5.7-mile section from the Portal upstream to the Lost Clove Road bridge near Big Indian

**Angler Effort:** Daily pressure estimates (as hours) was calculated as the mean and variance of daily pressure counts (individual anglers) for each day surveyed (Angyal 2017; Lockwood 1999). Note, because each instantaneous count is multiplied by the number of daylight hours in

April – May June – August September – October 15 October 16 – December 15 a given day (see Equation 1), the pressure estimates are for daylight hours only. Weekend/holidays and weekdays were analyzed as separate strata to reduce the estimated variance. As with Angyal (2017), no adjustments were made to account for unobservable sections of the creek. These sections are generally not accessible to the public. All nomenclature in the calculations below are sourced from Lockwood (1999).

Estimated number of angler hours on day d from instantaneous count j:

$$E_{dj} = F_d A_{dj}$$
(1)  
 $F_d$  = number of fishable hours on day  $d$ , and

Where

 $A_{di}$  = anglers counted on day d on count j

Estimated fishing pressure on any given day d:

$$E_d = \frac{\sum_{j=1}^{n_d} E_{dj}}{n_d} \tag{2}$$

2

Where  $n_d$  = number of pressure counts on day d

Estimated variance of total angler-hours on day d:

$$V\widehat{ar(E_d)} = \frac{\sum_{j=1}^{n_d} E_{dj}^2 - \frac{\left(\sum_{j=1}^{n_d} E_{dj}\right)^2}{n_d}}{n_d(n_d - 1)}$$
(3)

Estimated angler-hours by day-type during a multiple day period p:

$$E_p = \frac{D_p}{m_p} \sum_{d=1}^{m_p} E_d \tag{4}$$

Where

 $D_p$  = number of days by day-type in period p,

 $m_p$  = number of sampled days of a given day-type in period p

Estimated variance of total angler-hours by day-type for period p:

$$Var(\widehat{E_{p})} = \frac{D_{p}^{2}}{m_{p}} \left(1 - \frac{m_{p}}{D_{p}}\right) \left(\frac{\sum_{d=1}^{m_{p}} E_{d}^{2} - \frac{\left(\sum_{d=1}^{m_{p}} E_{d}\right)^{2}}{m_{p}}}{(m_{p}-1)}\right) + \frac{D_{p}}{m_{p}} \sum_{d=1}^{m_{p}} Var(\widehat{E}_{d})$$
(5)

**Angler Catch Rates/Estimated Total Catch:** As the pattern of interviews was predicted to be similar those found by Angyal (2017), catch rates and estimated total catch were summarized using the "multiple day" estimator (Lockwood 1999). Mean catch rates by sub-section and time stratum were the average of all individual interview catch rates within those strata. Unless the angler indicated the fishing trip was over, all angler data collected streamside was considered 'incomplete' trip data. Data collected from anglers in parking areas post-fishing or data recalled by the angler for a separate sub-section fished earlier in the day, was considered 'complete' trip data. Any angler data collected on creel cards was combined with the incomplete trip data and treated as a 'completed' trip interview. To reduce any biases associated with short angling times, interviews representing trips lasting less than 0.5 hours were excluded from calculations (Pollack et al. 1997).

Estimated catch per angler-hour from incomplete trip interviews for period *p*:

 $c_{pi}$  = total catch by angler *i*,

$$\bar{R}_p = \frac{\sum_{i=1}^{k_p} \binom{c_{pi}}{h_{pi}}}{k_p} \tag{6}$$

Where

 $h_{pi}$  = total angler hours fished by angler *i*, and

 $k_p$  = total number of anglers interviewed in multiple day period p

Estimated variance of mean-of-ratios catch per angler-hour for incomplete trip interviews for period *p*:

$$\widehat{Var(\bar{R}_p)} = \frac{\sum_{i=1}^{k_p} {\binom{c_{pi}}{h_{pi}}}^2 - \frac{\left(\sum_{i=1}^{k_p} {\binom{c_{pi}}{h_{pi}}}\right)^2}{k_p}}{k_p(k_{p-1})}$$
(7)

Estimated catch per angler-hour for completed trips during period *p*:

$$\hat{R}_{p} = \frac{\sum_{i=1}^{k_{p}} c_{pi}}{\sum_{i=1}^{k_{p}} h_{pi}}$$
(8)

Where  $c_{pi}$  = total catch by angler *i*,  $h_{pi}$  = total angler hours fished by angler *i*, and  $k_p$  = total number of anglers interviewed in multiple day period *p* 

Estimated variance of catch per angler-hour from completed trips during period *p*:

$$\widehat{Var}(\widehat{R}_{p}) = \left[\frac{1}{\sqrt{k_{p}}(\overline{h_{p}})}\sqrt{\frac{\left[\sum_{i=1}^{k_{p}}c_{pi}^{2}-2\widehat{R}_{p}\left(\sum_{i=1}^{k_{p}}c_{pi}h_{pi}\right)+\widehat{R}_{p}^{2}\left(\sum_{i=1}^{k_{p}}h_{pi}^{2}\right)\right]}{k_{p}-1}}\right]^{2}$$
(9)

Total trout catch, by stratum:

$$\hat{C}_p = \hat{E}_p R_p \tag{10}$$

And the estimated variance will be calculated as

$$\widehat{Var}(\widehat{C})_p = R_p^2 \widehat{Var}(\widehat{E}_p) + \widehat{E}_p^2 \widehat{Var}(R_p) - \widehat{Var}(\widehat{E}_p) \widehat{Var}(R_p)$$
(11)

*Size and Species Distribution of Creel:* Species composition and size distributions were evaluated for the 2022 survey year and broken down in stratum-specific summaries of both observed and reported brown, brook, and rainbow trout. Species compositions were expressed as proportions, while size distributions of creeled and released fish were evaluated using size ranges provided on the interview forms.

#### Results

**Sampling effort:** One hundred and forty-six days were spent on the creek between April 1 and December 15, 2022. This resulted in 292 pressure count runs (2x per day) and 576 angler interviews. One goal of the randomized survey design was to ensure the creel captured the wide-ranging environmental conditions that anglers have historically encountered on the Upper Esopus. Figure 2 compares the creel survey days with four of the most important conditions for trout angling: Time of day, Flow, Water Temperature, and Turbidity. The latter three variables are all reported from the USGS Gage Station at Coldbrook Road (Coldbrook Gage). This gage was selected because it is the only gage situated below the Portal and best represents the subsection of creek that sustains the highest angling pressure in the current and historical creel surveys (Chimney Hole to Phoenicia). One caveat is that the probe is fixed in a shallow run and potentially not representative of conditions in the deeper runs and pools in this subsection.

Figure 2A shows the proportion of run counts in 2022 that began during 'dusk', 'dawn', and 'mid-day'. For this analysis 'dawn' represents three hours after sunrise, 'dusk' represents the three hours prior to sunset, and 'mid-day' is the remainder of the daylight hours. As shown, the 2022 time-of-day sampling patterns were relatively stable across all seasons, with roughly 50% of creel runs made during 'mid-day' hours and 25-30% during 'dawn' and 'dusk' hours.

Figure 2B shows the proportion of creel days at flow ranges derived from observations by the creel agent in 2022, who noted fishing conditions in the subsection from the Ashokan Reservoir to Phoenicia were generally best when flows were between 250 and 800 CFS (in green) and more difficult when outside that range. As shown in Figure 2B, flow conditions were similar by time series, with the creel missing one high flow day in the fall season. Optimal flow conditions were met on at least 50% of the possible days each season, with high flows impacting the spring and fall catch-and-release season and low flows impacting the summer and early fall.

An evaluation of the proportion of creel days sampled by water temperature is found in Figure 2C. The groupings reflect important temperatures for trout angling, with temperatures exceeding 70F thought to be stressful to trout populations and prolonged temperatures above 75F as potentially lethal to all trout species found in the Upper Esopus (see Table 1 of Wehrly et al 2007). As shown in Figure 2A, the two timeseries were nearly identical in 2022, with water temperatures on creel days representative of the water temperatures reported for the entirety of each season. Overall, temperatures were optimal for trout fishing in the spring and late fall; however, nearly half of the summertime water temperatures and nearly a quarter of the early fall temperatures were above 70F, with several summer days above 75F. As many of the 2022 anglers were catch and release fly anglers (see Angler Demographics section below), these high temperatures may have impacted angler effort, especially in the lower two subsections of creek that are best represented by the USGS Coldbrook Gage.

Figure 2D shows the proportion of creel days at low, moderate and high turbidity levels. For this analysis, turbidities below 10 NTU are 'low', turbidities from 10-25 NTU are 'moderate' and turbidities above 25 NTU are 'high'. As with flow and temperature, the turbidities experienced during creel days were representative of seasonal turbidities as a whole. Roughly 40% of creel days in the spring showed moderate turbidity, with a few of these days at high turbidity levels. The percentage of moderate to high turbidites increased to roughly 50% for summer and early fall creel days, and early fall also saw some periods of high turbidity. The fall catch and release season saw roughly 75% of days at low turbidity, which was the best among all the seasons.



Figure 2. Proportion of sample days by environmental variable and timeseries. (A) Time of day: 'Dawn' includes three hours after sunrise and 'Dusk' includes three hours before sunset. (B) USGS Coldbrook Gage flows in CFS: fishing is difficult below 250 CFS and above 800 CFS. (C) USGS Coldbrook Gage water temperatures in Fahrenheit: temperatures above 70 F are stressful for trout and magnified with angling stress. (D) USGS Coldbrook Gage turbidities (NTU): turbidities below 10 NTU are considered 'minimal', between 10-25 NTU are 'moderate' and above 25 NTU are 'turbid'.

**Angler Effort:** The 2022 seasonal pressure estimates by river section are found in Table 1 and compared with previous creel years in Figure 3. The spring months of 2022 had the highest amount of angling pressure, followed by summer months, the fall harvest season, and lastly the fall catch and release season. As in previous years, the 2022 angling effort was heaviest in the section from the reservoir to Phoenicia, followed by Phoenicia to the Portal, with the Portal to Lost Clove having the least amount of angling pressure. Unlike previous seasons, the decline in angling effort was much more gradual as the season progressed, especially in the two

downstream subsections. In prior years there was a steep drop-off in angling effort after August 31<sup>st</sup>, especially in 2011 when Tropical Storms Irene and Lee dramatically altered conditions in the Upper Esopus.

Season	Sut	Subsection of Esopus Creek									
3643011	Chimney Hole to Phoenicia	Phoenicia to the Portal	Portal to Lost Clove Rd								
Spring	5086 (3899 - 6274)	1050 (723 - 1378)	1388 (959 - 1817)	7524 (5581 - 9469)							
Summer	6331 (5051 - 7611)	1453 (1002 - 1904)	538 (285 - 791)	8322 (6338 - 10306)							
Fall	3957 (2674 - 5240)	1046 (665 - 1427)	276 (144 - 408)	5279 (3483 - 7075)							
Fall - CR	1327 (939 - 1715)	468 (253 - 683)	196 (97 - 295)	1991 (1289 - 2693)							
Total	16701 (12563 - 20840)	4017 (2643 - 5392)	2398 (1485 - 3311)	23116 (16691 - 29543)							

Table 1. Total estimated angler hours in 2022. The 95% CIs are in parentheses



Figure 3. Seasonal estimated angler hours (Ep). Spring represents April through May; Summer represents June through August; Fall represents September through October 15; and the Fall-CR represents days after the catch and release season opens (October 16).

Angler Catch Rates/Estimated Total Catch: Five hundred and seventy-six angler interviews were made in 2022. Figure 4 compares the seasonal proportions of interview types (incomplete vs complete trips) and catch rates from the 2022 creel with those from creel years 2010-2012. As in prior creel years, the 2022 interview types were roughly split in half, with minimal differences in catch rate values and patterns, especially early in the year. Any disparities in the later seasons are likely due to small sample sizes of anglers as well as changing conditions. Because these differences are relatively minimal, the catch data from these interview data types was combined to provide the best sample sizes for comparison.



Figure 4. Interview types by year and season. (A) Relative proportions by season. (B) Catch rate estimates by season, interview type, and year.

The estimated catch rates for 2022 are presented by season and subsection in Figure 5A, while annual catch rates by season are compared in Figure 5B. As indicated by the graph labels in Figure 5A, the majority of 2022 interviews took place in the subsection from Chimney Hole to

Phoenicia, followed by Phoenicia to the Portal, and very few interviews were made in the uppermost section (Portal to Lost Clove). Catch rates were highly variable by season and river section in 2022, with the highest variance in the later seasons and upper river sections. This high variance is likely due to both challenging river conditions and smaller sample sizes. As compared with Figure 5A, the trend in river-wide catch rates for 2022 (Figure 5B left) are heavily influenced by the high sample sizes in the lowest subsection. The 2022 river-wide estimates were low, but stable in the spring and summer, followed by higher, but variable catch rates in the fall seasons. As shown in Figure 5B, this pattern is quite different from previous seasons when catch rates were higher in the spring and summer and declined in the fall.





Estimates of total catch from combined complete and incomplete trips in 2022 are presented by season, river section, and disposition in Table 2 and compared with earlier creel surveys in Figure 6. Annual catch totals are the sums of the seasonal catch estimates by subsection rather than using the mean estimates across all subsections. This methodology increases the variance around annual catch rates, but best represents the obvious changes in seasonal efforts and catch rates across the subsections.

Saasan	Sub	section of Esopus Creek		Entire Reach		
3643011	Chimney Hole to Phoenicia	Phoenicia to the Portal	Portal to Lost Clove Rd			
Spring	2085 (1184 - 2986)	52 (1 - 148)	333 (95 - 571)	2471 (1281 - 3705)		
Summer	3292 (2032 - 4553)	1177 (494 - 1859)	548 (71 - 1026)	5017 (2597 - 7438)		
Fall	4273 (1452 - 7094)	701 (205 - 1196)	0 (0 - 0)	4974 (1657 - 8291)		
Fall - CR	1513 (469 - 2556)	379 (86 - 673)	65 (2 - 192)	1957 (557 - 3421)		
Total	11164 (5137 - 17190)	2309 (786 - 3876)	946 (168 - 1789)	14419 (6092 - 22855)		

Table 2. Total estimated catch of trout in 2022. The 95% CIs are in parentheses

\*Annual totals and CIs by subsection and season are summed by the seasonal catch estimates by subsection



Figure 6. Seasonal catch estimates (total trout caught) from all interview types combined. The annual estimates reported are sums of seasonal estimates by subsection.

In 2022, the catch estimates rose from roughly 3600 fish in the spring to around 5000 fish in each of the summer and fall, then declined by more than half by the fall catch and release season. This trend is very different compared to previous years, where most of the estimated catch (and effort) took place in the spring and summer (Figure 6). Despite the different seasonal

patterns and new management regime, the total annual catch estimate for 2022 is on the same magnitude as those from the 2010-2012 survey years.

**Catch composition from angler interviews:** Figure 7 shows the proportion of reported brown and rainbow trout catches by season and disposition for all recent creel years, while Figure 8 shows the proportion of annual catches of each species by size range and disposition. Though catches of brook trout were reported each creel year, rainbow trout and brown trout accounted for over 99.9% of each year's total catch. Thus, due to sample size constraints, brook trout are not further discussed.

Rainbow trout were the predominant trout species caught in 2022, making up over 75% of the catch reported from angler interviews. This is a stark change from the brown trout-dominated catches in prior creel years. However, as was the case in prior years, the ratio of rainbow trout catches increased as the 2022 season progressed and very few rainbow trout were creeled (harvested). The sizes of rainbows caught in 2022 were also similar to prior years, with nearly 80% of fish reported below 10 inches in length.



Figure 7. Proportion of reported catches and dispositions (released or creeled) of rainbow and brown trout from the angler interviews. Creeled fish were likely harvested. Brook trout made up less than 1% of annual catches and are not reported in this figure.

Only 104 brown trout were reported caught in 2022, and only 13 of those trout harvested. This is significantly fewer than the 2010-2012 creel years, which averaged roughly 1200 brown trout caught and over 330 brown trout harvested per year. The sizes of brown trout in 2022 also differed greatly from prior years. Roughly a third of brown trout in 2022 were below eight inches, a little over a third between eight and twelve inches, and the remainder 12 inches or greater. Brown trout catches in prior years were dominated by the eight to ten-inch sized fish, which is the typical size range of NYSDEC stocked brown trout.

![](_page_16_Figure_1.jpeg)

Figure 8. Proportion of reported catches of rainbow trout and brown trout by length bin and disposition. Brook trout made up less than 1% of annual catches and are not reported.

**Angler demographics:** In addition to catch information, the 2022 angler interviews also sought input on angling techniques and angler origin. For ease of comparison, the angling techniques reported in interviews from 2022 and 2010-2012 were split into four categories: Artificial Lure, Bait, Fly, and Mixed (any combination of the others). As shown in Figure 9, the number of

interviews in 2022 were half of what were completed in 2011 and 2012 and a third of those collected in 2010. The most glaring difference among years is the lack of 'artificial lure' and 'bait' fishermen in 2022, which made up over half of the interviewees in prior seasons. The number of fly anglers was roughly the same in 2011, 2012, and 2022, further demonstrating a major shift has occurred from a relatively mixed trout fishery to one dominated by fly anglers.

![](_page_17_Figure_1.jpeg)

Figure 9. Total annual interviews by angling technique.

Anglers interviewed in 2011, 2012, and 2022 were asked to provide their ZIP codes to get an estimate of the distance anglers traveled to fish the Upper Esopus. In 2022, anglers from 21 different states were interviewed, with the great majority (95%) coming from Northeastern states. Outside of the northeast, two anglers traveled from the Midwest, eleven from the Southeast, three from the Southwest, and eight from Western states. This pattern was similar to those reported for 2011 and 2012 anglers, with 97% and 98% anglers traveling from Northeastern anglers into percentages by state, region (if applicable) and creel year. Rankings of the percent contributions for 2022 were identical to those reported for 2011 and 2012, defining two major regions of origin for Upper Esopus anglers: The Hudson Valley and the New York City Metropolitan Area.

State - Region	2011	2012	2022
NY - Hudson Valley	57.4 %	67.3 %	55.2 %
Metro NYC - NY & NJ	25.1 %	18.3 %	24.4 %
NY - Upstate	6.4 %	3.3 %	6.8 %
NJ - Other	4.5 %	4.3 %	4.8 %
NY - Long Island	1.9 %	3.2 %	3.5 %
Connecticut	1.4 %	1.7 %	1.3 %
Pennsylvania	1.4 %	1.2 %	1.5 %
Massachussetts	1.2 %	0.5 %	1.5 %
Vermont	0.2 %		0.7 %
Rhode Island	0.3 %		0.4 %
Maine	0.1 %		

Table 3. P	Percent origin	of Northeastern	state anglers
------------	----------------	-----------------	---------------

During each creel season a portion of interviewed anglers made multiple trips to the Upper Esopus. Figure 10 compares the proportion of first-time versus repeat interviews by season and creel year. There is a clear pattern of more repeat interviews as the season progressed each creel year. However, the 2022 creel year differs slightly from the others, with higher proportions of first-time interviews each season. This is especially evident in the fall, where generally half of the anglers interviewed in 2010-2012 had been interviewed earlier in the year.

![](_page_18_Figure_1.jpeg)

Figure 10. Proportion of first-time vs repeat interviews by season and year.

**Angler opinions:** During the 2022 creel survey, anglers were asked two questions regarding their ideal trout fishing experience. The first question was a multi-part question where anglers were asked to rank the importance of four different characteristics of a trout fishery to an overall satisfactory fishing experience, while the second question asked anglers to report on which of the four characteristics discussed in the prior question was most important for a satisfactory fishing experience. These questions were new to 2022, so cannot be compared with previous creel surveys, rather they will help managers define the demographics of trout anglers that currently fish the Upper Esopus.

The responses to the multi-part opinion question are shown in Figure 11. The first characteristic shown is the importance of catching 'wild trout'. Just over 80% of anglers responded that catching 'wild trout' was either important or very important to their fishing experience. This characteristic received the highest proportion of 'very important' responses of the four characteristics. The second question relates to the size of trout caught. Over 65% of anglers agreed that commonly catching trout over 12 inches was important to their fishing trip. The third characteristic was the importance of catching many trout regardless of size. Responses for this characteristic were mixed, with roughly 45% of anglers reporting this was important to them. The final characteristic shown is the importance of harvesting the trout caught on a fishing trip. Just under 15% of anglers reported harvest as an important part of their fishing experience, with an overwhelming majority of anglers reporting this as 'not important'.

![](_page_19_Figure_1.jpeg)

Figure 11. Responses to the first angler opinion question, which asked anglers to rank the importance of four common characteristics of a trout fishery.

The follow-up to the multi-part question was to report which of the four was most important to a satisfactory trip. Responses followed a similar pattern as shown for the multi-part question, with 55% of anglers reporting 'catching wild trout' was most important, followed by 'commonly catching trout over 12 inches' at 23%, 'catching many trout regardless of size' at 15%, 'harvesting trout' at 5%, and 2% of anglers interviewed did not respond to this final question.

*Environmental conditions:* Stream flows, summertime water temperatures, and periods of high turbidity have all historically played a significant role in trout angling in the Upper Esopus. As shown in Figure 2D, turbidity was relatively stable across all seasons in 2022; however, stream flow and temperatures potentially impacted angling during summer of 2022. To further analyze these conditions, daily mean flow and water temperatures were downloaded from the respective USGS stream gage sites and compared with several thresholds defined for optimum trout angling.

Figure 12 shows the contribution of mean daily flows measured at the Coldbrook Gage in comparison with two important flow thresholds. The lower threshold of 250 CFS is the defined minimum flow target for the NYC DEP release protocols for the Shandaken Tunnel Outlet (Portal), developed in collaboration with the NYSDEC Division of Water and Bureau of Fisheries. Flows below 250 CFS are potentially harmful to the stream communities below the Portal, especially in the summer when shallow water and exposed rocks can be quickly warmed through solar irradiation. The higher flow threshold is based on field observations from the creel agent in 2022, who observed flows above 800 CFS would be difficult to fish and more importantly, increasingly dangerous for wading anglers.

![](_page_20_Figure_2.jpeg)

Figure 12. Contributions to the mean daily discharges reported for the USGS Coldbrook Gage. The 'Tributaries below the Portal' values were calculated by subtracting the sum of the daily discharges reported for the Portal and Allaben gages from the daily discharge measurements of the Coldbrook Gage.

As shown in Figure 12, the spring and early fall months of 2022 had the most days between the two flow thresholds. Most peak flows above 800 CFS throughout the season were associated with extreme weather events, as reflected by the associated spikes at 'Allaben' and 'Tributaries below the Portal' portions of the graph. However, there were two peaks in the late spring and early summer that were solely driven by Portal releases. The first was a mandatory testing of newly installed gates at the intake chamber of the Portal in Schoharie Reservoir, while the second was a planned, weekend recreational release for white water recreationists as defined in the NYC DEP's Release Protocol. Both releases were well above 800 CFS. This plot also demonstrates how instrumental the Portal releases were in keeping flows above the 250 CFS threshold during the drought-stricken summer months of 2022.

![](_page_21_Figure_1.jpeg)

![](_page_21_Figure_2.jpeg)

There are two publicly available data sources for water temperatures in the Upper Esopus: the USGS Coldbrook Gage and the USGS Gage at the Portal. The Coldbrook Gage is located at the most downstream end of the managed reach and must be considered the maximum potential temperatures experienced for the reach. The Portal temperatures are generally colder, drawn from low elevations in the Schoharie Reservoir for most of the year. However, through a combination of the shallowness of the reservoir, winter snowpack levels, and Portal release schedules, this cold-water reserve may be depleted as the summer progresses. There are currently no publicly accessible water temperature gages in the Esopus Creek above the Portal. As with stream flow, the daily water temperature measurements reported by the USGS

Coldbrook Gage are strongly influenced by the temperatures of the Esopus Creek above the Portal, the temperatures from Portal releases, and water temperatures from the major tributaries that enter the Esopus below the Portal. In addition to these surface water inputs; an unknown number of groundwater seeps likely add crucial cold water to the creek during summer months.

As discussed in the 'Sampling effort' section, temperatures above 70F are stressful to trout populations, and can be harmful when adding angling-related stress. Fortunately, the water temperatures reported for the USGS Coldbrook Gage during the spring and fall of 2022 were below the thermal threshold of 70F and optimum for trout angling. However, as shown in Figure 13, mean water temperatures at the USGS Coldbrook Gage exceeded 70F by mid-July despite the cold-water releases from the Portal. By August 1<sup>st</sup>, the cold-water reserve in the Schoharie Reservoir was depleted, Portal temperatures exceeded 70F, and mean temperatures at Coldbrook leveled off around 73F until the first week of September. It is currently unknown how this prolonged period of excessive temperatures impacted the trout population, angling pressure estimates, and catch/harvest estimates in the reach.

#### **Recommendations for 2023 Creel Survey**

One concern for creel estimates lies in the confidence that the sampling days chosen will be representative of the entire season. In river systems, it is especially important that sample days capture any stream conditions that may heavily impact fishing conditions. Figure 2 demonstrates that at least at the seasonal level, the 2022 creel survey days successfully reflected the prevailing ranges of flows, turbidities, and water temperatures that were reported for the creek. Therefore, from the standpoint of capturing environmental variability in creel estimates, the current sampling protocols should be continued in 2023.

Though annual pressure estimates were similar to those from the 2010-12 surveys, the seasonal patterns differed slightly in 2022 (Figure 3). In prior years, angling effort peaked in the summer and dropped off sharply into fall months. In 2022, effort still peaked in the summer, but gradually declined as the fall months progressed. One of the big concerns in 2022 was how the low flow conditions and high water temperatures in the summer months impacted the trout population and angling effort as a whole. Keeping the same pressure count methodology in 2023 will allow further evaluation on the impacts of seasonal changes in environmental conditions on the angler use of the creek.

As with pressure estimates, the annual catch rate and total catch estimates in 2022 were similar to those reported for 2010-12, but also had completely differing seasonal patterns to meet those annual values (Figures 5 & 6). The 2010-12 estimates generally peaked in the spring and early summer, which coincided with stocking efforts on the creek. Conversely, the 2022 estimated catches remained relatively stable throughout the year, with catch rates highest in the fall months. This major shift is likely a result of the change in management of the creek (no more stocking), and a second year of evaluation will be important to better define the current seasonal catch patterns.

The reported catch composition in 2022 is dramatically different than those reported for the 2010-12 creel surveys. As shown in Figure 7, the fishery has shifted from a mostly brown trout fishery with moderate harvest, especially in early seasons, to a nearly exclusive year-round rainbow trout fishery with minimal harvest reported. This change was expected when factoring in that the majority of the brown trout caught and harvested in the 2010-12 creel years were in the size range of the spring-stocked brown trout (Figure 8). Removing that size range of brown trout from the analysis would result in a similar pattern as shown for 2022. A secondary result of the elimination of stocking 20,000-30,000 yearling brown trout is the removal of competition for food for wild fish. Though minimal changes in brown or rainbow trout size proportions was found in 2022, species and size compositions should continue to be evaluated in all future creel surveys.

Another dramatic result of the 2022 creel survey was the change in angler demographics. From 2010-12, there was a relatively even split in the number of interviews of fly anglers versus artificial lure/bait anglers (Figure 9). Despite coming from roughly the same two metropolitan areas in 2022 (Table 3), the anglers interviewed in 2022 were almost exclusively fly anglers. As shown in Figure 9, the number of fly anglers interviewed in 2022 was similar to those reported in prior years; therefore, it is not necessarily that more fly anglers visited the creek in 2022, it is more likely that the change in management regime has led to fewer non-fly anglers entering the fishery. This metric should continue to be tracked in future creel surveys to better evaluate outreach efforts to both angling communities.

Another slight change in anglers interviewed in 2022 versus prior years was the number of repeat anglers as the seasons progressed (Figure 10). In 2010-12, the number of repeat interviews increased by season and by the fall months the ratio was roughly 50/50 new interviews to repeat interviews. In 2022, the pattern of higher repeat interviews by season was observed; however, there were roughly 5-10% fewer repeat interviews each season than in prior years. The two scenarios that might produce this result are (1) new anglers were consistently recruited to the fishery during each season or (2) anglers were less likely to return after their initial trip to the creek. Recruitment related questioning in 2023, such as "Why did you decide to fish the Esopus today?", "How often do you fish the Esopus (times per week/month/first time)?", or "Are you planning a return trip?" will provide a better snapshot of angler recruitment within the fishery and facilitate better avenues for outreach. As another measure of interannual recruitment, 2023 anglers will also be asked if they had been interviewed in 2022.

The angler opinion questions also indicate a certain demographic of angler is now recruited to the Upper Esopus fishery. Overwhelmingly, the ideal fishing experience for the anglers interviewed in 2022 was a catch and release fishery on 'wild' trout. The Upper Esopus certainly matches that description at the moment. Regarding size versus quantity, the majority of anglers interviewed in 2022 preferred a trip where they caught a few large trout rather than one where they caught many small trout. As it is likely the Upper Esopus fishery will remain dominated by small rainbow trout under the current management plan, the size versus quantity question should be further investigated. Asking anglers to be more specific on the 'species targeted' during the demographic portion of the interview may provide additional data on expected catch. As would questions such as "Why did you decide to fish the Esopus today?" or "What are/were you expecting to catch today?" during the opinion portion of the survey. These questions will be critical for both outreach on the current fishery and help guide future management decisions.

Throughout the season and in a post-season write-up, the creel agent provided valuable information relating to the effectiveness of the creel survey to match on-the-ground observations as well as areas for improvement for the 2023 season. Regarding the extreme environmental conditions, the creel agent noted very few anglers were observed or interviewed on the creek during periods of high flows and associated high turbidities. This was especially the case when flows at Coldbrook exceeded 1200 CFS. In 2023, this gage will be monitored regularly and any scheduled creel days with flows greater than 1200 CFS will be skipped and marked as zero pressure days in the database.

The creel agent also noted very few anglers were present during the summertime periods of low flow and high water temperatures. Instead, many of the vehicles parked at the access sites seemed to be from other recreationists, such as swimmers or tubers, especially on weekends. In 2023, it is recommended the creel agent count both anglers and non-anglers at each NYSDEC access site to better track seasonal use. In addition, on warm, summer days when angling pressure is minimal, the creel agent may use the downtime to measure water temperatures at key locations throughout the managed reach to compare with those recorded at the Coldbrook gage. To better evaluate summertime thermal refugia, thermographs may also be placed in strategic locations in 2023, such as deep pools and tributary confluences.

Weather and time of day were also observed to be important for both angling pressure and angling success. The creel agent noticed light rain events seemed to produce more anglers, as did the low light times of dawn and dusk. This extra effort could be associated with seasonal aquatic macroinvertebrate hatches. To better evaluate these observations, the prevailing weather should be included in both the run count and interview datasheets. In addition, the creel agent will mark any observed hatches on the pressure count and/or interview datasheets.

The creel agent also noted differences in angling success due to fishing technique, angling experience, and guided trips. Regarding fishing technique, the fly anglers should be further broken up into two categories: general fly anglers and euro nymphers. In 2022, the latter seemed to be the most successful throughout the year. As far as experience, adding 'birth year' and potentially 'years of fishing experience' to the demographic portion of the interview could be noteworthy. Finally, many of the interviews in 2022 came on guided trips but this was not noted on the interview sheets. Documenting solo, group, and guided trips in 2023 could provide a better snapshot of angling patterns. In addition, the guides were generally very helpful in assisting with interviews and great resources regarding the current fishing conditions on the creek. A digital diary for the guide services could provide managers with invaluable information, especially relating to prevailing conditions and aquatic invertebrate hatches throughout the season. The 2023 season would be a good opportunity to try a pilot program as the diary results could be directly compared with the full creel data.

Finally, the creel agent noted the use of specific words to rank the opinion questions (i.e. "very important", "important", "not important", etc) seemed to be confusing to anglers and thus difficult to relate. It is possible this may have resulted in flawed or incomplete results. Numbered ranks should be considered for future questions relating preferences.

#### **Literature Cited**

- Alexiades, A., Marcy-Quay, B., Sullivan, P., & Kraft, C. (2014). *Evaluation of the NYSDEC catch rate oriented trout stocking program: Project Report.* Ithaca: Cornell University.
- Angyal, R. (2017). *Esopus Creek Creel Survey and Electrofishing Survey 2010-13: FinalReport.* New York State Department of Environmental Conservation, Federal Aid in Sporstfish Restoration, F-63-R-1, Study 3, Job 3-2, New Paltz, NY, USA. 68p.
- Capossela, J.P. (1989). Chapter 2: Legendary Rivers of the Charmed Circle in *Good Fishing in the Catskills*. Stackpole Books and Northeast Sportsman's Press. Harrisburg, PA, USA. pp 25-34.
- Hoenig, J., Jones, C., Pollock, D., Robson, D., & Wade, D. (1997). *Calculation of catch rate and total catch in roving surveys of anglers*. Biometrics 53, pp 306-317.
- Lockwood, R., Benjamin, D., & Bence, J. (1999). *Estimating angling effort and catch from Michigan roving and access site angler survey data.* State of Michigan Department of Natural Resources Fisheries Division Research Report No. 2044.
- McCormick, J., & Meyer, K. (2017). Sample Size Estimation for On-Site Creel Surveys. North American Journal of Fisheries Management, 37: 970-980.
- NYSDEC. (2020). *New York State Trout Stream Management Plan.* Albany: New York State Department of Environmental Conservation.
- Pollock, K., Jones, C., & Brown, T. (1994). *Angler Survey Methods and Their Applications in Fisheries Management.* Bethesda: American Fisheries Society.
- Pollock, K., Hoenig, J. Jones, C., Robson, D., & Greene, C. (1997). *Catch Rate Estimation for Roving and Access Point Surveys.* North American Journal of Fisheries Management, 17: 11-19.
- Responsive Management. (2019). *New York Angler Effort and Expenditures in 2017: Report 1 of 4*. Conducted for the New York State Department of Environmental Conservation, Division of Fish and Wildlife. Harrisonburg, VA, USA. 189 p.
- Robson, D., & Jones, C. (1989). *The theoretical basis of an access site angler survey design*. Biometrics, 45:83-98.
- Van Put, E. (2007). Trout Fishing in the Catskills. Skyhorse Publishing, New York, NY.
- Wehrly, K., Want, L., & Mitro, M. (2007). *Field-Based Estimates of Thermal Tolerance Limits for Trout: Incorporating Exposure Time and Temperature Fluctuation*. Transactions of the American Fisheries Society, 136: 365-374.

#### Appendix A. 'Bus routes' for the angler census

![](_page_26_Picture_1.jpeg)

Figure 1. 'Bus route' for the sub-section from Chimney Hole to the Rt 28 Bridge in Phoenicia

![](_page_27_Figure_0.jpeg)

Figure 2. 'Bus route' for the sub-section from the Rt 28 Bridge in Phoenicia to the Portal

![](_page_28_Figure_0.jpeg)

Figure 3. 'Bus route' for the sub-section from the Portal to Lost Clove Road Bridge

## Appendix B. Creel schedule

Mook	Data	Dav	Leave	Start on	Count start	Interview	Due count 1	Interview	Dup count 3	Interview	Leave	Back to
week	Date	Day	office	creek	locale	period 1	Kun Count 1	period 2	Kun Count 2	period 3	creek	office
1	3/3/2022	Thursday										
1	3/4/2022	Friday	5:30	6:30	Lost Clove		06:30 - 08:00	08:05 - 10:25	10:30 - 12:00	12:05 - 14:30	14:30	15:30
1	3/5/2022	Saturday	9:15	10:15	Chimney Hole		10:15 - 11:45	11:50 - 14:10	14:15 - 15:45	15:50 - 18:15	18:15	19:15
1	3/6/2022	Sunday	5:15	6:15	Lost Clove	06:15 - 07:25	07:30 - 09:00	09:05 - 11:25	11:30 - 13:00	13:05 - 14:15	14:15	15:15
1	3/7/2022	Monday										
1	3/8/2022	Tuesday	9:30	10:30	Chimney Hole	10:30 - 11:25	11:30 - 13:00	13:05 - 15:25	15:30 - 17:00	17:05 - 18:30	18:30	19:30
1	3/9/2022	Wednesday										
2	3/10/2022	Thursday	9:30	10:30	Lost Clove	10:30 - 12:25	12:30 - 14:00	14:05 - 16:25	16:30 - 18:00	18:05 - 18:30	18:30	19:30
2	3/11/2022	Friday										
2	3/12/2022	Saturday	5:15	6:15	Chimney Hole	06:15 - 08:40	08:45 - 10:15	10:20 - 12:40	12:45 - 14:15		14:15	15:15
2	3/13/2022	Sunday	10:30	11:30	Lost Clove		11:30 - 13:00	13:05 - 15:25	15:30 - 17:00	17:05 - 19:30	19:30	20:30
2	3/14/2022	Monday										
2	3/15/2022	Tuesday										
2	3/16/2022	Wednesday	6:00	7:00	Chimney Hole		07:00 - 08:30	08:35 - 10:55	11:00 - 12:30	12:35 - 15:00	15:00	16:00
3	3/17/2022	Thursday										
3	3/18/2022	Friday	6:00	7:00	Chimney Hole	07:00 - 08:10	08:15 - 09:45	09:50 - 12:10	12:15 - 13:45	13:50 - 15:00	15:00	16:00
3	3/19/2022	Saturday	10:30	11:30	Lost Clove	11:30 - 12:25	12:30 - 14:00	14:05 - 16:25	16:30 - 18:00	18:05 - 19:30	19:30	20:30
3	3/20/2022	Sunday	6:00	7:00	Chimney Hole	07:00 - 09:25	09:30 - 11:00	11:05 - 13:25	13:30 - 15:00		15:00	16:00
3	3/21/2022	Monday	10:45	11:45	Lost Clove	11:45 - 13:40	13:45 - 15:15	15:20 - 17:40	17:45 - 19:15	19:20 - 19:45	19:45	20:45
3	3/22/2022	Tuesday										
3	3/23/2022	Wednesday										
4	3/24/2022	Thursday										
4	3/25/2022	Friday										
4	3/26/2022	Saturday	5:45	6:45	Chimney Hole		06:45 - 08:15	08:20 - 10:40	10:45 - 12:15	12:20 - 14:45	14:45	15:45
4	3/27/2022	Sunday	10:45	11:45	Lost Clove		11:45 - 13:15	13:20 - 15:40	15:45 - 17:15	17:20 - 19:45	19:45	20:45
4	3/28/2022	Monday	5:45	6:45	Chimney Hole	06:45 - 07:55	08:00 - 09:30	09:35 - 11:55	12:00 - 13:30	13:35 - 14:45	14:45	15:45
4	3/29/2022	Tuesday										
4	3/30/2022	Wednesday	10:45	11:45	Down	11:45 - 12:40	12:45 - 14:15	14:20 - 16:40	16:45 - 18:15	18:20 - 19:45	19:45	20:45
5	3/31/2022	Thursday	10:45	11:45	Chimney Hole	11:45 - 13:40	13:45 - 15:15	15:20 - 17:40	17:45 - 19:15	19:20 - 19:45	19:45	20:45
5	4/1/2022	Friday	5:45	6:45	Lost Clove	06:45 - 09:10	09:15 - 10:45	10:50 - 13:10	13:15 - 14:45		14:45	15:45
5	4/2/2022	Saturday	10:45	11:45	Chimney Hole		11:45 - 13:15	13:20 - 15:40	15:45 - 17:15	17:20 - 19:45	19:45	20:45
5	4/3/2022	Sunday	5:30	6:30	Lost Clove		06:30 - 08:00	08:05 - 10:25	10:30 - 12:00	12:05 - 14:30	14:30	15:30
5	4/4/2022	Monday										
5	4/5/2022	Tuesday										
5	4/6/2022	Wednesday										
6	4/7/2022	Thursday	11:00	12:00	Lost Clove	12:00 - 12:55	13:00 - 14:30	14:35 - 16:55	17:00 - 18:30	18:35 - 20:00	20:00	21:00
6	4/8/2022	Friday										
6	4/9/2022	Saturday	5:30	6:30	Chimney Hole	06:30 - 07:40	07:45 - 09:15	09:20 - 11:40	11:45 - 13:15	13:20 - 14:30	14:30	15:30
6	4/10/2022	Sunday	11:00	12:00	Lost Clove	12:00 - 13:55	14:00 - 15:30	15:35 - 17:55	18:00 - 19:30	19:35 - 20:00	20:00	21:00
6	4/11/2022	Monday	5:15	6:15	Chimney Hole	06:15 - 08:40	08:45 - 10:15	10:20 - 12:40	12:45 - 14:15		14:15	15:15
6	4/12/2022	Tuesday										
6	4/13/2022	Wednesday										

4

Mook	Data	Dav	Leave	Start on	Count start	Interview	Pup count 1	Interview	Pup count 3	Interview	Leave	Back to
week	Date	Day	office	creek	locale	period 1	Kun count 1	period 2	Kun count 2	period 3	creek	office
7	4/14/2022	Thursday										
7	4/15/2022	Friday	5:15	6:15	Chimney Hole		06:15 - 07:45	07:50 - 10:10	10:15 - 11:45	11:50 - 14:15	14:15	15:15
7	4/16/2022	Saturday	11:15	12:15	Lost Clove		12:15 - 13:45	13:50 - 16:10	16:15 - 17:45	17:50 - 20:15	20:15	21:15
7	4/17/2022	Sunday	5:15	6:15	Chimney Hole	06:15 - 07:25	07:30 - 09:00	09:05 - 11:25	11:30 - 13:00	13:05 - 14:15	14:15	15:15
7	4/18/2022	Monday	11:15	12:15	Lost Clove	12:15 - 13:10	13:15 - 14:45	14:50 - 17:10	17:15 - 18:45	18:50 - 20:15	20:15	21:15
7	4/19/2022	Tuesday										
7	4/20/2022	Wednesday										
8	4/21/2022	Thursday	5:00	6:00	Lost Clove	06:00 - 08:25	08:30 - 10:00	10:05 - 12:25	12:30 - 14:00		14:00	15:00
8	4/22/2022	Friday	11:15	12:15	Chimney Hole	12:15 - 14:10	14:15 - 15:45	15:50 - 18:10	18:15 - 19:45	19:50 - 20:15	20:15	21:15
8	4/23/2022	Saturday	5:00	6:00	Lost Clove		06:00 - 07:30	07:35 - 09:55	10:00 - 11:30	11:35 - 14:00	14:00	15:00
8	4/24/2022	Sunday	11:15	12:15	Chimney Hole		12:15 - 13:45	13:50 - 16:10	16:15 - 17:45	17:50 - 20:15	20:15	21:15
8	4/25/2022	Monday										
8	4/26/2022	Tuesday										
8	4/27/2022	Wednesday										
9	4/28/2022	Thursday	5:00	6:00	Lost Clove	06:00 - 07:10	07:15 - 08:45	08:50 - 11:10	11:15 - 12:45	12:50 - 14:00	14:00	15:00
9	4/29/2022	Friday										
9	4/30/2022	Saturday	11:30	12:30	Chimney Hole	12:30 - 13:25	13:30 - 15:00	15:05 - 17:25	17:30 - 19:00	19:05 - 20:30	20:30	21:30
9	5/1/2022	Sunday	4:45	5:45	Lost Clove	05:45 - 08:10	08:15 - 09:45	09:50 - 12:10	12:15 - 13:45		13:45	14:45
9	5/2/2022	Monday	11:30	12:30	Chimney Hole	12:30 - 14:25	14:30 - 16:00	16:05 - 18:25	18:30 - 20:00	20:05 - 20:30	20:30	21:30
9	5/3/2022	Tuesday										
9	5/4/2022	Wednesday										
10	5/5/2022	Thursday	4:45	5:45	Chimney Hole		05:45 - 07:15	07:20 - 09:40	09:45 - 11:15	11:20 - 13:45	13:45	14:45
10	5/6/2022	Friday	11:30	12:30	Lost Clove		12:30 - 14:00	14:05 - 16:25	16:30 - 18:00	18:05 - 20:30	20:30	21:30
10	5/7/2022	Saturday	4:45	5:45	Chimney Hole	05:45 - 06:55	07:00 - 08:30	08:35 - 10:55	11:00 - 12:30	12:35 - 13:45	13:45	14:45
10	5/8/2022	Sunday	11:30	12:30	Lost Clove	12:30 - 13:25	13:30 - 15:00	15:05 - 17:25	17:30 - 19:00	19:05 - 20:30	20:30	21:30
10	5/9/2022	Monday										
10	5/10/2022	Tuesday										
10	5/11/2022	Wednesday										
11	5/12/2022	Thursday	11:30	12:30	Lost Clove	12:30 - 14:25	14:30 - 16:00	16:05 - 18:25	18:30 - 20:00	20:05 - 20:30	20:30	21:30
11	5/13/2022	Friday										
11	5/14/2022	Saturday	4:30	5:30	Chimney Hole	05:30 - 07:55	08:00 - 09:30	09:35 - 11:55	12:00 - 13:30		13:30	14:30
11	5/15/2022	Sunday	11:45	12:45	Lost Clove		12:45 - 14:15	14:20 - 16:40	16:45 - 18:15	18:20 - 20:45	20:45	21:45
11	5/16/2022	Monday	4:30	5:30	Chimney Hole		05:30 - 07:00	07:05 - 09:25	09:30 - 11:00	11:05 - 13:30	13:30	14:30
11	5/17/2022	Tuesday										
11	5/18/2022	Wednesday										
12	5/19/2022	Thursday										
12	5/20/2022	Friday	11:45	12:45	Chimney Hole	12:45 - 13:40	13:45 - 15:15	15:20 - 17:40	17:45 - 19:15	19:20 - 20:45	20:45	21:45
12	5/21/2022	Saturday	4:30	5:30	Lost Clove	05:30 - 06:40	06:45 - 08:15	08:20 - 10:40	10:45 - 12:15	12:20 - 13:30	13:30	14:30
12	5/22/2022	Sunday	11:45	12:45	Chimney Hole	12:45 - 14:40	14:45 - 16:15	16:20 - 18:40	18:45 - 20:15	20:20 - 20:45	20:45	21:45
12	5/23/2022	Monday										
12	5/24/2022	Tuesday										
12	5/25/2022	Wednesday	4:30	5:30	Lost Clove	05:30 - 07:55	08:00 - 09:30	09:35 - 11:55	12:00 - 13:30		13:30	14:30

Manle.	Data	Dest	Leave	Start on	Count start	Interview	Due sout 1	Interview	Dum anumt 3	Interview	Leave	Back to
week	Date	Day	office	creek	locale	period 1	Kun count 1	period 2	Run count 2	period 3	creek	office
13	5/26/2022	Thursday	11:45	12:45	Lost Clove		12:45 - 14:15	14:20 - 16:40	16:45 - 18:15	18:20 - 20:45	20:45	21:45
13	5/27/2022	Friday										
13	5/28/2022	Saturday	4:30	5:30	Chimney Hole		05:30 - 07:00	07:05 - 09:25	09:30 - 11:00	11:05 - 13:30	13:30	14:30
13	5/29/2022	Sunday	11:45	12:45	Lost Clove	12:45 - 13:40	13:45 - 15:15	15:20 - 17:40	17:45 - 19:15	19:20 - 20:45	20:45	21:45
13	5/30/2022	Monday	4:30	5:30	Chimney Hole	05:30 - 06:40	06:45 - 08:15	08:20 - 10:40	10:45 - 12:15	12:20 - 13:30	13:30	14:30
13	5/31/2022	Tuesday										
13	6/1/2022	Wednesday										
14	6/2/2022	Thursday										
14	6/3/2022	Friday										
14	6/4/2022	Saturday	4:15	5:15	Lost Clove	05:15 - 07:40	07:45 - 09:15	09:20 - 11:40	11:45 - 13:15		13:15	14:15
14	6/5/2022	Sunday	12:00	13:00	Chimney Hole	13:00 - 14:55	15:00 - 16:30	16:35 - 18:55	19:00 - 20:30	20:35 - 21:00	21:00	22:00
14	6/6/2022	Monday	4:15	5:15	Lost Clove		05:15 - 06:45	06:50 - 09:10	09:15 - 10:45	10:50 - 13:15	13:15	14:15
14	6/7/2022	, Tuesdav	12:00	13:00	Chimney Hole		13:00 - 14:30	14:35 - 16:55	17:00 - 18:30	18:35 - 21:00	21:00	22:00
14	6/8/2022	, Wednesday			,							
15	6/9/2022	, Thursday										
15	6/10/2022	Friday										
15	6/11/2022	Saturday	12:00	13:00	Chimney Hole	13:00 - 13:55	14:00 - 15:30	15:35 - 17:55	18:00 - 19:30	19:35 - 21:00	21:00	22:00
15	6/12/2022	Sunday	4:15	5:15	Lost Clove	05:15 - 06:25	06:30 - 08:00	08:05 - 10:25	10:30 - 12:00	12:05 - 13:15	13:15	14:15
15	6/13/2022	Monday	12:00	13:00	Chimnev Hole	13:00 - 14:55	15:00 - 16:30	16:35 - 18:55	19:00 - 20:30	20:35 - 21:00	21:00	22:00
15	6/14/2022	, Tuesday			,							
15	6/15/2022	Wednesday	4:15	5:15	Lost Clove	05:15 - 07:40	07:45 - 09:15	09:20 - 11:40	11:45 - 13:15		13:15	14:15
16	6/16/2022	Thursday	12:00	13:00	Lost Clove		13:00 - 14:30	14:35 - 16:55	17:00 - 18:30	18:35 - 21:00	21:00	22:00
16	6/17/2022	, Fridav										
16	6/18/2022	Saturday	4:15	5:15	Chimney Hole		05:15 - 06:45	06:50 - 09:10	09:15 - 10:45	10:50 - 13:15	13:15	14:15
16	6/19/2022	Sunday	12:00	13:00	Lost Clove	13:00 - 13:55	14:00 - 15:30	15:35 - 17:55	18:00 - 19:30	19:35 - 21:00	21:00	22:00
16	6/20/2022	Monday	4:15	5:15	Chimney Hole	05:15 - 06:25	06:30 - 08:00	08:05 - 10:25	10:30 - 12:00	12:05 - 13:15	13:15	14:15
16	6/21/2022	Tuesday		0120								
16	6/22/2022	Wednesday										
17	6/23/2022	Thursday										
17	6/24/2022	Friday	4:15	5:15	Chimney Hole	05:15 - 07:40	07:45 - 09:15	09:20 - 11:40	11:45 - 13:15		13:15	14:15
17	6/25/2022	Saturday	12:00	13.00	Lost Clove	13.00 - 14.55	15:00 - 16:30	16:35 - 18:55	19.00 - 20.30	20.35 - 21.00	21.00	22.00
17	6/26/2022	Sunday	4.15	5.15	Chimney Hole		05.15 - 06.45	06:50 - 09:10	09:15 - 10:45	10:50 - 13:15	13:15	14:15
17	6/27/2022	Monday	1.13	5.25	entitle y Hole		00120 00140	00100 00120				
17	6/28/2022	Tuesday										
17	6/29/2022	Wednesday	12:00	13:00	Lost Clove		13:00 - 14:30	14:35 - 16:55	17:00 - 18:30	18:35 - 21:00	21:00	22:00
18	6/30/2022	Thursday	12.00	10.00	2030 01070		10:00 14:00	14.00 10.00	17.00 10.00	10.00 21.00	21.00	22.00
18	7/1/2022	Friday										
18	7/2/2022	Saturday	12:00	13:00	Lost Clove	13:00 - 13:55	14:00 - 15:30	15:35 - 17:55	18:00 - 19:30	19:35 - 21:00	21:00	22:00
18	7/3/2022	Sunday	4.30	5.30	Chimney Hole	05:30 - 06:40	06:45 - 08:15	08.20 - 10.40	10:45 - 12:15	12:20 - 13:30	13:30	14.30
18	7/4/2022	Monday	12.00	13.00	Lost Clove	13.00 - 14.55	15:00 - 16:30	16:35 - 18:55	19.00 - 20.30	20.35 - 21.00	21.00	22.00
18	7/5/2022	Tuesday	12.00	20100	2031 01010	20100 24100	20100 20100	20100 20100	29.00 20.00	23.03 21.00	22.00	22.00
18	7/6/2022	Wednesday	4:30	5:30	Chimney Hole	05:30 - 07:55	08:00 - 09:30	09:35 - 11:55	12:00 - 13:30		13:30	14:30

W1-	Data	Devi	Leave	Start on	Count start	Interview	D	Interview	D	Interview	Leave	Back to
week	Date	Day	office	creek	locale	period 1	Run count 1	period 2	Run count 2	period 3	creek	office
19	7/7/2022	Thursday										
19	7/8/2022	Friday	4:30	5:30	Lost Clove		05:30 - 07:00	07:05 - 09:25	09:30 - 11:00	11:05 - 13:30	13:30	14:30
19	7/9/2022	Saturday	12:00	13:00	Chimney Hole		13:00 - 14:30	14:35 - 16:55	17:00 - 18:30	18:35 - 21:00	21:00	22:00
19	7/10/2022	Sunday	4:30	5:30	Lost Clove	05:30 - 06:40	06:45 - 08:15	08:20 - 10:40	10:45 - 12:15	12:20 - 13:30	13:30	14:30
19	7/11/2022	Monday										
19	7/12/2022	Tuesday										
19	7/13/2022	Wednesday	12:00	13:00	Chimney Hole	13:00 - 13:55	14:00 - 15:30	15:35 - 17:55	18:00 - 19:30	19:35 - 21:00	21:00	22:00
20	7/14/2022	Thursday										
20	7/15/2022	Friday										
20	7/16/2022	Saturday	12:00	13:00	Lost Clove	13:00 - 14:55	15:00 - 16:30	16:35 - 18:55	19:00 - 20:30	20:35 - 21:00	21:00	22:00
20	7/17/2022	Sunday	4:30	5:30	Chimney Hole	05:30 - 07:55	08:00 - 09:30	09:35 - 11:55	12:00 - 13:30		13:30	14:30
20	7/18/2022	Monday	12:00	13:00	Lost Clove		13:00 - 14:30	14:35 - 16:55	17:00 - 18:30	18:35 - 21:00	21:00	22:00
20	7/19/2022	Tuesday	4:30	5:30	Chimney Hole		05:30 - 07:00	07:05 - 09:25	09:30 - 11:00	11:05 - 13:30	13:30	14:30
20	7/20/2022	Wednesday										
21	7/21/2022	Thursday										
21	7/22/2022	Friday										
21	7/23/2022	Saturday	12:00	13:00	Chimney Hole	13:00 - 13:55	14:00 - 15:30	15:35 - 17:55	18:00 - 19:30	19:35 - 21:00	21:00	22:00
21	7/24/2022	Sunday	4:45	5:45	Lost Clove	05:45 - 06:55	07:00 - 08:30	08:35 - 10:55	11:00 - 12:30	12:35 - 13:45	13:45	14:45
21	7/25/2022	Monday	11:45	12:45	Chimney Hole	12:45 - 14:40	14:45 - 16:15	16:20 - 18:40	18:45 - 20:15	20:20 - 20:45	20:45	21:45
21	7/26/2022	Tuesday										
21	7/27/2022	Wednesday	4:45	5:45	Lost Clove	05:45 - 08:10	08:15 - 09:45	09:50 - 12:10	12:15 - 13:45		13:45	14:45
22	7/28/2022	Thursday										
22	7/29/2022	Friday	4:45	5:45	Lost Clove		05:45 - 07:15	07:20 - 09:40	09:45 - 11:15	11:20 - 13:45	13:45	14:45
22	7/30/2022	Saturday	11:45	12:45	Chimney Hole		12:45 - 14:15	14:20 - 16:40	16:45 - 18:15	18:20 - 20:45	20:45	21:45
22	7/31/2022	Sunday	4:45	5:45	Lost Clove	05:45 - 06:55	07:00 - 08:30	08:35 - 10:55	11:00 - 12:30	12:35 - 13:45	13:45	14:45
22	8/1/2022	Monday										
22	8/2/2022	Tuesday										
22	8/3/2022	Wednesday	11:45	12:45	Chimney Hole	12:45 - 13:40	13:45 - 15:15	15:20 - 17:40	17:45 - 19:15	19:20 - 20:45	20:45	21:45
23	8/4/2022	Thursday										
23	8/5/2022	Friday										
23	8/6/2022	Saturday	5:00	6:00	Lost Clove	06:00 - 08:25	08:30 - 10:00	10:05 - 12:25	12:30 - 14:00		14:00	15:00
23	8/7/2022	Sunday	11:30	12:30	Chimney Hole	12:30 - 14:25	14:30 - 16:00	16:05 - 18:25	18:30 - 20:00	20:05 - 20:30	20:30	21:30
23	8/8/2022	Monday										
23	8/9/2022	Tuesday	5:00	6:00	Lost Clove		06:00 - 07:30	07:35 - 09:55	10:00 - 11:30	11:35 - 14:00	14:00	15:00
23	8/10/2022	Wednesday	11:30	12:30	Chimney Hole		12:30 - 14:00	14:05 - 16:25	16:30 - 18:00	18:05 - 20:30	20:30	21:30
24	8/11/2022	Thursday										
24	8/12/2022	Friday										
24	8/13/2022	Saturday	5:00	6:00	Lost Clove	06:00 - 07:10	07:15 - 08:45	08:50 - 11:10	11:15 - 12:45	12:50 - 14:00	14:00	15:00
24	8/14/2022	Sunday	11:30	12:30	Chimney Hole	12:30 - 13:25	13:30 - 15:00	15:05 - 17:25	17:30 - 19:00	19:05 - 20:30	20:30	21:30
24	8/15/2022	Monday	5:00	6:00	Lost Clove	06:00 - 08:25	08:30 - 10:00	10:05 - 12:25	12:30 - 14:00		14:00	15:00
24	8/16/2022	Tuesday										
24	8/17/2022	Wednesday	11:30	12:30	Chimney Hole	12:30 - 14:25	14:30 - 16:00	16:05 - 18:25	18:30 - 20:00	20:05 - 20:30	20:30	21:30

Mo	ak	Date	Dav	Leave	Start on	Count start	Interview	Pup count 1	Interview	Pup count 2	Interview	Leave	Back to
	eĸ	Date	Day	office	creek	locale	period 1	Kun Count I	period 2	Kun Lount 2	period 3	creek	office
25	5	8/18/2022	Thursday										
25	5	8/19/2022	Friday										
25	5	8/20/2022	Saturday	5:15	6:15	Lost Clove		06:15 - 07:45	07:50 - 10:10	10:15 - 11:45	11:50 - 14:15	14:15	15:15
25	5	8/21/2022	Sunday	11:15	12:15	Chimney Hole		12:15 - 13:45	13:50 - 16:10	16:15 - 17:45	17:50 - 20:15	20:15	21:15
25	5	8/22/2022	Monday										
25	5	8/23/2022	Tuesday	5:15	6:15	Lost Clove	06:15 - 07:25	07:30 - 09:00	09:05 - 11:25	11:30 - 13:00	13:05 - 14:15	14:15	15:15
25	5	8/24/2022	Wednesday	11:15	12:15	Chimney Hole	12:15 - 13:10	13:15 - 14:45	14:50 - 17:10	17:15 - 18:45	18:50 - 20:15	20:15	21:15
26	6	8/25/2022	Thursday										
26	6	8/26/2022	Friday										
26	6	8/27/2022	Saturday	11:00	12:00	Lost Clove	12:00 - 13:55	14:00 - 15:30	15:35 - 17:55	18:00 - 19:30	19:35 - 20:00	20:00	21:00
26	6	8/28/2022	Sunday	5:15	6:15	Chimney Hole	06:15 - 08:40	08:45 - 10:15	10:20 - 12:40	12:45 - 14:15		14:15	15:15
26	6	8/29/2022	Monday	11:00	12:00	Lost Clove		12:00 - 13:30	13:35 - 15:55	16:00 - 17:30	17:35 - 20:00	20:00	21:00
26	6	8/30/2022	Tuesday										
2€	6	8/31/2022	Wednesday	5:15	6:15	Chimney Hole		06:15 - 07:45	07:50 - 10:10	10:15 - 11:45	11:50 - 14:15	14:15	15:15
27	7	9/1/2022	Thursday										
27	7	9/2/2022	Friday										
27	7	9/3/2022	Saturday	5:30	6:30	Lost Clove	06:30 - 07:40	07:45 - 09:15	09:20 - 11:40	11:45 - 13:15	13:20 - 14:30	14:30	15:30
27	7	9/4/2022	Sunday	11:00	12:00	Chimney Hole	12:00 - 12:55	13:00 - 14:30	14:35 - 16:55	17:00 - 18:30	18:35 - 20:00	20:00	21:00
27	7	9/5/2022	Monday	5:30	6:30	Lost Clove	06:30 - 08:55	09:00 - 10:30	10:35 - 12:55	13:00 - 14:30		14:30	15:30
27	7	9/6/2022	Tuesday	10:45	11:45	Chimney Hole	11:45 - 13:40	13:45 - 15:15	15:20 - 17:40	17:45 - 19:15	19:20 - 19:45	19:45	20:45
27	7	9/7/2022	Wednesday										
28	8	9/8/2022	Thursday	5:30	6:30	Chimney Hole		06:30 - 08:00	08:05 - 10:25	10:30 - 12:00	12:05 - 14:30	14:30	15:30
28	8	9/9/2022	Friday										
28	8	9/10/2022	Saturday	10:45	11:45	Lost Clove		11:45 - 13:15	13:20 - 15:40	15:45 - 17:15	17:20 - 19:45	19:45	20:45
28	8	9/11/2022	Sunday	5:30	6:30	Chimney Hole	06:30 - 07:40	07:45 - 09:15	09:20 - 11:40	11:45 - 13:15	13:20 - 14:30	14:30	15:30
28	8	9/12/2022	Monday	10:45	11:45	Lost Clove	11:45 - 12:40	12:45 - 14:15	14:20 - 16:40	16:45 - 18:15	18:20 - 19:45	19:45	20:45
- 28	8	9/13/2022	Tuesday										
28	8	9/14/2022	Wednesday										
	9	9/15/2022	Thursday										
29	9	9/16/2022	Friday	5:30	6:30	Chimney Hole	06:30 - 08:55	09:00 - 10:30	10:35 - 12:55	13:00 - 14:30		14:30	15:30
29	9	9/17/2022	Saturday	10:30	11:30	Lost Clove	11:30 - 13:25	13:30 - 15:00	15:05 - 17:25	17:30 - 19:00	19:05 - 19:30	19:30	20:30
29	9	9/18/2022	Sunday	5:45	6:45	Chimney Hole		06:45 - 08:15	08:20 - 10:40	10:45 - 12:15	12:20 - 14:45	14:45	15:45
29	9	9/19/2022	Monday			,							
29	9	9/20/2022	, Tuesday	10:30	11:30	Lost Clove		11:30 - 13:00	13:05 - 15:25	15:30 - 17:00	17:05 - 19:30	19:30	20:30
29	9	9/21/2022	Wednesdav										
30	0	9/22/2022	Thursday										
30	0	9/23/2022	Friday	10:15	11:15	Lost Clove	11:15 - 12:10	12:15 - 13:45	13:50 - 16:10	16:15 - 17:45	17:50 - 19:15	19:15	20:15
-30	0	9/24/2022	Saturday	5:45	6:45	Chimney Hole	06:45 - 07:55	08:00 - 09:30	09:35 - 11:55	12:00 - 13:30	13:35 - 14:45	14:45	15:45
30	0	9/25/2022	Sunday	10:15	11:15	Lost Clove	11.15 - 13.10	13:15 - 14:45	14.50 - 17.10	17:15 - 18:45	18:50 - 19:15	19:15	20:15
30	0	9/26/2022	Monday	5.45	6.45	Chimney Hole	06:45 - 09:10	09.15 - 10.45	10.50 - 13.10	13.15 - 14.45	10.00 10.10	14.45	15.45
30	0	9/27/2022	Tuesday	5.15	6173	enniney noie	50.15 05.10	39.19 10.19	10.00 10.10	10.10 11.10		21.73	10.70
20	n	9/28/2022	Wednesday										
30	0	JI 201 2022	vecunesudy										

Wash	Data	Davis	Leave	Start on	Count start	Interview	Due sout 1	Interview	Dum anumt 2	Interview	Leave	Back to
week	Date	Day	office	creek	locale	period 1	Run count 1	period 2	Run count 2	period 3	creek	office
31	9/29/2022	Thursday	5:45	6:45	Lost Clove		06:45 - 08:15	08:20 - 10:40	10:45 - 12:15	12:20 - 14:45	14:45	15:45
31	9/30/2022	Friday	10:15	11:15	Chimney Hole		11:15 - 12:45	12:50 - 15:10	15:15 - 16:45	16:50 - 19:15	19:15	20:15
31	10/1/2022	Saturday	5:45	6:45	Lost Clove	06:45 - 07:55	08:00 - 09:30	09:35 - 11:55	12:00 - 13:30	13:35 - 14:45	14:45	15:45
31	10/2/2022	Sunday	10:00	11:00	Chimney Hole	11:00 - 11:55	12:00 - 13:30	13:35 - 15:55	16:00 - 17:30	17:35 - 19:00	19:00	20:00
31	10/3/2022	Monday										
31	10/4/2022	Tuesday										
31	10/5/2022	Wednesday										
32	10/6/2022	Thursday										,
32	10/7/2022	Friday	10:00	11:00	Lost Clove	11:00 - 12:55	13:00 - 14:30	14:35 - 16:55	17:00 - 18:30	18:35 - 19:00	19:00	20:00
32	10/8/2022	Saturday	6:00	7:00	Chimney Hole	07:00 - 09:25	09:30 - 11:00	11:05 - 13:25	13:30 - 15:00		15:00	16:00
32	10/9/2022	Sunday	10:00	11:00	Lost Clove		11:00 - 12:30	12:35 - 14:55	15:00 - 16:30	16:35 - 19:00	19:00	20:00
32	10/10/2022	Monday	6:00	7:00	Chimney Hole		07:00 - 08:30	08:35 - 10:55	11:00 - 12:30	12:35 - 15:00	15:00	16:00
32	10/11/2022	Tuesday										
32	10/12/2022	Wednesday										
33	10/13/2022	Thursday										
33	10/14/2022	Friday	9:45	10:45	Lost Clove	10:45 - 11:40	11:45 - 13:15	13:20 - 15:40	15:45 - 17:15	17:20 - 18:45	18:45	19:45
33	10/15/2022	Saturday	6:15	7:15	Chimney Hole	07:15 - 08:25	08:30 - 10:00	10:05 - 12:25	12:30 - 14:00	14:05 - 15:15	15:15	16:15
33	10/16/2022	Sunday	9:45	10:45	Lost Clove	10:45 - 12:40	12:45 - 14:15	14:20 - 16:40	16:45 - 18:15	18:20 - 18:45	18:45	19:45
33	10/17/2022	Monday	6:15	7:15	Chimney Hole	07:15 - 09:40	09:45 - 11:15	11:20 - 13:40	13:45 - 15:15		15:15	16:15
33	10/18/2022	Tuesday										
33	10/19/2022	Wednesday										
34	10/20/2022	Thursday										
34	10/21/2022	Friday	6:15	7:15	Chimney Hole		07:15 - 08:45	08:50 - 11:10	11:15 - 12:45	12:50 - 15:15	15:15	16:15
34	10/22/2022	Saturday	9:30	10:30	Lost Clove		10:30 - 12:00	12:05 - 14:25	14:30 - 16:00	16:05 - 18:30	18:30	19:30
34	10/23/2022	Sunday	6:15	7:15	Chimney Hole	07:15 - 08:25	08:30 - 10:00	10:05 - 12:25	12:30 - 14:00	14:05 - 15:15	15:15	16:15
34	10/24/2022	Monday	9:30	10:30	Lost Clove	10:30 - 11:25	11:30 - 13:00	13:05 - 15:25	15:30 - 17:00	17:05 - 18:30	18:30	19:30
34	10/25/2022	Tuesday										
34	10/26/2022	Wednesday										
35	10/27/2022	Thursday										
35	10/28/2022	Friday	9:30	10:30	Chimney Hole	10:30 - 12:25	12:30 - 14:00	14:05 - 16:25	16:30 - 18:00	18:05 - 18:30	18:30	19:30
35	10/29/2022	Saturday	6:30	7:30	Lost Clove	07:30 - 09:55	10:00 - 11:30	11:35 - 13:55	14:00 - 15:30		15:30	16:30
35	10/30/2022	Sunday	9:15	10:15	Chimney Hole		10:15 - 11:45	11:50 - 14:10	14:15 - 15:45	15:50 - 18:15	18:15	19:15
35	10/31/2022	Monday										
35	11/1/2022	Tuesday										
35	11/2/2022	Wednesday	6:30	7:30	Lost Clove		07:30 - 09:00	09:05 - 11:25	11:30 - 13:00	13:05 - 15:30	15:30	16:30
36	11/3/2022	Thursday										
36	11/4/2022	Friday										
36	11/5/2022	Saturday	9:15	10:15	Chimney Hole	10:15 - 11:10	11:15 - 12:45	12:50 - 15:10	15:15 - 16:45	16:50 - 18:15	18:15	19:15
36	11/6/2022	Sunday	5:30	6:30	Lost Clove	06:30 - 07:40	07:45 - 09:15	09:20 - 11:40	11:45 - 13:15	13:20 - 14:30	14:30	15:30
36	11/7/2022	Monday										
36	11/8/2022	Tuesday	8:15	9:15	Chimney Hole	09:15 - 11:10	11:15 - 12:45	12:50 - 15:10	15:15 - 16:45	16:50 - 17:15	17:15	18:15
36	11/9/2022	Wednesday	5:45	6:45	Lost Clove	06:45 - 09:10	09:15 - 10:45	10:50 - 13:10	13:15 - 14:45		14:45	15:45

Week	Date	Day	Leave office	Start on creek	Count start locale	Interview period 1	Run count 1	Interview period 2	Run count 2	Interview period 3	Leave creek	Back to office
37	11/10/2022	Thursday										
37	11/11/2022	Friday	8:15	9:15	Chimney Hole		09:15 - 10:45	10:50 - 13:10	13:15 - 14:45	14:50 - 17:15	17:15	18:15
37	11/12/2022	Saturday	5:45	6:45	Lost Clove		06:45 - 08:15	08:20 - 10:40	10:45 - 12:15	12:20 - 14:45	14:45	15:45
37	11/13/2022	Sunday	8:00	9:00	Chimney Hole	09:00 - 09:55	10:00 - 11:30	11:35 - 13:55	14:00 - 15:30	15:35 - 17:00	17:00	18:00
37	11/14/2022	Monday	5:45	6:45	Lost Clove	06:45 - 07:55	08:00 - 09:30	09:35 - 11:55	12:00 - 13:30	13:35 - 14:45	14:45	15:45
37	11/15/2022	Tuesday										
37	11/16/2022	Wednesday										
38	11/17/2022	Thursday										
38	11/18/2022	Friday	5:45	6:45	Lost Clove	06:45 - 09:10	09:15 - 10:45	10:50 - 13:10	13:15 - 14:45		14:45	15:45
38	11/19/2022	Saturday	8:00	9:00	Chimney Hole	09:00 - 10:55	11:00 - 12:30	12:35 - 14:55	15:00 - 16:30	16:35 - 17:00	17:00	18:00
38	11/20/2022	Sunday	5:45	6:45	Lost Clove		06:45 - 08:15	08:20 - 10:40	10:45 - 12:15	12:20 - 14:45	14:45	15:45
38	11/21/2022	Monday	8:00	9:00	Chimney Hole		09:00 - 10:30	10:35 - 12:55	13:00 - 14:30	14:35 - 17:00	17:00	18:00
38	11/22/2022	Tuesday										
38	11/23/2022	Wednesday										
39	11/24/2022	Thursday	8:00	9:00	Chimney Hole	09:00 - 09:55	10:00 - 11:30	11:35 - 13:55	14:00 - 15:30	15:35 - 17:00	17:00	18:00
39	11/25/2022	Friday										
39	11/26/2022	Saturday	6:00	7:00	Lost Clove	07:00 - 08:10	08:15 - 09:45	09:50 - 12:10	12:15 - 13:45	13:50 - 15:00	15:00	16:00
39	11/27/2022	Sunday	8:00	9:00	Chimney Hole	09:00 - 10:55	11:00 - 12:30	12:35 - 14:55	15:00 - 16:30	16:35 - 17:00	17:00	18:00
39	11/28/2022	Monday										
39	11/29/2022	Tuesday										
39	11/30/2022	Wednesday	6:00	7:00	Lost Clove	07:00 - 09:25	09:30 - 11:00	11:05 - 13:25	13:30 - 15:00		15:00	16:00
40	12/1/2022	Thursday										
40	12/2/2022	Friday	6:00	7:00	Lost Clove		07:00 - 08:30	08:35 - 10:55	11:00 - 12:30	12:35 - 15:00	15:00	16:00
40	12/3/2022	Saturday	8:00	9:00	Chimney Hole		09:00 - 10:30	10:35 - 12:55	13:00 - 14:30	14:35 - 17:00	17:00	18:00
40	12/4/2022	Sunday	6:00	7:00	Lost Clove	07:00 - 08:10	08:15 - 09:45	09:50 - 12:10	12:15 - 13:45	13:50 - 15:00	15:00	16:00
40	12/5/2022	Monday										
40	12/6/2022	Tuesday	8:00	9:00	Chimney Hole	09:00 - 09:55	10:00 - 11:30	11:35 - 13:55	14:00 - 15:30	15:35 - 17:00	17:00	18:00
40	12/7/2022	Wednesday										
41	12/8/2022	Thursday	8:00	9:00	Chimney Hole	09:00 - 10:55	11:00 - 12:30	12:35 - 14:55	15:00 - 16:30	16:35 - 17:00	17:00	18:00
41	12/9/2022	Friday										
41	12/10/2022	Saturday	6:15	7:15	Lost Clove	07:15 - 09:40	09:45 - 11:15	11:20 - 13:40	13:45 - 15:15		15:15	16:15
41	12/11/2022	Sunday	8:00	9:00	Chimney Hole		09:00 - 10:30	10:35 - 12:55	13:00 - 14:30	14:35 - 17:00	17:00	18:00
41	12/12/2022	Monday										
41	12/13/2022	Tuesday										
41	12/14/2022	Wednesday	6:15	7:15	Lost Clove		07:15 - 08:45	08:50 - 11:10	11:15 - 12:45	12:50 - 15:15	15:15	16:15

### **Appendix C. Primary angler interview locations**

![](_page_36_Picture_1.jpeg)

Figure 1. Known interview locations in the sub-section from Chimney Hole to the Rt 28 Bridge in Phoenicia

![](_page_37_Figure_0.jpeg)

Figure 2. Known interview locations in the sub-section from the Rt 28 Bridge in Phoenicia to the Portal

![](_page_38_Figure_0.jpeg)

Figure 3. Known interview locations in the sub-section from the Portal to Lost Clove Road Bridge

## Appendix D. Field Datasheets for Upper Esopus Creel Survey

Date:	Stream Flow: low mod hig	h Turl	oidity: clear	mod turbio	d	
Count #1 Direct	ion: upstream downstream Air temperatu	re (F):	Weather:			
Count #2 Direct	ion: upstream downstream Air temperatu	re (F):	_ Weather:			
	UPstream					
	↓		Cou	int 1	Cou	int 2
Subsection	Location	View	Anglers	Tubes / Kayaks	Anglers	Tubes / Kayaks
A	ART trail view of Chimney Hole	All				
А	Below ART Bridge	All				
А	Five Arches Bridge	All				
А	Coldbrook Gage access	All				
А	Lower Winnie Rd	All				
А	NYSDEC FA - Across from DOT (only if vehicles present)	All				
А	Hudler Cemetary	All				
А	Rt 28 Bridge - Mt Tremper	Downstream				
А	Old Bridge foundation off Riseley Rd	All				
А	NYSDEC FA - Flood Control Berm	All				
А	DOT Pulloff - Emerson	All				
Α	Rt 28 view - Railroad curve	All				
А	Bridge Street Bridge in Phoenicia (only count downstream of Rt 28 Bridge)	All				
Α	Old Rt. 28 to NYSDEC - Mt. Tremper FA	All				
В	Hight Street view	Upstream of Rt. 28 bridge				
В	Herdeman Rd pulloff	All				
в	Woodland Valley Rd Bridge (careful not to double count with High St)	AII				
В	Veteran's Way view	All				
В	DOT Pulloff - across from River Rd	All				
В	NYSDEC FA - Shandaken Cemetary	All				
BIC	Portal (Shandaken Tunnal outlet)	Upstream				
вле		Downstream				
с	Shandaken Town Hall	All				
с	DOT Pulloff - Peck Hollow	All				
с	Fox Hollow Bridge	All				
с	Rt. 28 Bridge just west of Rt. 42 (Parking lot and path)	All				
с	Drive along County Rt. 47	All				
с	Fire House Rd. Bridge	All				
с	End of Church Rd	All				
с	Lost Clove Rd. Bridge	Downstream				
	∱ DOWNstream	Time start:				
I	e e modioant	Time finish:				

#### **Esopus Creek: Pressure Counts**

#### **UPPER ESOPUS CREEL INTERVIEW DATASHEET**

Г

Unique ID #		ONLY EN	ITER INFO	ORMATION FO	R ANGLING	IN	<u>Unique ID</u> Current date plus a sequential trip
Date (mm/dd/yy)	THE CURRENT SUBSECTION. ANGLING INFO						number. Trip number is reset each survey day.
Location	FROM OTHER SUBSECTIONS MAY BE ENTERED     ON A SEPARATE DATASHEET IF THE TRIP						EX: 030122-001 is the first interview on March 1, 2022.
Subsection		HAPPEN	ED EARLI	ER TODAY			Location
Time (24hr)			Number	of fish relea	sed		Nearest access point/landmark
Time start (24hr)	Spec	< 8"	8"-10"	10"-12"	12"-14"	>14"	Subsection A Chimney Hole to Phoenicia
Break? (hr:min)	BT						B Phoenicia to Portal
Trip complete? (Y/N)	RT						Angling technique
Target species	ST						B Bait fishing
Angling technique							BFL Bait, fly, & artificial lure
Zip code	Creeled fish						BL Bait & artificial lure F Fly fishing
Different subsection today (Y/N)	Spec	c Total length (mm)		Scales (Y/N)	Comments		FL Fly & artificial lure L Artificial lure
Creel card (Y/N)							Species codes
Comments							BT Brown trout RT Rainbow trout ST Brook trout
							Regulations in mainstem Esopus Wild Quality: Apr 1-Oct 15: 3 trout, 1 over 12" Oct 16- Mar 31: C & R, artificial only

#### Angler Opinion Questions

Question 1: Have you previously been interviewed for your opinion of the Upper Esopus Creek trout fishery?

Yes, skip Questions 2-3 and end interview

No, proceed to Questions 2-3

Unsure, proceed to Questions 2-3 

Question 2: How important are the below descriptions to you for a satisfactory fishing experience?

	Very important	Important	Somewhat important	Not important	No response	Unasked
Catch wild trout	[]	[]	[]	[]	[]	[]
Catch many trout regardless of size	[]	[]	[]	[]	Ξ	[]
Commonly catch trout over 12 inches	[]	[]	[]	[]	Ξ	[]
Harvest - catch trout to eat	[]	[]	[]	[]	[]	[]

#### Question 3: Of the four characteristics listed in Question 2, which is the most important?

Catch wild trout	Catch many trout regardless of size	Commonly catch trout over 12 inches	Harvest - catch trout to eat	No response	Unasked
Ξ.			[]	[]	[]

Uppe	er Esopu	s Creel S	urvey –	Creel Ca	rd for Co	mpleted Trips
Unique ID End time Total breaks	AM _ hours _	PM minut	 tes	<u>Subse</u> Chimne Rt 28 B The Po	ection fis ey Hole t ridge in F rtal to Lo	<u>hed (<i>CHOOSE ONE</i>)</u> o Rt 28 Bridge in Phoenicia Phoenicia to the Portal st Clove Road Bridge
Fish <u>RELEAS</u>	SED (num	ber of fish	in approp	oriate colu	mn)	Comments:
Species	< 8"	8"-10"	10"-12"	12"-14"	>14"	
Brown trout						
Rainbow trout						
Brook trout						
Fish <u>CREELE</u>	<u>D</u> (numb	er of fish	in approp	riate colu	ımn)	
Species	< 8"	8"-10"	10"-12"	12"-14"	>14"	
Brown trout						
Rainbow trout						
Brook trout						
box (locations)	on additi	onal shee	et of pape	er) or mai	il to the a	ddress on other side.
		NYS Reg 21 S Nev	i Departn ion 3 Fisl South Put v Paltz, N	nent of Er neries t Corners Y 12561-1	nvironme s Rd 1696	ental Conservation