

Results of the 2022-2023 Virginia Angler Survey



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Author:

Mallory Gyovai White

Human Dimensions Program Manager
Virginia Department of Wildlife Resources

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SUMMARY

The Virginia Department of Wildlife Resources (DWR) manages the state's freshwater fish resources by balancing the biological needs and considerations of aquatic species while also providing access to aquatic-related outdoor recreation for the public. DWR sends a survey to freshwater fishing license holders biennially, in an effort to connect with Virginia anglers and evaluate their fishing behaviors, perceptions of fisheries management, and satisfaction with fishing in Virginia. The information gathered from these surveys is critical to understanding angler effort and engagement, and ultimately informs fisheries management in Virginia. This survey also provides an avenue for feedback from Virginia anglers to biologists and managers at DWR.

The 2022-2023 Virginia Angler Survey was distributed in September and October of 2023. Survey invitations were sent by mail and email to a random sample of Virginia residents over the age of 18 who had bought a freshwater fishing license in the past year. The sampling scheme matched the proportion of licensed angler across DWR regions and included an oversampling of younger anglers, as historically younger anglers have lower response rates. We received 2,347 completed surveys. Survey responses were weighed after statistical comparisons between survey respondents and the licensed angler population demonstrated differences between age, gender, and license purchase avidity.

Selected results include:

- The majority of Virginia anglers feel that DWR does a good job providing information about fishing regulations (77.3%).
- Angler experience in Virginia varies from beginner (5.1%), novice (12.2%), intermediate (36.4%), advanced (36.2%), and expert (10.1%).
- Annually, Virginia anglers spend an average of 25.1 days freshwater fishing and have an average of 4.8 different sites that they fish at.
- Virginia freshwater anglers reported slight dissatisfaction (satisfaction scale 1 – 5; \bar{x} = 2.7) with the amount of time they spend fishing.
 - The top *personal* reason that anglers agree limits or prevents time spent fishing is 'Too many work commitments' (52.2%)
 - The top *external* reason that anglers agree limits or prevents time spent fishing is 'The cost of fishing equipment and supplies is too high' (32.7%)
- The top 3 species most often fished for by Virginia anglers are 1) Largemouth Bass, 2) Smallmouth Bass, and 3) Anything that bites.
- Wildlife Management Areas (WMAs) are used by 29.3% of Virginia anglers.
- Over half of anglers felt that DWR does a good job providing information about fish consumption advisories (59.1%), stocking coldwater fish (58.6%), conserving native fish (56.3%), and teaching youth to fish (54%).

INTRODUCTION

The statewide angler survey is conducted biennially to understand population-level angler demographics, fishing avidity, participation, management preferences, and satisfaction. The survey results are used to inform Aquatics Wildlife Resource Division (AWRD) goals and objectives, including angler use and preference goals described in the AWRD Strategic Plan. Results from this survey are also used to inform other agency-wide goals, such as the goals for outdoor recreationists outlined in the DWR Wildlife Viewing Plan.

Traditionally, angler information has been collected as part of on-site creel surveys, however other survey methods are preferred for obtaining population-level information (Ditton & Hunt, 2001). A mixed mode approach, using mail and email surveys, can be used to meet this objective (Dillman et al., 2014; York et al., 2022). The dual mode of mailed and emailed surveys allows us to engage with the entire population of Virginia freshwater fishing license holders, as we are able to target recipients that may only have one form of communication listed in the Go Outdoors Virginia (GOV) license database. A random sample of Virginia freshwater license holders are selected for these surveys, with sampling schemes adjusted to meet project objectives and minimize total survey error (Biemer, 2010). This survey schedule also allows DWR to connect with anglers on a regular basis, establishing baseline data and capturing angler perspectives as new issues or proposed regulation changes may arise.

Virginia Angler Survey Objectives:

- Evaluate angler use of waterbodies and public lands in Virginia, preference for fish species, and fishing activities over the last 12 months
- Angler opinions of DWR performances related to aquatic wildlife resource management
- Collect demographic information for Virginia resident anglers

METHODS

Sampling

Sampling included two modes, mail and email. Dual modes were used to control costs of survey invitations and provide an opportunity for all fishing license purchasers to receive an invitation. Although it would have been more cost effective to exclusively use email invitations and an online survey, not all license purchasers have an email associated with their license in the license database. A stratified random sampling technique was used to achieve a minimum number of responses from individuals residing in each DWR management region (Figure 1). Sampling rates were adjusted so that more invitations were sent to younger anglers. In previous DWR survey projects, and studies of anglers elsewhere in the US, survey responses are biased towards older individuals (Wallen et al., 2016; Valdez and White, 2021). A total of 21,500 email invitations and 5,500 mail invitations were distributed.

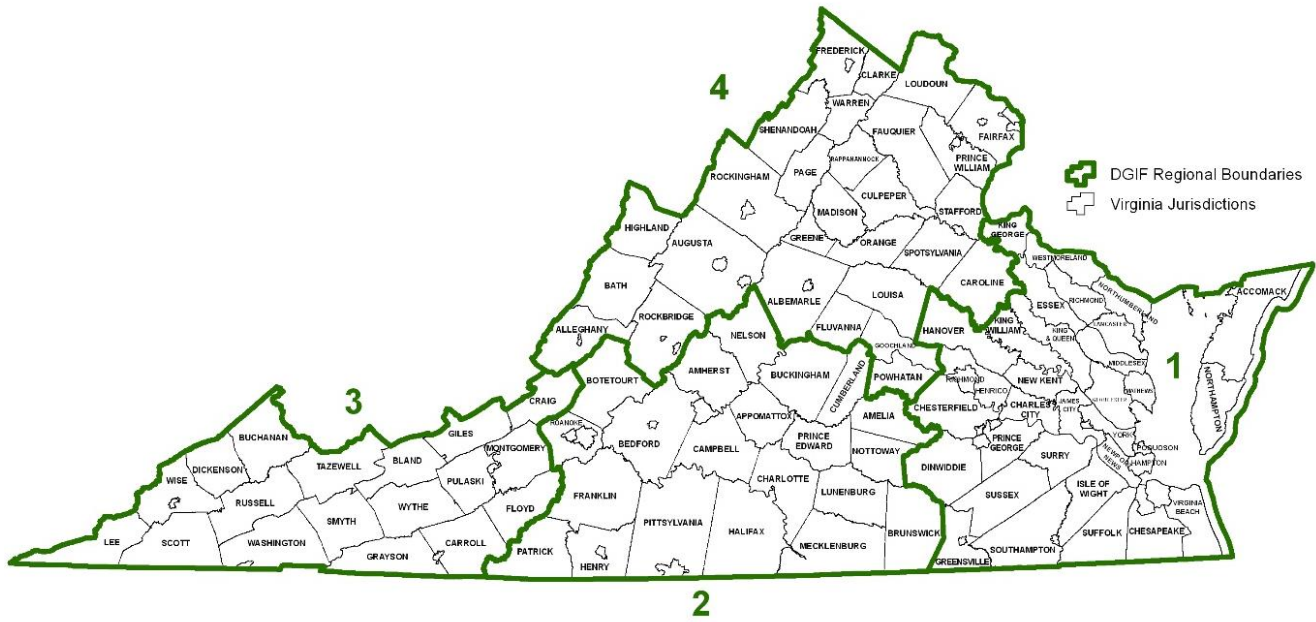


Figure 1. A map of Virginia separated by Virginia Department of Wildlife Resources regional boundaries 1, 2, 3 and 4.

Individuals were eligible to receive a survey invitation if they were 18 years old or older, a Virginia resident, and had purchased a freshwater fishing license between July 1, 2022-2023. There are a number of licenses that convey freshwater fishing privileges in Virginia, so the sample was not limited to license type but instead by freshwater fishing privileges (VDWR, 2023). The GoOutdoorsVirginia (GOV) license database was queried to identify 317,804 unique license holders that were eligible to receive a survey invitation. The overall sampling rate was 8.5% (27,000 invitations; 317,804 individuals). Among these individuals, 80.0% (n = 254,330) had a valid, unique email address in the database and 20.0% (n = 63,474) did not. Individuals with a valid email address were eligible for an email survey and those without a valid email address were eligible to receive a mail survey. The percent split between email and mail invitations was 79.6% (n = 21,500) and 20.4% (n = 5,500), comparable to the split of individuals with and without a valid email address.

Survey Design and Distribution

The survey instrument largely consisted of questions previously used in Virginia angler surveys (Valdez and White, 2021). Survey questions were asked to return information regarding fishing participation and frequency, catch and non-catch fishing preferences, opinions and perceptions of fishing abilities or activities, and engagement with DWR. A series of wildlife and outdoor-related recreation questions were also included to continue efforts from other research that showed a high level of overlap between people that fish, hunt, and view wildlife (Grooms et al., 2020). A few demographic questions collected information on age, gender, race, income and education.

There were two survey distribution efforts: a dual mode comprehensive distribution conducted by the Center for Survey Research at the University of Virginia (UVA), and a delayed supplemental email-only distribution conducted by DWR. The additional email sample was added due to a lower-than-expected number of responses to the UVA sample in the initial stages of data collection. Qualtrics survey platform was used by both UVA and DWR for the online survey efforts, and the language on email invitations and reminders was identical (Qualtrics, Provo, UT).

UVA sent survey invitations by mail (n = 5,500) and email (n = 17,500) in September 2023. Mail recipients received an advanced notice letter, survey questionnaire, and up to two postcard reminders. The advanced notice letter provided additional information about the Virginia Angler Survey, and included a 'Virginia Angler' sticker as a token of appreciation. The postcard reminders included an option to take the survey online if preferred, and contained a unique password for online survey access. A link to the password-protected online survey was hosted on DWR's website (www.dwr.virginia.gov/surveys). Email recipients received an invitation email and up to five email reminders, which all contained a unique link to access the online survey. Due to an issue with incentive procurement, only mail recipients received a sticker. DWR sent supplemental survey invitations by email (n = 4,000) in October 2023. The supplemental sample of email recipients received an invitation email and up to three reminders, which all contained a unique link to access the online survey.

All survey responses were combined due to no statistical differences found between responses to select fishing activities and demographic information between the UVA and DWR email samples (Appendix 3.1). In total, there were 565 undeliverable mailed surveys and 434 undeliverable emailed surveys, dropping the effective sample to 26,001. A total of 2,347 usable surveys were returned, resulting in a margin of error of $\pm 2\%$ and an effective survey response rate of 9.0%.

Statistical Analysis

We tested for nonresponse bias by directly comparing survey respondents and the eligible population using metadata available in the Go Outdoors Virginia (GOV) license database (Appendix 3.2). Results from those tests revealed differences below the $\alpha = .05$ level for age, gender, and license purchase avidity. Comparing the population to respondents, survey respondents were older, more likely to be male, and more avid license purchasers. License purchase avidity is defined as someone who had purchased a license in the previous three consecutive years.

Although the effect sizes of the comparative test results were small, the variables of age, gender, and license purchase avidity had an impact on responses to fishing activity to the point where weighting responses was warranted. The weighting procedure applied to survey responses returned results that were closer to those of the angler population for those demographic variables. All statistical analysis were conducted in program R (v4.3; R Core Team, 2023). Weights were calculated and applied to responses using the 'survey' package in R (v4.1.1; Lumley, 2021).

RESULTS

Descriptive statistics are reported for all survey questions included on the survey (Tables 1-28). The survey results can be divided into 4 distinct sections: fishing behaviors and actions (Tables 1-17), fishing opinions (Tables 18-23), outdoor recreation (Tables 24-26), and demographic information (Tables 27-28).

Table 1. Responses to the question, “In the last 12 months, how many **days** did you fish in Virginia and outside Virginia?”

Response	Mean (<i>SE</i>)	Median	n
Days spent freshwater fishing in VA	25.1 (<i>0.8</i>)	10	2283
Days spent freshwater fishing outside VA	2.6 (<i>0.2</i>)	0	1746
Days spent saltwater fishing in VA	4.9 (<i>0.4</i>)	0	2017
Days spent saltwater fishing outside VA	1.8 (<i>0.2</i>)	0	1848

Table 2. Responses to the question, “In the last 12 months, how many different freshwater **fishing sites** (rivers, streams, lakes, ponds) in Virginia did you fish at?”

Response	Mean (<i>SE</i>)	Median	n
Number of freshwater fishing sites	4.8 (<i>0.2</i>)	5	1573

Table 3. Responses to the question, “In the last 12 months, what percent of your days did you spend fishing on each of the following types of water in Virginia?” Only responses totaling 100% considered for analysis.

Response	Mean (<i>SE</i>)	n
Public lakes or reservoirs greater than 500 acres	18.7 (<i>0.8</i>)	649
Public lakes or reservoirs, less than 500 acres	25.3 (<i>0.9</i>)	837
Non-tidal rivers and streams above the fall line (non-trout streams)	12.9 (<i>0.7</i>)	500
Tidal rivers below the fall line	11.3 (<i>0.7</i>)	392
Public coldwater rivers and streams (trout streams) – Stocked by DWR	11.8 (<i>0.6</i>)	454
Public coldwater rivers and streams (trout streams) – Wild trout streams	5.7 (<i>0.4</i>)	292
Private lakes and ponds (including home-owner association ponds)	14.3 (<i>0.7</i>)	562

Table 4. Responses to the question, “In the last 12 months, did you freshwater fish at any of the following public lands in Virginia?” Respondents could select more than one option.

Response	%	n
National Forest	23.9	427
Wildlife Management Area (WMA)	29.3	523
State Park	31.9	568
State Forest	8.1	144

Table 5. Responses to the question, “In the last 12 months, which of the following methods did you use while freshwater fishing in Virginia?” Respondents could select more than one option.

Response	%	n
Rod and reel	96.2	1715
Fly rod	17.5	312
Jugs, set lines, set poles	4.6	82
Bowfishing	1.6	28
Microfishing	2.6	47
Other [†]	0.7	12

[†]Other responses (n = 8): noodles (1), hand harvesting (1), cast net (1), cane pole (3), spinning rod (1), fixed line (1).

Table 6. Responses to the question, “In the past 12 months, did you use live bait while freshwater fishing in Virginia?”

Response	%	n
Yes	56.1	1000
No	43.9	784

Table 7. Responses to the question, “If you used the types of live bait listed below in the last 12 months, indicate whether the bait was purchased from a retail store, captured/trapped, or both.”

Response	%	n
Purchased		
Bait fish (Examples: minnows, chubs)	46.0	456
Crayfish	1.0	10
Salamanders	0.5	5
Worms	79.9	792
Freshwater Mussels	0.3	3
Captured/Trapped		
Bait fish (Examples: minnows, chubs)	29.5	292
Crayfish	9.9	98
Salamanders	1.0	10
Worms	21.8	216
Freshwater Mussels	0.9	9

Table 8. Responses to the question, “If you used the types of live bait listed below in the last 12 months, indicate what you normally do with the live bait that are left over from a fishing trip.”

Response	%	n
Released		
Bait fish (Examples: minnows, chubs)	36.4	352
Crayfish	7.4	72
Salamanders	0.9	9
Worms	22.4	216
Freshwater Mussels	0.6	6
Destroyed		
Bait fish (Examples: minnows, chubs)	8.2	79
Crayfish	0.4	4
Salamanders	0.2	2
Worms	16.3	157
Freshwater Mussels	0.1	1
Saved for Future Fishing		
Bait fish (Examples: minnows, chubs)	22.3	215
Crayfish	2.0	19
Salamanders	0.1	1
Worms	47.3	457
Freshwater Mussels	0.5	5
Given Away		
Bait fish (Examples: minnows, chubs)	20.3	196
Crayfish	1.2	12
Salamanders	0.3	3
Worms	20.0	193
Freshwater Mussels	0.5	5

Table 9. Responses to the question, “In the last 12 months, what percent of your freshwater fishing activities were done in the following ways?” Only responses totaling 100% considered for analysis.

Response	%	Mean (SE)	n
From a motorized boat	39.7	25.1 (0.9)	677
From a non-motorized boat (ex: canoe, kayak)	31.9	13.1 (0.6)	545
From the shore, pier, or a dock	74.8	48.7 (1.0)	1277
By wading	31.7	13.1 (0.6)	541

Table 10. Responses to the question, “Are you a member of a fishing organization or fishing club?” Respondents could select more than one option.

Response	%	n
National fishing organization or club (ex: B.A.S.S.)	6.3	97
Statewide fishing organization or club (ex: Virginia Angler’s Club)	1.4	22
Local fishing organization or club (ex: Central Virginia’s Sportfishing Association)	3.8	58
Not a member of any fishing organization or fishing club	90.8	1396

Table 11. Responses to the question, “What is your freshwater fishing experience level?”

Response	%	n
Beginner	5.1	90
Novice	12.2	216
Intermediate	36.4	645
Advanced	36.2	640
Expert	10.1	179

Table 12. Responses to the question, “Please check the fish that you specifically fished for in freshwater in Virginia in the last 12 months.” Respondents could select more than one option.

Response	%	n
Smallmouth bass	55.9	991
Largemouth bass	71.1	1260
Striped bass or Hybrid Striped bass	23.5	417
Panfish (bream, sunfish, rock bass)	44.2	783
Shad or herring	5.6	100
White perch	11.3	201
Crappie	41.9	742
Flathead catfish	19.1	339
Blue catfish	30.0	532
Channel catfish	33.9	600
Walleye, Sauger, or Saugeye	6.5	116
Stocked trout (Brook, Rainbow, Brown)	32.1	568
Wild trout (not stocked, Brook, Rainbow, Brown)	18.6	330
Northern pike or Chain pickerel	7.7	136
Muskellunge	5.1	91
Yellow perch	13.4	238
Carp	9.8	174
Suckers	2.9	52
Northern snakehead	6.4	114
Anything that bites	38.8	688
Other [†]	2.1	38

[†]Other responses (n = 34): bullhead catfish (3), catfish (2), gar (5), fallfish (4), bowfin (5), spotted bass (3), eels (1), croaker (5), creek chubs (2), rock bass (1), white bass (1), shiners/microspecies (1).

Table 13. Responses to the question, “From the list of fish species on the previous page, please write the letter of the species that you fish for the most often in freshwater in Virginia.”

Response	Species	%	n
1 st most often fished species	Largemouth Bass	36.4	485
2 nd most often fished species	Smallmouth Bass	18.1	226
3 rd most often fished species	Anything that bites	15.5	174

Table 14. Responses to the question, “Have you consumed any freshwater fish that you caught in Virginia in the last 12 months?”

Response	%	n
Yes	40.5	715
No	59.5	1049

Table 15. Responses to the question, “Did you compete in any freshwater fishing tournaments in Virginia in the last 12 months?”

Response	%	n
Yes	6.0	106
No	94.0	1661

Table 16. Responses to the question, “Did you fish in freshwater with a guide in Virginia in the last 12 months?”

Response	%	n
Yes	4.8	85
No	95.2	1679

Table 17. Responses to the question, “In the last 12 months, what percent of your fishing trips were taken on your own, with family, or with friends or social groups?” Only responses totaling 100% considered for analysis.

Response	Mean (<i>SE</i>)	n
On your own	37.4 (0.9)	1055
With family	41.9 (1.0)	1160
With friends or social groups	20.7 (0.8)	790

Table 18. Responses to the question, “How unimportant or important are the following factors when you choose a location to go fishing?” Mean responses are based on a scale from Very Unimportant (1) to Very Important (5).

	Mean (<i>SE</i>)	Response % (<i>Count</i>)				
		Very Unimportant	-	Neutral	-	Very Important
Fishing location close to home	3.6 0.03	5.1 89	7.2 124	29.1 505	35.1 609	23.5 407
Knowing that many different fish species are present	3.5 0.03	5.5 95	12.0 208	29.2 506	36.6 635	16.7 289
Knowing that my target species is present	4.0 0.03	6.4 111	4.8 84	15.0 261	34.8 606	38.9 677
Free fishing access	3.9 0.03	5.8 100	5.7 98	18.9 328	29.1 504	40.5 701
Boat ramps available	3.2 0.03	13.9 240	17.7 306	28.1 486	19.2 332	21.1 364
Piers available	2.9 0.03	14.5 250	20.1 346	34.2 588	21.6 372	9.5 164
Restrooms available	3.0 0.03	13.2 229	17.9 310	34.8 601	19.9 345	14.1 244
The area is not crowded	4.0 0.02	3.0 52	3.7 65	18.4 319	44.0 763	30.8 535
The area is clean (litter free)	4.3 0.02	3.4 59	1.2 21	9.1 159	38.0 660	48.3 839
Fish are stocked regularly	3.3 0.03	7.5 129	12.4 214	37.9 651	23.9 411	18.3 314
Parking available	3.9 0.02	3.4 59	3.7 64	19.5 337	44.2 765	29.1 504
ADA-compliant fishing access is available	2.9 0.03	13.8 237	13.7 235	50.6 867	14.3 246	7.5 129
Regulations posted on site (signs on trees, at ramp)	3.5 0.03	7.9 137	8.0 138	30.3 525	33.9 588	19.9 345
Other [†]	3.4 0.05	5.9 24	4.7 19	58.9 238	8.2 33	22.3 90

[†]Other responses (n = 132): good water quality (12), safety (9), law enforcement presence (8), positive interactions with others (6), 24/7 fishing access (5), facilities in good condition (4), kayak access (3).

Table 19. Responses to the question, “Do you agree or disagree that the following **personal reasons** limit or prevent you from fishing more often?” Mean responses are based on a scale of Strongly disagree (1) to Strongly agree (5).

	Mean (<i>SE</i>)	Response % (<i>Count</i>)				
		Strongly disagree	-	Neither agree or disagree	-	Strongly agree
I don't know where to fish	2.6 <i>0.03</i>	21.4 <i>368</i>	29.8 <i>513</i>	24.2 <i>416</i>	19.1 <i>329</i>	5.5 <i>94</i>
I have too many work commitments	3.3 <i>0.03</i>	8.2 <i>140</i>	16.7 <i>286</i>	23.0 <i>393</i>	39.5 <i>676</i>	12.7 <i>217</i>
I have too many family commitments	3.1 <i>0.03</i>	7.9 <i>135</i>	21.2 <i>361</i>	34.3 <i>583</i>	30.2 <i>513</i>	6.4 <i>108</i>
Other recreational activities take up my time	2.9 <i>0.02</i>	9.0 <i>154</i>	26.0 <i>445</i>	33.5 <i>574</i>	28.6 <i>490</i>	3.0 <i>51</i>
I can't afford to fish more often	2.4 <i>0.03</i>	19.0 <i>324</i>	38.7 <i>661</i>	26.6 <i>455</i>	12.9 <i>221</i>	2.8 <i>48</i>
I don't have anyone to fish with me	2.4 <i>0.03</i>	22.1 <i>376</i>	36.0 <i>613</i>	27.4 <i>467</i>	11.6 <i>197</i>	2.9 <i>49</i>
Personal health concerns	2.1 <i>0.02</i>	35.8 <i>609</i>	32.8 <i>558</i>	22.6 <i>385</i>	6.6 <i>113</i>	2.2 <i>38</i>
Other [†]	3.0 <i>0.06</i>	8.9 <i>28</i>	9.3 <i>29</i>	62.0 <i>194</i>	6.4 <i>20</i>	13.4 <i>42</i>

[†]Other responses (n = 80): responses either align with next question or fall under options in the table.

Table 20. Responses to the question, “Do you agree or disagree that the following **external reasons** limit or prevent you from fishing more often?” Mean responses are based on a scale of Strongly disagree (1) to Strongly agree (5).

	Mean (<i>SE</i>)	Response % (<i>Count</i>)				
		Strongly disagree	-	Neither agree or disagree	-	Strongly agree
Fishing regulations are too confusing	2.5 0.03	15.4 262	37.4 635	31.4 534	13.1 222	2.8 47
License fees for fishing are too expensive	2.7 0.03	14.3 243	33.9 578	27.7 472	17.8 303	6.3 108
I can't catch enough fish to suite me	2.5 0.03	16.1 273	36.7 623	29.4 499	13.9 236	4.0 68
I don't have enough fishing opportunities close to home	2.7 0.03	13.9 238	36.1 617	24.8 424	20.4 348	4.8 82
Fishing regulations are too restrictive	2.4 0.02	14.9 253	42.4 720	32.0 543	8.5 144	2.2 37
The cost of fishing equipment and supplies is too high	3.0 0.03	7.9 135	28.0 477	31.3 533	25.3 432	7.4 127
Fishing facilities and areas are too crowded	3.0 0.02	5.0 85	25.2 430	38.2 652	24.9 425	6.7 115
Fishing facilities (ramps, piers, etc.) need improvement	3.1 0.03	7.0 119	20.8 353	40.3 685	24.0 408	7.9 135
Other [†]	3.2 0.06	6.1 17	6.1 17	66.4 184	6.5 18	14.8 41

[†]Other responses (n = 60): limited fishing access (10), fishing sites unsafe (4).

Table 21. Responses to the question, “Overall, how satisfied are you with the amount of time you spend freshwater fishing in Virginia?”

	Mean (<i>SE</i>)	Response % (<i>Count</i>)				
		Very Unsatisfied	-	Neither Satisfied or Unsatisfied	-	Very Satisfied
Satisfaction	2.7 0.03	14.3 246	38.6 664	18.4 316	20.0 344	8.8 151

Table 22. Responses to the question, “Please indicate the extent that you disagree or agree with the following statements about your freshwater fishing trips.” Mean responses are based on a scale of Strongly disagree (1) to Strongly agree (5).

	Mean (<i>SE</i>)	Response % (<i>Count</i>)				
		Strongly disagree	-	Neutral	-	Strongly agree
A successful fishing trip is one in which I catch many fish	3.1 0.02	4.7 79	22.8 387	33.0 559	32.6 553	6.9 117
Catching a big trophy fish is the biggest reward to me	2.9 0.03	9.0 152	29.1 492	32.5 550	19.3 326	10.2 173
A fishing trip is successful even if I do not catch any fish	3.7 0.03	2.4 41	11.3 191	18.0 304	49.7 837	18.5 312
I usually eat the fish I catch	2.5 0.03	24.8 420	29.9 505	19.1 323	18.6 315	7.5 127
I would rather catch 1 or 2 big fish than 10 smaller fish	3.1 0.03	4.3 73	24.8 417	36.5 614	24.8 417	9.5 159
I want to keep all the fish I catch	1.9 0.02	37.6 633	40.0 670	15.2 256	4.9 83	2.5 42
I’m happiest with the fishing trip if I catch a challenging fish	3.6 0.02	2.1 35	9.5 161	30.1 509	46.0 778	12.3 209
When I go fishing, I’m not satisfied unless I catch at least something	3.0 0.03	8.3 140	27.7 468	24.8 419	29.1 493	10.2 172
A successful trip is when I reach my catch or creel limit	2.5 0.03	17.2 290	35.2 594	33.0 558	11.2 189	3.4 58

Table 23. Responses to the question, “Rate the **performance** of the following functions of the Virginia Department of Wildlife Resources.” Mean responses are based on a scale of Very poor (1) to Very good (5). Mean and percent responses do not include responses of “Don’t know”.

	Mean (SE)	Response % (Count)					
		Don't know	Very Poor	-	Neither good or poor	-	Very good
Providing information about fishing regulations	4.0 0.02	- 41	0.6 10	4.0 65	18.0 289	50.2 809	27.1 437
Working with private landowners to open access to fishing water	3.0 0.03	- 343	7.6 96	17.3 219	47.3 597	19.9 251	7.8 99
Improving habitat for fish	3.5 0.03	- 201	3.3 47	10.2 145	30.8 438	40.8 579	14.9 211
Providing information about where to fish	3.5 0.03	- 97	4.0 61	14.2 219	28.6 439	36.0 554	17.2 264
Providing information about fish consumption advisories	3.6 0.03	- 177	2.9 42	9.0 130	29.1 422	39.3 570	19.8 287
Teaching youth to fish	3.6 0.03	- 273	3.4 46	8.1 110	34.4 466	34.6 468	19.4 263
Improving existing angler access for fishing	3.4 0.03	- 244	4.1 56	12.0 164	39.4 537	33.1 451	11.4 156
Determining the effects of regulation changes (size and creel limits) on fish species	3.5 0.02	- 268	2.2 29	6.2 83	42.4 570	34.9 470	14.3 193
Controlling nonnative, invasive aquatic species	3.4 0.03	- 304	4.5 59	11.3 148	40.1 524	31.3 408	12.7 166
Restoring native aquatic vegetation	3.4 0.03	- 352	3.6 45	11.5 143	42.6 531	30.2 376	12.0 150
Conserving native fish	3.6 0.03	- 247	2.3 32	8.6 118	32.7 447	40.4 553	15.9 217
Stocking warmwater fish (bass, stripers, catfish)	3.4 0.03	- 301	4.6 60	12.9 170	33.2 437	34.5 454	14.8 195
Stocking coldwater fish (trout)	3.6 0.03	- 261	2.9 39	8.6 116	29.9 404	39.0 526	19.6 265

Table 24. Responses to the question, “Within the last 12 months, have you hunted game or other wildlife in Virginia?”

Response	%	n
Yes	38.7	736
No	61.3	1165

Table 25. Responses to the question, “Within the last 12 months, did you take any trips or outings to any location more than one mile away from home within Virginia for the primary purpose of observing, photographing, or feeding wildlife?”

Response	%	n
Yes	36.4	691
No	63.6	1208

Table 26. Responses to the question, “Which of the following non-wildlife focused outdoor activities have you participated in within the past 12 months in Virginia?” Respondents could select more than one answer.

Response	%	n
Archery	27.8	505
Biking	24.9	451
Camping	46.1	837
Hiking or backpacking	45.3	822
Horseback riding	5.6	102
Motorized boating	30.2	548
Non-motorized boating (ex: kayaking or canoeing)	38.5	699
Swimming	40.8	741
Recreational shooting sports	30.6	555
Running, jogging, or walking	42.2	766
Winter sports	8.6	156
Viewing wildflowers	20.9	380
I do not participate in any of these activities	9.2	167
Other [†]	5.6	101

[†]Other responses (n = 56): Outdoor sports (15), foraging (8), ATV/off-roading (9), driving for sights (7), photography (4).

Table 27. Responses to demographic questions.

Demographics		
	Mean	SE
Age (Years)	43.8	0.09
	%	n
Gender		
Woman	18.0	334
Man	80.0	1480
Transgender	0.3	5
A gender not listed here (<i>write-in:</i>)	0.3	5
Prefer not to answer	1.5	27
Ethnicity		
Hispanic	4.5	80
Non-Hispanic	95.5	1694
Race		
American Indian or Alaska Native	2.3	41
Asian	2.4	44
Black or African American	6.4	117
Native Hawaiian or other Pacific Islander	0.5	9
White	89.7	1630
Other	2.6	47
Highest formal education		
Less than high school	4.3	79
High school diploma or equivalent	29.1	534
Some college, no degree	23.9	439
Associate degree	10.0	184
Bachelor's degree	19.9	366
Master's degree	8.5	156
Professional degree	2.0	36
Doctorate degree	2.4	44
Household Income		
Less than \$24,999	19.9	343
\$25,000 to \$49,999	22.1	382
\$50,000 to \$74,999	21.6	372
\$75,000 to \$99,999	14.8	256
\$100,000 to \$124,999	9.3	160
\$125,000 or more	12.3	212

Table 28. Responses to the question, "Which of the following best describes where you currently live?"

Response	%	n
Rural	51.9	952
Suburban	37.6	689
Urban	10.5	192

DISCUSSION AND MANAGEMENT IMPLICATIONS

The methodology for this project was implemented to achieve multiple objectives and return accurate statewide results for Virginia freshwater license holders. Two iterations of this survey have been conducted following the same methodology, allowing us to monitor trends in angler activities, preferences, and opinions over time. These results can be used across divisions at DWR, from Aquatics to Outreach, to address information gaps and identify areas of improvement. As we strive to serve the Commonwealth by managing Virginia's freshwater resources and providing recreational fishing opportunities, it is vitally important to collect data that is representative of the average Virginia freshwater license holder.

Future Research Efforts

The response rate for this survey is comparable to the previous Virginia Angler Surveys (Valdez and White, 2021), although lower than recent DWR survey efforts (Valdez and White, 2023; Valdez, 2022; White and Valdez, 2022). However, the declining trend observed in survey response rates extends beyond the field of human dimensions research and the impact is observed in research that utilizes surveys, regardless of industry (Stedman et al., 2019; US BLS, 2022). Response rates can be influenced by a variety of factors, some that can be altered to increase response rates, like survey design, and others that cannot, like perceived subject matter relevance or surveys delivered to the general population (Saleh and Bista, 2017; Stedman et al., 2019). Our response rate is impacted by the sampling scheme, because younger license holders are known to have lower survey response rates (Valdez and White, 2021; Appendix 3.3), however it is critical to maintain this sampling scheme so that results are representative of the entire population of Virginia freshwater license holders. Based on suggestions from Dillman et al. 2014, future efforts to combat declining responses rates to the Virginia Angler Survey should include offering incentives for all survey respondents, providing advanced communication efforts via DWR channels, utilizing branded emails and official letterheads, and providing contact information for survey assistance.

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APPENDICES

Appendix 1. 2022-2023 Angler Survey Questionnaire

1. In the last 12 months, how many **days** did you fish in Virginia and outside Virginia? (*Write 0 if you did not fish in that way*)

	In Virginia	Outside Virginia
Freshwater Fishing	_____ Days*	_____ Days
Saltwater Fishing	_____ Days	_____ Days

*If you spent **0 days freshwater fishing in Virginia** in the last 12 months, skip to Question 24.

2. In the last 12 months, how many different **freshwater sites** (rivers, streams, lakes, ponds) in Virginia did you fish at?

_____ **Sites**

3. In the last 12 months, what percent of your days did you spend fishing on each of the following types of water in Virginia? (*Answers should add to 100%*)

Public lakes or reservoirs, greater than 500 acres (ex: Smith Mountain, Kerr, Chesdin, Moomaw, Briery Creek)	_____ %
Public lakes or reservoirs, less than 500 acres	_____ %
Non-tidal rivers and streams above the fall line (non-trout streams)	_____ %
Tidal rivers below the fall line	_____ %
Public coldwater rivers and streams (trout streams) – Stocked by DWR	_____ %
Public coldwater rivers and streams (trout streams) – Wild trout streams	_____ %
Private lakes and ponds (including home-owner association ponds)	_____ %
Total =	_____ 100 %

4. In the last 12 months, did you freshwater fish at any of the following public lands in Virginia? (*Check all that apply*)

- National Forest
- DWR Lake or Wildlife Management Area (WMA)
- State Park
- State Forest

5. In the last 12 months, which of the following methods did you use while freshwater fishing in Virginia? (*Check all that apply*)

- Rod and reel
- Fly rod
- Jugs, set lines, set poles, etc.
- Bowfishing
- Microfishing
- Other (Please specify): _____

6. In the last 12 months, did you use live bait while freshwater fishing in Virginia?

- Yes
- No (If No, skip to Question 9)

7. If you used the types of live bait listed below in the last 12 months, indicate whether the bait was purchased from a retail store, captured/trapped, or both. (Check all that apply)

Type of bait	Purchased	Captured/Trapped
Bait fish (ex: minnows, chubs)	<input type="checkbox"/>	<input type="checkbox"/>
Crayfish	<input type="checkbox"/>	<input type="checkbox"/>
Salamanders	<input type="checkbox"/>	<input type="checkbox"/>
Worms	<input type="checkbox"/>	<input type="checkbox"/>
Freshwater mussels	<input type="checkbox"/>	<input type="checkbox"/>

8. If you used the types of live bait listed below in the last 12 months, indicate what you normally do with the live bait that are left over from a fishing trip. (Check all that apply)

Type of bait	Released	Destroyed	Saved for future fishing	Given away
Bait fish (ex: minnows, chubs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crayfish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Salamanders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Worms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Freshwater mussels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. In the last 12 months, what percent of your freshwater fishing activities were done in the following ways? (Answers should add to 100%)

- From a motorized boat _____%
- From a non-motorized boat (ex: canoe, kayak) _____%
- From a shore, pier, or a dock _____%
- By wading _____%
- Total = 100 %**

10. Are you a member of a fishing organization or fishing club? (Check all that apply)

- National fishing organization or club (ex: B.A.S.S.)
- Statewide fishing organization or club (ex: Virginia Anglers Club)
- Local fishing organization or club (ex: Central Virginia Sportfishing Association)
- Not a member of any fishing organization or fishing club

11. What is your freshwater fishing experience level?

- Beginner** – Very limited experience holding a rod and casting
- Novice** – Some experience with rod and casting techniques and beginning to experiment with different types of tackle
- Intermediate** – Comfortable with the rod, casting, and tackle selection in some settings
- Advanced** – Lots of experience with equipment and techniques in many settings
- Expert** – Very experienced with equipment and techniques in all settings

12. Please check the fish that you specifically fished for in freshwater in Virginia in the last 12 months. (Check all that apply)

- | | |
|---|---|
| <input type="checkbox"/> A: Smallmouth bass | <input type="checkbox"/> K: Walleye, Sauger, or Saugeye |
| <input type="checkbox"/> B: Largemouth bass | <input type="checkbox"/> L: Stocked trout (Brook, Rainbow, Brown, Tiger) |
| <input type="checkbox"/> C: Striped bass or Hybrid Striped bass | <input type="checkbox"/> M: Wild trout (not stocked Brook, Rainbow, Brown, Tiger) |
| <input type="checkbox"/> D: Panfish (bream, sunfish, rock bass) | <input type="checkbox"/> N: Northern pike or Chain pickerel |
| <input type="checkbox"/> E: Shad or herring | <input type="checkbox"/> O: Muskellunge |
| <input type="checkbox"/> F: White perch | <input type="checkbox"/> P: Yellow perch |
| <input type="checkbox"/> G: Crappie | <input type="checkbox"/> Q: Carp |
| <input type="checkbox"/> H: Flathead catfish | <input type="checkbox"/> R: Suckers |
| <input type="checkbox"/> I: Blue catfish | <input type="checkbox"/> S: Northern snakehead |
| <input type="checkbox"/> J: Channel catfish | <input type="checkbox"/> T: Anything that bites |
| | <input type="checkbox"/> U: Other (please specify): _____ |

13. From the list of fish species on the previous page, please write the letter of the species that you fish for the most often in freshwater in Virginia (example: write B for Largemouth Bass; write G for Crappie).

1st most often fished species _____
2nd most often fished species _____
3rd most often fished species _____

14. Have you consumed any freshwater fish that you caught in Virginia in the last 12 months?

- Yes
- No

15. Did you compete in any freshwater fishing tournaments in Virginia in the last 12 months?

- Yes
- No

16. Did you fish in freshwater with a guide in Virginia in the last 12 months?

- Yes
- No

17. In the last 12 months, what percent of your fishing trips were taken on your own, with family, or with friends or social groups? (Answers should add to 100%)

On your own _____ %
With family _____ %
With friends or social groups _____ %
Total = _____ **100 %**

18. How unimportant or important are the following factors when you choose a location to go fishing?
 (Check one answer for each statement)

	Very Unimportant	Unimportant	Neutral	Important	Very Important
Fishing location close to home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowing that many different fish species are present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowing that my target species is present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Free fishing access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boat ramps available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Piers available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restrooms available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The area is not crowded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The area is clean (litter free)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish are stocked regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parking available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ADA-compliant fishing access is available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regulations posted on site (signs on trees, at ramp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify below):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19. Do you agree or disagree that the following **personal reasons** limit or prevent you from fishing more often? (Check one answer for each statement)

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I don't know where to fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have too many work commitments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have too many family commitments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other recreational activities take up my time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can't afford to fish more often	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't have anyone to fish with me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal health concerns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify below):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Do you agree or disagree that the following **external reasons** limit or prevent you from fishing more often? (Check one answer for each statement)

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Fishing regulations are too confusing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
License fees for fishing are too expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can't catch enough fish to suit me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I don't have enough fishing opportunities close to home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishing regulations are too restrictive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The cost of fishing equipment and supplies is too high	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishing facilities and areas are too crowded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishing facilities (ramps, piers, etc.) need improvement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify below):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. Overall, how satisfied are you with the amount of time you spend freshwater fishing in Virginia?

Very Unsatisfied **Neither Satisfied or Unsatisfied** **Very Satisfied**
 1 2 3 4 5

22. Please indicate the extent that you disagree or agree with the following statements about your freshwater fishing trips. (Check one answer for each statement)

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
A successful fishing trip is one in which I catch many fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catching a trophy fish is the biggest reward to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A fishing trip is successful even if I do not catch any fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I usually eat the fish I catch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would rather catch 1 or 2 big fish than 10 smaller fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I want to keep all the fish I catch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'm happiest with the fishing trip if I catch a challenging fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I go fishing, I'm not satisfied unless I catch at least something	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A successful trip is when I reach my catch or creel limit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23. Rate the **performance** of the following functions of the Virginia Department of Wildlife Resources. (Check one answer for each statement)

	Don't know	Very poor	Poor	Neither good or poor	Good	Very good
Providing information about fishing regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working with private landowners to open access to fishing water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving habitat for fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Providing information about where to fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Providing information about fish consumption advisories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teaching youth to fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving existing angler access for fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Determining the effects of regulation changes (size and creel limits) on fish species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controlling nonnative, invasive aquatic species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring native aquatic vegetation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conserving native fish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stocking warmwater fish (bass, stripers, catfish)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stocking coldwater fish (trout)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In this part of the survey, we will be asking you about your wildlife recreation activities. By "**wildlife recreation**" we mean activities you do for enjoyment outside of work. **Wildlife** refers to all animals, such as birds, fish, insects, mammals, amphibians, and reptiles, that are living in natural or wild environments.

24. Within the last 12 months, have you hunted game or other wildlife in Virginia?

- Yes
- No

25. Within the last 12 months, did you take any trips or outings to any location more than one mile away from home within Virginia for the primary purpose of observing, photographing, or feeding wildlife? (**Do not** include trips to zoos, circuses, aquariums, museums, or scouting for game.)

- Yes
- No

26. We are also interested in your participation in other kinds of non-wildlife focused outdoor recreation activities. Which of the following non-wildlife focused outdoor activities have you participated in within the last 12 months in Virginia? (*Check all that apply*)

- | | |
|--|---|
| <input type="checkbox"/> Archery | <input type="checkbox"/> Non-motorized boating (ex: kayaking or canoeing) |
| <input type="checkbox"/> Biking | <input type="checkbox"/> Swimming |
| <input type="checkbox"/> Camping | <input type="checkbox"/> Recreational shooting sports |
| <input type="checkbox"/> Hiking or backpacking | <input type="checkbox"/> Running, jogging, or walking |
| <input type="checkbox"/> Horseback riding | <input type="checkbox"/> Winter sports |
| <input type="checkbox"/> Motorized boating | <input type="checkbox"/> Viewing wildflowers |
| <input type="checkbox"/> I do not participate in any of these activities | <input type="checkbox"/> Other (please specify): _____ |

27. In what year were you born? _____

28. What is your gender?

- Woman
- Man
- Transgender
- A gender not listed here (Please specify:) _____
- Prefer not to answer

29. What is your ethnicity?

- Hispanic
- Non-Hispanic

30. What is your race? *(Check all that apply)*

- | | |
|---|--|
| <input type="checkbox"/> American Indian or Alaska Native | <input type="checkbox"/> Native Hawaiian or other Pacific Islander |
| <input type="checkbox"/> Asian | <input type="checkbox"/> White |
| <input type="checkbox"/> Black or African American | <input type="checkbox"/> Other (Please specify): _____ |

31. What is your highest degree or level of school?

- | | | |
|--|--|--|
| <input type="checkbox"/> Less than high school | <input type="checkbox"/> Associate degree | <input type="checkbox"/> Professional degree |
| <input type="checkbox"/> High school diploma or equivalent | <input type="checkbox"/> Bachelor's degree | <input type="checkbox"/> Doctorate degree |
| <input type="checkbox"/> Some college, no degree | <input type="checkbox"/> Master's degree | |

32. What was your total individual income during the past 12 months?

- | | | |
|--|--|--|
| <input type="checkbox"/> Less than \$24,999 | <input type="checkbox"/> \$50,000 - \$74,999 | <input type="checkbox"/> \$100,000 - \$124,999 |
| <input type="checkbox"/> \$25,000 - \$49,999 | <input type="checkbox"/> \$75,000 - \$99,999 | <input type="checkbox"/> \$125,000 or more |

33. Which of the following best describes where you currently live?

- Rural
- Suburban
- Urban

If you have any further comments about freshwater fishing in Virginia, please share them in the space below.

Thank you for taking the time to complete this survey! If you have questions regarding this study or this survey, please contact surveys@dwr.virginia.gov.



CONSERVE. CONNECT. PROTECT.

Dear [First Name] [Last Name],

The Virginia Department of Wildlife Resources (DWR) serves the Commonwealth of Virginia by managing freshwater fish populations and providing fishing opportunities across the state. To improve our service across Virginia, DWR seeks input from anglers like you to better understand fishing effort and preferences. We are inviting you and a select number of anglers that purchased a fishing license in 2022 or 2023 to participate in the upcoming Virginia Angler Survey.

The Virginia Angler Survey will be mailed to you in the next few days, and it will cover questions about how often you fish, the types of fish and water bodies you prefer, and your views of DWR fisheries management. Even if you have not fished or fished very little in the past year, your responses are still important to us. To say thanks, we will include a small gift along with the questionnaire packet.

I am writing in advance because many people like to know ahead of time they will be asked to fill out a questionnaire and your response is valued. Your input directly impacts management decisions made at DWR, and the feedback you provide is very important for improving our services. Information from this survey is used to track trends in angler activities and preferences over time, and to better understand how fishing varies in different parts of the state.

Previous angler survey reports are on our website: www.dwr.virginia.gov/surveys/reports/. The results of this survey will be collected in a report and added to this website for public access. These reports are also shared with DWR biologists and staff and may be shared with other fish and wildlife professionals. If you have any questions or concerns about this study, please email surveys@dwr.virginia.gov.

Understanding anglers across the state is important to us, and the Virginia Angler Survey provides us with an opportunity to hear directly from you. Be on the lookout for the DWR Virginia Angler Survey in your mailbox soon and thank you in advance for your time and effort!

Sincerely,

Dr. Mike Bednarski, Chief of Fisheries

Appendix 3.1 Comparative test results of select fishing activities and demographic information between the UVA and DWR email respondents.

	UVA	DWR	Comparison		
			Stat. test	p value	Effect size
<i>Fishing Activities</i>					
Days freshwater fished in VA	25.2	28.7	W = 192294	0.511	Cliff's Δ = 0.03
Days freshwater fished outside VA	3.1	2.1	W = 114705	0.397	Cliff's Δ = -0.03
Days saltwater fished in VA	5.1	6.6	W = 163586	0.234	Cliff's Δ = 0.04
Days saltwater fished outside VA	2.1	2.4	W = 139695	0.404	Cliff's Δ = 0.03
Number of fishing locations	5.0	4.9	W = 88194	0.665	Cliff's Δ = -0.02
Fishing locations (% fished from)					
Motorized boat	44.9	52.6	$\chi^2 = 3.8738$	0.049	Cramer's V = 0.05
Non-motorized boat	33.6	30.0	$\chi^2 = 0.95155$	0.329	Cramer's V = 0.02
Shore, pier, dock	69.2	68.9	$\chi^2 = 0.00556$	0.941	Cramer's V < 0.01
Wading	34.3	27.9	$\chi^2 = 3.0041$	0.083	Cramer's V = 0.04
Fish consumption (% Yes)	41.7	45.2	$\chi^2 = 0.82674$	0.363	Cramer's V = 0.02
<i>Demographic Information</i>					
Age (Years)	45.0	45.6	W = 216342	0.5928	Cliff's Δ = 0.02
Gender (% Women)	10.8	10.7	$\chi^2 = <0.001$	0.998	Cramer's V < 0.01
Ethnicity (% Hispanic)	3.8	2.3	$\chi^2 = 1.0357$	0.309	Cramer's V = 0.02
Race (% White)	89.9	91.3	$\chi^2 = 0.32327$	0.5696	Cramer's V = 0.01
Education (% Bachelor's Degree or Higher)	39.5	41.1	$\chi^2 = 0.17332$	0.677	Cramer's V = 0.01
Income (% \$75,000 or higher)	46.1	50.3	$\chi^2 = 1.0681$	0.3014	Cramer's V = 0.03

Appendix 3.2 Comparative test results of age, DWR region, gender, and license purchase avidity between the eligible population and survey respondents using data from the Go Outdoors Virginia (GOV) database.

	Respondents	Population	Statistical Test	p value	Effect Size
Age (Years)	46.5	43.3	$t = -10.0$	< 0.001	Cohen's D = -0.21
Gender (% Women)	15.3	19.1	$\chi^2 = 22.77$	< 0.001	Cramer's V = 0.01
License Purchase Avidity (% Avid)	46.4	35.1	$\chi^2 = 130.0$	< 0.001	Cramer's V = 0.02
DWR Region:			$\chi^2 = 0.755$	0.86	Cramer's V < 0.001
Region 1 (%)	30.8	30.7			
Region 2 (%)	17.8	17.4			
Region 3 (%)	13.6	13.3			
Region 4 (%)	37.8	38.6			

Appendix 3.3 Response rates per age quartile of survey respondent

Age Quartiles for Sample	Response Rate (%)	n
1 (18-31 years)	4.8	451
2 (32-43 years)	7.3	591
3 (44-55 years)	10.5	548
4 (56-85 years)	17.8	757